

**ORGANISATION FOR CO-OPERATION BETWEEN
RAILWAYS
(OSJD)**



RULES FOR THE CARRIAGE OF DANGEROUS GOODS

ANNEX 2

**TO THE AGREEMENT ON INTERNATIONAL RAILWAY FREIGHT
COMMUNICATIONS**

(SMGS)

As of 1 July 2025

TABLE OF CONTENTS

VOLUME I

		Page
Part 1	General requirements	1-1
1.1	Scope of application	1-1
1.2	Terms and definitions, units of measurement, and acronyms (abbreviations).....	1-11
1.3	Training of persons involved in the carriage of dangerous goods	1-35
1.4	Safety obligations of the participants in the carriage of dangerous goods.....	1-38
1.5	Derogations	1-44
1.6	Transitional measures	1-45
1.7	General provisions concerning radioactive material	1-61
1.8	Checks and other support measures to ensure compliance with safety requirements	1-65
1.9	Restrictions on carriage imposed by the competent authorities	1-92
1.10	Security provisions	1-93
1.11	Internal emergency plans for marshalling yards.....	1-99
Part 2	Classification	2-1
2.1	General provisions	2-1
2.2	Class specific provisions.....	2-11
2.3	Test methods	2-154

TABLE OF CONTENTS

VOLUME II

		Page
Part 3	List of dangerous goods, special provisions and exemptions related to limited and excepted quantities.....	3.1-1
3.1	General provisions	3.1-1
3.2	List of dangerous goods	3.2-1
	Table A	3.2 A-1
	Table B	3.2 B-1
3.3	Special provisions applicable to certain articles or substances	3.3-1
3.4	Dangerous goods packed in limited quantities	3.4-1
3.5	Dangerous goods packed in excepted quantities	3.5-1

TABLE OF CONTENTS

VOLUME III

		Page
Part 4	Packing and tank provisions	4.1-1
4.1	Use of packagings, including intermediate bulk containers (IBCs) and large packagings.....	4.1-1
4.2	Use of portable tanks and UN multiple-element gas containers (MEGCs).....	4.2-1
4.3	Use of tank-wagons, demountable tanks, tank-containers and tank swap bodies with shells made of metallic materials, and battery-wagons and multiple-element gas containers (MEGCs).....	4.3-1
4.4	(Reserved).....	4.4-1
4.5	Use of vacuum-operated waste tanks (filled by the vacuum method).....	4.5-1
Part 5	Consignment procedures.....	5-1
5.1	General provisions.....	5-1
5.2	Marking and labelling.....	5-8
5.3	Placarding and markings on the wagons, containers, bulk containers, tank-wagons tank-containers, MEGC, portable tanks.....	5-22
5.4	Transport documentation.....	5-33
5.5	Special provisions.....	5-51

TABLE OF CONTENTS (continued)		Page
Part 6	Requirements for the construction and testing of packagings, intermediate bulk containers (IBCs), large packagings and tanks.....	6.1-1
6.1	Requirements for the construction and testing of packagings.....	6.1-1
6.2	Requirements for the construction and testing of pressure receptacles, aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas.....	6.2-1
6.3	Requirements for the construction and testing of packagings for class 6.2 infectious substances of category A (UN Nos. 2814 and 2900).....	6.3-1
6.4	Requirements for the construction, testing and approval of packages for radioactive material and for the approval of such material.....	6.4-1
6.5	Requirements for the construction and testing of intermediate bulk containers (IBCs).....	6.5-1
6.6	Requirements for the construction and testing of large packagings.....	6.6-1
6.7	Requirements for the design, construction, inspection and testing of portable tanks and UN multiple element gas containers (UN MEGCs).....	6.7-1
6.8	Requirements for the construction, equipment, type approval, inspections and tests, and marking of tank-wagons (except for tank-wagon designed to be operated on 1520 mm gauge railways), demountable tanks and tank-containers and tank swap bodies, with shells made of metallic materials, and battery-wagons and multiple element gas containers (MEGCs).....	6.8-1
6.9	Requirements for the design, construction, inspection, and testing of portable tanks with shells made of fibre-reinforced plastics (FRP) materials	6.9-1

TABLE OF CONTENTS (continued)		Page
6.10	Requirements for the construction, equipment, type approval, inspection and marking of vacuum-operated waste tanks.....	6.10-1
6.11	Requirements for the design, construction, inspection and testing of bulk containers.....	6.11-1
6.12 – 6.19	(Reserved)	
6.20	Requirements for the construction, equipment, compliance verification (type approval), inspections and tests, and marking of tank-wagons with shells made of metallic materials designed to be operated on 1520mm gauge railways.....	6.20-1
Part 7	Provisions concerning the conditions of carriage, loading, unloading and handling of goods.....	
7.1	General provisions	7-1
7.2	Provisions concerning carriage in packages.....	7-2
7.3	Provisions concerning carriage in bulk	7-4
7.4	Provisions concerning carriage in tanks	7-9
7.5	Provisions concerning loading, unloading and handling	7-9
7.6	(Reserved)	7-25
7.7	(Reserved)	7-25

PART 1 GENERAL REQUIREMENTS

CHAPTER 1.1 SCOPE OF APPLICATION

1.1.1 STRUCTURE

Annex 2 to SMGS is composed of seven parts. Each part is divided into chapters, articles and paragraphs.

1.1.2 SCOPE OF APPLICATION

1.1.2.1 In compliance with Article 9 "Rules for the transport of dangerous goods these rules shall apply to the international carriage of dangerous goods by rail and regulate:

a) conditions for the carriage of dangerous substances and articles including:

- classification, classification criteria and test procedures;
- packaging and labelling as well as requirements at the mixed packing;
- use of tanks, its filling and labelling;
- consignment procedures, execution of transport documents;
- requirements at the construction, testing and approval of packagings and tanks;
- use of wagons and containers;
- requirements concerning loading, unloading and handling of goods as well as of consolidated cargo

b) list of dangerous goods which are not allowed to be carried.

1.1.2.2 (Reserved)

1.1.2.3 For the carriage of dangerous goods as hand luggage, registered luggage in passenger cars only the provisions of 1.1.3.8 shall apply.

1.1.3 EXEMPTIONS

1.1.3.1 General exemptions

The provisions laid down in Annex 2 to SMGS shall not apply to:

a) 1) the carriage of dangerous goods by private individuals where the goods in question are packaged for retail sale and are intended for their personal or domestic use or for their leisure or sporting activities, provided that measures have been taken to prevent any leakage of contents in normal conditions of carriage. When these goods are flammable liquids carried in refillable receptacles filled by, or for, a private individual, the total quantity shall not exceed 60 litres per receptacle. Dangerous goods in intermediate bulk containers, large packagings or tanks are not considered to be packaged for retail sale or to be intended for the personal or domestic use or for the leisure or sporting activities;

2) The carriage of dangerous goods by private individuals in the limits defined in paragraph (a) (i) intended initially for their personal or domestic use or for their leisure or sporting activities and which are carried as waste, including the cases when these dangerous goods are no longer packaged in the original package for retail sale, provided that measures have been taken to prevent any leakage under normal conditions of carriage

b) (reserved);

c) the carriage undertaken by enterprises which is ancillary to their main activity, such as deliveries to or returns from building or civil engineering sites, or in relation to surveying, repairs and maintenance, in quantities of not more than 450 litres per packaging, including IBCs and large packagings, and within the maximum quantities

specified in 1.1.3.6. Measures shall be taken to prevent any leakage of contents in normal conditions of carriage. Carriage undertaken by such enterprises for their supply or external or internal distribution does not fall within the scope of this exemption. These exemptions shall also not apply to Class 7;

- d) the carriage undertaken by the competent authorities for the emergency response or under their supervision, insofar as such carriage is necessary in relation to the emergency response, in particular carriage undertaken to contain and collect the dangerous goods involved in an incident or accident and move them to the nearest appropriate safe place;
- e) emergency transport intended to save human lives or protect the environment, undertaken by the competent authority for the emergency response or under their supervision, provided that all measures are taken to ensure that such transport is carried out in complete safety;
- f) the carriage of uncleaned empty static storage vessels which have contained gases of Class 2, groups A, O or F, substances of Class 3 or Class 9 belonging to packing group II or III or pesticides of Class 6.1 belonging to packing group II or III, provided the conditions set out below are satisfied:
 - all openings with the exception of pressure relief devices (when fitted) are hermetically closed;
 - measures have been taken to prevent any leakage of contents in normal conditions of carriage;
 - the load is fixed in cradles or crates or other handling devices or to the wagon or container in such a way that it will not shift during normal conditions of carriage.

This exemption shall not apply to the static storage vessels which have contained desensitized explosives or substances the carriage of which is prohibited by Annex 2 to SMGS.

Note: For radioactive material see also 1.7.1.4.

1.1.3.2 Exemptions related to the carriage of gases

The provisions laid down in Annex 2 to SMGS shall not apply to the carriage of:

- a) gases contained in the fuel tanks or fuel tanks of railway vehicles performing a transport operation and destined for their propulsion or for the operation of any of their equipment used or intended for use during carriage (e.g. refrigerating equipment);

Note: A container fitted with equipment for use during carriage, secured on a railway vehicle, is considered as an integral part of the railway vehicle. The fuel necessary to operate the equipment benefits from the same exemptions.

- b) (reserved);
- c) gases of Groups A and O (according to 2.2.2.1), if the pressure of the gas in the receptacle or tank at a temperature of 20°C does not exceed 200 kPa (2 bar) and if the gas is not a liquefied or a refrigerated liquefied gas. This includes every kind of receptacle or tank, e.g. also parts of machinery and apparatus;

Note: This exemption shall not apply to lamps. For lamps see 1.1.3.10.

- d) gases contained in the equipment used for the operation of the vehicle (e.g. fire extinguishers), including in spare parts (e.g. inflated pneumatic tyres); this exemption also applies to inflated pneumatic tyres carried as a load;
- e) gases contained in the special equipment of wagons or vehicles carried as a load and necessary for the operation of this special equipment during transport (cooling systems, fish-tanks, heaters, etc.) as well as spare receptacles for such equipment or uncleaned empty exchange receptacles, transported in the same wagon or vehicle;
- f) gases contained in foodstuffs (except UN 1950), including carbonated beverages;
- g) gases contained in balls intended for use in sports; and

h) (reserved)

1.1.3.3 Exemptions related to the carriage of liquid fuels

The provisions laid down in Annex 2 to SMGS shall not apply to the carriage of:

- a) fuel contained in the fuel tanks of railway vehicles performing a transport operation and destined for their propulsion or for the operation of any of their equipment used or intended for use during carriage (e.g. refrigerating equipment);

Note: A container fitted with equipment for use during carriage, secured on a railway vehicle, is considered as an integral part of the railway vehicle. The fuel necessary to operate the equipment benefits from the same exemptions.

b) (reserved)

c) (reserved)

1.1.3.4 Exemptions related to special provisions or to dangerous goods packed in limited or excepted quantities

Note: For radioactive material see also 1.7.1.4.

1.1.3.4.1 Special provisions of Chapter 3.3 exempt partially or totally the carriage of specific dangerous substances and articles from the requirements of Annex 2 to SMGS. The exemption applies when the special provision is referred to in Column (6) of Table A of Chapter 3.2.

1.1.3.4.2 Certain dangerous goods may be exempted from the requirements of Annex 2 to SMGS provided that the conditions of Chapter 3.4 are met.

1.1.3.4.3 Certain dangerous goods may be exempted from the requirements of Annex 2 to SMGS provided that the conditions of Chapter 3.5 are met.

1.1.3.5 Exemptions related to empty uncleaned packagings

The requirements of Annex 2 to SMGS shall not apply to empty uncleaned packagings (including IBCs and large packagings) which have contained substances of Classes 2, 3, 4.1, 5.1, 6.1, 8 and 9 provided adequate measures have been taken to nullify any hazard. Hazards shall be deemed to be nullified provided adequate measures have been taken to nullify all hazards of Classes 1 to 9.

1.1.3.6 Quantity of packed goods transported by wagon or large container being subject to requirements or exemptions of Annex 2 to SMGS.

Note 1: This paragraph shall apply when it is referred to in other provisions of Annex 2 to SMGS (in Chapters 1.8 and 1.10 as well as in paragraph 1.1.3.1 c) etc.).

Note 2: Transport category is a category which is assigned to specific goods depending on its hazard risk

1.1.3.6.1 (reserved)

1.1.3.6.2 (reserved)

1.1.3.6.3 The provisions of paragraph 1.1.3.1 c) may apply if the total quantity of dangerous goods of the same transport category transported by wagon or large container does not exceed the quantity indicated in column (3) of the table below.

Some requirements (for example provisions of paragraph 1.8.3 and Chapter 1.10) shall apply if the values indicated in column (3) of the table below are exceeded.

Transport category	Substances or articles (UN No., classification code/ group, packing group)	Total quantity per wagon or large container ^{b)}
(1)	(2)	(3)
0	Class 1: 1.1L, 1.2L, 1.3L and UN No. 0190 Class 3: UN No. 3343 Class 4.2: Substances belonging to packing group I Class 4.3: UN Nos. 1183, 1242, 1295, 1340, 1390, 1403, 1928, 2813, 2965, 2968, 2988, 3129, 3130, 3131, 3132b 3134, 3148, 3396, 3398 and 3399 Class 5.1: UN No.2426 Class 6.1: UN Nos. 1051, 1600, 1613, 1614, 2312, 3250 and 3294 Class 6.2: UN Nos. 2814, 2900 and 3549 Class 7: UN Nos. 2912 to 2919, 2977, 2978 and 3321 to 3333 Class 8: UN No. 2215 MALEIC ANHYDRIDE, MOLTEN Class 9: UN Nos. 2315, 3151, 3152, 3432 and articles containing such substances or mixtures, and empty uncleaned packagings, except those classified under UN No. 2908, having contained substances classified in this transport category	0
1	Substances and articles belonging to packing group I and not classified in transport category 0, and substances and articles of the following classes: Class 1: classification codes: 1.1B - 1.1J^{a)}, 1.2B - 1.2J, 1.3C, 1.3G, 1.3H, 1.3J and 1.5D^{a)} Class 2: groups: "T", "TC"^{a)}, "TO", "TF", "TOC"^{a)}, and "TFC" aerosols: groups: "C", "CO", "FC", "T", "TF", "TC", "TO", "TFC", and "TOC" chemicals under pressure: UN Nos.3502, 3503, 3504 and 3505 Class 4.1: UN Nos. 3221 to 3224 Class 5.2: UN Nos. 3101 to 3104	20
2	Substances belonging to packing group II and not classified in transport categories 0, 1 or 4 and substances of the following classes: Class 1: with classification codes: 1.4B to 1.4G and 1.6N Class 2: group «F» aerosols: group «F» chemicals under pressure: UN No. 3501 Class 4.1: UN Nos. 3225 to 3230 Class 4.3: UN No. 3292 Class 5.1: UN No. 3356 Class 5.2: UN Nos. 3105 to 3110, 3531, 3532 Class 6.1: UN Nos.1700, 2016 and 2017 articles belonging to packing group III Class 6.2: UN No. 3291 Class 9: UN Nos. 3090, 3091, 3245, 3480, 3481, 3536, 3551, 3552	333
3	Substances belonging to packing group III and not classified in transport categories 0, 2 or 4, as well as articles of the following classes: Class 2: groups "A" and "O"	1000

Transport category	Substances or articles (UN No., classification code/ group, packing group)	Total quantity per wagon or large container ^{b)}
(1)	(2)	(3)
	aerosols: groups: "A" and "O" chemicals under pressure: UN No. 3500 Class 3: UN No. 3473 Class 4.3: UN No. 3476 Class 8: UN Nos. 2794, 2795, 2800, 3028, 3477, 3506, and 3554 Class 9: UN Nos. 2990 and 3072	
4	Class 1: 1.4S Class 2: UN Nos. 3537 to 3539 Class 3: UN No. 3540 Class 4.1: UN Nos. 1331, 1345, 1944, 1945, 2254, 2623 and 3541 Class 4.2: UN Nos. 1361 and 1362, packing group III and 3542 Class 4.3: UN No. 3543 Class 5.1: UN No. 3544 Class 5.2: UN No. 3545 Class 6.1: UN No. 3546 Class 7: UN Nos. 2908 to 2911 Class 8: UN No. 3547 Class 9: UN No. 3268, 3499, 3508, 3509, 3548, and 3559 and empty, uncleaned packagings having contained dangerous goods, except for those classified in transport category 0	unlimited

^{a)} For UN Nos. 0081, 0082, 0084, 0241, 0331, 0332, 0482, 1005 and 1017, the total quantity per wagon or large container shall be 50 kg.

^{b)} In the above table, the term "total quantity per wagon or large container" means:

- for articles, total mass in kilograms of the articles without their packagings (for articles of Class 1, net mass in kilograms of the explosive substance; for dangerous goods in machinery and equipment specified in Annex 2 to SMGS, the total quantity of dangerous goods contained therein in kilograms or litres as appropriate;
- for solids, liquefied gases, refrigerated liquefied gases and dissolved gases, net mass in kilograms;
- for liquids, the total quantity of dangerous goods contained in litres;
- for compressed gases, adsorbed gases and chemicals under pressure, the water capacity of the receptacle in litres.

1.1.3.6.4 If dangerous goods of different transport categories are carried in the same wagon or large container, and the sum of

- the quantity of substances and articles of transport category 1 multiplied by "50",
 - the quantity of substances and articles of transport category 1 referred to in Note a to the table in 1.1.3.6.3 multiplied by "20";
 - the quantity of substances and articles of transport category 2 multiplied by "3",
- and
- the quantity of substances and articles of transport category 3
- exceeds a calculated value of "1000", then in these cases some requirements have to be met (for example, provisions of 1.8.3 and Chapter 1.10).

1.1.3.6.5 For the purposes of 1.1.3.6 dangerous goods exempted from provisions of Annex 2 to SMGS in accordance with 1.1.3.1 (a), (b) and (d) to (f), 1.1.3.2 to 1.1.3.5, 1.1.3.7 to 1.1.3.10 shall not be taken into account.

1.1.3.7 Exemptions related to the carriage of electric energy storage and production systems

The provisions laid down in Annex 2 to SMGS do not apply to electric energy storage and production systems (e.g. lithium batteries, electric capacitors, asymmetric capacitors, metal hydride storage systems, fuel cells, etc.):

- a) installed in a railway vehicle, performing a transport operation and destined for its propulsion or for the operation of any of its equipment;
- b) contained in equipment for the operation of this equipment used or intended for use during carriage (e.g. a laptop except for equipment such as data loggers and cargo tracking devices attached to or placed in packages, overpacks, containers or load compartments which are only subject to the requirements in 5.5.4);
- c) (reserved)

1.1.3.8 Application of the exemptions in the carriage of dangerous goods as hand luggage, registered luggage or in or on board vehicles

Note: *The provisions of this article do not preclude the application of additional restrictions imposed by national law and/or by passenger operators in compliance with contract of carriage falling within scope of contractual law.*

For the carriage of dangerous goods as hand luggage, registered luggage or in or on board vehicles, the exemptions in accordance with 1.1.3.1, 1.1.3.2 c) to g), 1.1.3.4 - 1.1.3.5, 1.1.3.7 and 1.1.3.10 shall apply.

1.1.3.9 Exemptions related to dangerous goods used as a coolant or conditioner during carriage

When used in wagons or containers for cooling or conditioning purposes, dangerous goods that are only asphyxiant (which dilute or replace the oxygen normally in the atmosphere) are only subject to the provisions of section 5.5.3.

1.1.3.10 Exemptions related to the carriage of lamps containing dangerous goods

The following lamps are not subject to Annex 2 to SMGS provided that they don't contain radioactive material and don't contain mercury in quantities above those specified in special provision 366 of Chapter 3.3:

- a) lamps that are collected directly from individuals and households when carried to a collection or recycling facility;

Note: *This also includes lamps brought by individuals to a first collection point, and then carried to another collection point, intermediate processing or recycling facility.*

- b) Lamps each containing not more than 1 g of dangerous goods and packaged so that there is not more than 30 g of dangerous goods per package that:

- 1) the lamps are manufactured according to a certified quality management system;

Note: *ISO 9001 may be used for this purpose*

- 2) each lamp is either individually packed in inner packagings, separated by dividers, or surrounded with cushioning material to protect the lamps and packed into strong outer packagings meeting the general provisions of 4.1.1.1 and capable of passing a 1.2 m drop test;

- c) Used, damaged or defective lamps each containing not more than 1 g of dangerous goods with not more than 30 g of dangerous goods per package when carried from a collection or recycling facility. The lamps shall be packed in strong outer packagings sufficient for preventing release of the contents under normal conditions of carriage meeting the general provisions of 4.1.1.1 and that are capable of passing a drop test of not less than 1.2 m;
- d) Lamps containing only gases of Groups A and O (according to 2.2.2.1) provided they are packaged so that the projectile effects of any rupture of the lamp will be contained within the package.

Note: Lamps containing radioactive material are addressed in 2.7.2.2.2 b).

1.1.4 APPLICABILITY OF OTHER REGULATIONS

1.1.4.1 General provisions

1.1.4.1.1 International carriage on the territory of any Contracting State may be subject to national regulations or prohibitions. Such regulations or prohibitions shall be published in an appropriate manner.

1.1.4.1.2 (Reserved)

1.1.4.1.3 (Reserved)

1.1.4.2 Carriage in a transport chain including maritime or air carriage

1.1.4.2.1 Packages, containers, bulk containers, portable tanks, tank-containers and MEGCs and wagons containing a wagon load made up of packages containing one and the same substance or articles, which do not entirely meet the requirements for packing, mixed packing, marking, labelling of packages or placarding and orange plate marking of Annex 2 to SMGS, but are in conformity with the requirements of the IMDG Code or the ICAO Technical instructions shall be accepted for carriage in a transport chain including maritime or air carriage subject to the following conditions:

- a) If the packages are not marked and labelled in accordance with Annex 2 to SMGS, they shall bear marks and danger labels in accordance with the requirements of the IMDG Code or the ICAO Technical Instructions;
- b) The requirements of the IMDG Code or the ICAO Technical Instructions shall be applicable to mixed packing within a package;
- c) For carriage in a transport chain including maritime carriage, if the containers, bulk containers, portable tanks, tank-containers or MEGCs or wagons containing a wagon load made up of packages containing one and the same substance or article are not marked and placarded in accordance with Chapter 5.3 of Annex 2 to SMGS, they shall be marked and placarded in accordance with Chapter 5.3 of the IMDG Code. For empty, uncleaned portable tanks, tank-containers and MEGCs, this requirement shall apply up to and including the subsequent transfer to a cleaning station.

This derogation does not apply in the case of goods classified as dangerous goods in classes 1 to 9 of Annex 2 to SMGS and considered as non-dangerous goods according to the applicable requirements of the IMDG Code or the ICAO Technical Instructions.

1.1.4.2.2 (reserved)

1.1.4.2.3 (reserved)

Note: For carriage in accordance with 1.1.4.2.1 see also 5.4.1.1.7; for carriage in containers, see also 5.4.2.

1.1.4.3 Use of IMO type portable tanks approved for maritime transport

IMO type portable tanks (types 1, 2, 5 and 7) which don't meet the requirements of Chapters 6.7 or 6.8, but which were built and approved before 1 January 2003 in accordance with the provisions of the IMDG Code (amendments 29-98) may continue to be

used provided that they meet the applicable periodic inspection and test provisions of the IMDG Code¹¹. In addition, they shall meet the provisions corresponding to the instructions set out in columns (10) and (11) of Table A in Chapter 3.2 and the provisions of Chapter 4.2 of Annex 2 to SMGS. See also 4.2.0.1 of the IMDG Code.

1.1.4.4 Piggyback transport

1.1.4.4.1 Dangerous goods may also be carried in piggyback transport under the following conditions:

Road vehicles and their contents handed over for transport in piggyback transport shall meet the provisions of ADR.

The following shall not be permitted:

- explosives of Class 1, compatibility group A (UN Nos. 0074, 0113, 0114, 0129, 0130, 0135, 0224 and 0473);
- self-reactive substances of Class 4.1 requiring temperature control (UN Nos. 3231 to 3240);
- polymerizing substances of classes 1 to 8 in packagings or IBCs with a self-accelerating decomposition temperature (SAPT) $\leq 50^{\circ}\text{C}$ and polymerizing substances in tanks with an SAPT $\leq 45^{\circ}\text{C}$, therefore requiring temperature control;s
- organic peroxides of Class 5.2 requiring temperature control (UN Nos. 3111 to 3120);
- sulphur trioxide of Class 8 at least 99.95% pure, without inhibitor, carried in tanks (UN No. 1829).

1.1.4.4.2 Placards, marks or orange-coloured plates on wagons carrying road vehicles

It is not necessary to affix placards, marks or orange-coloured plates to carrying wagons in the following cases:

- a) when road vehicles bear the placards, marks or orange-coloured plates in accordance with chapters 5.3 or 3.4 of ADR;
- b) when placards, marks or orange-coloured plates are not required for road vehicles (e.g. in accordance with 1.1.3.6 or the Note to 5.3.2.1.5 of ADR).

1.1.4.4.3 Carriage of trailers carrying packages

If a trailer becomes separated from its tractor unit, the orange-coloured plate in accordance with 5.3.2 of ADR and the mark in accordance with Chapter 3.4 of ADR affixed at the rear of the trailer shall also be affixed to its front. However, the orange-coloured plate need not be affixed to the front of the trailer if the corresponding placards are affixed to both sides.

1.1.4.4.4 Repetition of placards, marks or orange-coloured plates on wagons carrying road vehicles

If the affixed placards, marks or orange-coloured plates in accordance with 1.1.4.4.2 are not visible from outside the carrying wagon, they shall be affixed to both sides of the wagon carrying transport units or trailers.

1.1.4.4.5 Information in the consignment note

For carriage in piggyback transport in accordance with 1.1.4.4, the following shall be entered in the consignment note:

1. The International Maritime Organization (IMO) has issued "Guidance on the Continued Use of Existing IMO Type Portable Tanks and Road Tank Vehicles for the Transport of Dangerous Goods" as CCC.1/Circ.3. The text of this guidance can be found on the IMO website at: www.imo.org

"Carriage in accordance With 1.1.4.4"

The road vehicle and the dangerous goods carried on it shall be identified in the transport document (see 5.4.0.1).

For the carriage of tanks or dangerous goods in bulk for which ADR prescribes an orange-coloured plate with the hazard identification number, the hazard identification number shall be entered in the transport document before the letters "UN" preceding the UN number (see 5.4.1.1.1 (a)).

1.1.4.4.6 All the other provisions of Annex 2 to SMGS remain unaffected.

1.1.4.5 Carriage other than by rail

1.1.4.5.1 If the wagon carrying dangerous goods is carried by maritime on one of the sections of the journey, then national or international rules governing the carriage of goods by sea shall be applicable to the said section of the journey.

1.1.4.5.2 (reserved)

1.1.4.5.3 (reserved)

1.1.4.6 Consignments into or through the territory of the state applying the provisions of RID

If carriage in accordance with RID follows carriage in accordance with Annex 2 to SMGS, the provisions of RID shall apply to this section of the journey located in the territory of the state applying the provisions of RID.

In this case, the marks for packages, overpacks, tank-wagons and tank-containers as well as the information to be provided in accordance with Annex 2 to SMGS in the documents attached to the consignment note can also, in addition to the languages prescribed in Annex 2 to SMGS, be in English, German or French, unless otherwise stipulated in the agreements concluded between the countries concerned in the transport operation.

Note: *The provisions of this paragraph shall apply to labelling and marking of packages in compliance with 5.2.1.5 and 5.5.3.4 and of overpacks in compliance with 5.1.2.1 a), of tank-wagons and tank-containers in compliance with 5.5.2.3, 5.5.3.6, 6.8.3.5.6 d) and 6.8.4 e). These provisions shall also apply to the information to be provided in the documents attached to the consignment note in compliance with 5.4.1.2.1 c), d), g) and 5.4.1.2.3.3.*

1.1.5 Application of standards

Where the application of a standard is required and there is any conflict between the standard and the provisions of Annex 2 to SMGS, the provisions of Annex 2 to SMGS take precedence.

Titles of standards mentioned in Annex 2 to SMGS may differ from titles of standards mentioned in other international documents. The number of standard plays an important role here. The requirements of the concrete standard, which are not inconsistent with and contrary to the provisions of Annex 2 to SMGS as well as the requirements of other standards or its parts, to which a reference is made in that concrete standard, shall be applied in accordance with the procedures laid down.

Note: *A standard provides details on how to meet the provisions of Annex 2 to SMGS and may include requirements in addition to those set out in Annex 2 to SMGS.*

1.1.6 List of technical documents and regulations

Additional technical requirements to be applied by the SMGS Contacting States on their own territory in order to ensure the safety of transport of dangerous goods and fulfill the

requirements of Annex 2 to SMGS are listed in the list of technical documents and regulations (hereinafter referred to as the "*List*") to be applied additionally for the purpose of implementing the provisions and requirements of Annex 2 to SMGS.

The technical documents and regulations, which are listed in *the List*, shall be applied by the SMGS Contracting States mentioned in the column 5 of *this List*. The SMGS Contracting States, which are not mentioned in the column 5 of *this List*, are not bound by these technical documents and regulations, which can be used only as recommendation for them.

Amendments and changes to *the List* shall be made and published in compliance with the procedure laid down in Article 56. Amendments and changes to *the list* shall take effect at the same time as the appropriate amendments and changes to Annex 2 to SMGS.

CHAPTER 1.2

TERMS and DEFINITIONS, UNITS OF MEASUREMENT, AND ACRONYMS (ABBREVIATIONS)

1.2.1 TERMS AND DEFINITIONS

For the purposes of Annex 2 to SMGS, terms and definitions are used as follows:

A

Aerosol or aerosol dispenser: see **Aerosol packaging**.

B

Bag means a flexible packaging made of paper, plastics film, textiles, woven material or other suitable material.

Battery-wagon means a wagon containing elements which are linked to each other by a manifold and permanently fixed to this wagon. The following elements are considered to be elements of a battery-wagon: cylinders, tubes, bundles of cylinders (also known as frames), pressure drums as well as tanks destined for the carriage of gases as defined in 2.2.2.1.1 with a capacity of more than 450 litres;

Body (for all categories of IBC other than composite IBCs) means the receptacle proper, including openings and closures, but does not include service equipment.

Box means a packaging with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fibreboard, plastics or other suitable material. Small holes for purposes of ease of handling or opening or to meet classification requirements, are permitted as long as they do not compromise the integrity of the packaging during carriage.

Bulk container means a containment system (including any liner or coating) intended for the carriage of solid substances which are in direct contact with the containment system. Packagings, intermediate bulk containers (IBCs), large packagings and tanks are not included.

A bulk container is:

- of a permanent character and accordingly strong enough to be suitable for repeated use,
- specially designed to facilitate the carriage of goods by one or more means of transport without intermediate reloading,
- fitted with devices permitting its ready handling,
- of a capacity of not less than 1.0 m³.

Examples of bulk containers are containers, offshore bulk containers, skips, bulk bins, swap bodies, trough-shaped containers, roller containers, load compartments of wagons.

Note: This definition only applies to bulk containers meeting the requirements of Chapter 6.11.

Bundle of cylinders means a pressure receptacle comprising an assembly of cylinders or cylinder shells that are fastened together and which are interconnected by a manifold and carried as a unit. The total water capacity shall not exceed 3 000 litres except that bundles intended for the carriage of toxic gases of Class 2 (groups starting with letter T according to 2.2.2.1.3) shall be limited to 1 000 litres water capacity.

C

Calculation pressure means a theoretical pressure at least equal to the test pressure which, according to the degree of danger exhibited by the substance being carried, may

to a greater or lesser degree exceed the working pressure. It is used solely to determine the thickness of the walls of the shell, independently of any external or internal reinforcing device.

Note: For portable tanks, see Chapter 6.7.

Capacity of shell or shell compartment for tanks, means the total inner volume of the shell or shell compartment expressed in litres or cubic metres. When it is impossible to completely fill the shell or the shell compartment because of its shape or construction, this reduced capacity shall be used for the determination of the degree of filling and for the marking of the tank;

Cargo transport unit means a wagon, a container, a tank-container, portable tank or a MEGC;

Note: This definition applies only for the application of special provision 302 of Chapter 3.3 and of 5.5.2.

Carriage in bulk means the carriage of uncounted unpackaged solids or articles in wagons, containers or bulk containers. The term does not apply to packaged goods nor to substances carried in tanks.

Carriage means the change of place of dangerous goods, including stops made necessary by transport conditions and including any period spent by the dangerous goods in wagons, tanks and containers made necessary by traffic conditions before, during and after the change of place.

This definition also covers the intermediate temporary storage of dangerous goods in order to change the mode or means of transport (transshipment). This shall apply, provided that transport documents showing the place of dispatch and the place of reception are presented on request and provided that packages and tanks are not opened during intermediate storage, except to be checked by the competent authorities.

Carrier – See Part I, Article 2 of SMGS «Definitions».

CGA means the Compressed Gas Association (CGA, 14501 George Carter Way, Suite 103, Chantilly, VA 20151, USA).

Closed bulk container means a totally closed bulk container having a rigid roof, sidewalls, end walls and floor (including hopper-type bottoms). The term includes bulk containers with an opening roof, side or end wall that can be closed during carriage. Closed bulk containers may be equipped with openings to allow for the exchange of vapours and gases with air and which under normal conditions of carriage prevent the release of solid contents as well as the penetration of rain and splash water.

Closed container means a totally enclosed container having a rigid roof, rigid side walls, rigid end walls and a floor. The term includes containers with an opening roof where the roof is closed during transport.

Closed cryogenic receptacle means a thermally insulated pressure receptacle for refrigerated liquefied gases of a water capacity of not more than 1 000 litres

Closed wagon means a wagon with fixed sides and roof as well as floor. The wagons with movable sides or roof, which shall be closed during transportation process, are included.

Note: Closed hopper wagons shall be covered by this definition.

Closure means a device which closes an opening in a receptacle.

Note: For pressure receptacles, closures are, for example, valves, pressure relief devices, pressure gauges or level indicators.

Collective entry means an entry for a defined group of substances or articles (see 2.1.1.2, B, C and D).

Competent authority means the authority or authorities or any other body or bodies designated as such in each State and in each specific case in accordance with domestic law.

Compliance assurance (radioactive material) means a systematic programme of measures applied by a competent authority which is aimed at ensuring that the requirements of Annex 2 to SMGS are met in practice.

Compressed Natural Gas means a compressed gas composed of natural gas with a high methane content assigned to UN No. 1971 (See also the *List*, document No.2)

Confinement system, for the carriage of radioactive material, means the assembly of fissile material and packaging components specified by the designer and agreed to by the competent authority as intended to preserve criticality safety.

Conformity assessment means the process of verifying the conformity of a product according to the provisions of sections 1.8.6 and 1.8.7 related to type examination, supervision of manufacture, initial inspection and associated testing.

Consignee – See Part I, Article 2 of SMGS «Definitions».

Consignor – See Part I, Article 2 of SMGS «Definitions».

Container means an article of transport equipment

- of a permanent character and accordingly strong enough to be suitable for repeated use,
- specially designed to facilitate the carriage of goods, by one or more means of transport, without breakage of load,
- fitted with devices permitting its mechanical loading and unloading and fixation on the transportation means,
- equipped with loading and unloading devices and all other operational devices (See also “large container”, “closed container”, “open container”, “sheeted container” and “small container”,
- having an internal volume of not less than 1 m³, except for containers for the carriage of radioactive material.

Note: *The term "container" does not cover conventional packagings, IBCs, tank-containers or wagons. Nevertheless, a container may be used as a packaging for the carriage of radioactive material.*

Containment system, for the carriage of radioactive material, means the assembly of components of the packaging specified by the designer as intended to retain the radioactive material during carriage.

Control temperature means the maximum temperature at which the organic peroxide or the self-reactive substance can be safely carried.

Conveyance" means, for carriage by road or by rail, a road vehicle or a wagon.

Crate means an outer packaging with incomplete surfaces.

Critical temperature (for organic peroxides and self-reactive substances) means the temperature at which emergency procedures shall be implemented in the event of loss of temperature control in order to prevent a dangerous reaction during transportation of organic peroxides and self-reactive substances.

Critical temperature (for gases) means the temperature above which the substance cannot exist in the liquid state.

Criticality safety index (CSI) assigned to a package, overpack or container containing fissile material, for the carriage of radioactive material, means a number which is used to provide control over the accumulation of packages, overpacks or containers containing fissile material.

Cryogenic receptacle means a transportable thermally insulated pressure receptacle for refrigerated liquefied gases of a water capacity of not more than 1 000 litres (see also "Open cryogenic receptacle").

CSC means the International Convention for Safe Containers (Geneva, 1972) as amended and published by the International Maritime Organization (IMO), London.

CSI² means the criticality safety index.

Cylinder means a pressure receptacle of a water capacity not exceeding 150 litres (see also "Bundle of cylinders").

D

Dangerous goods means those substances or articles the carriage, loading or unloading and storage of which may cause explosion, fire, damage to technical facilities or other goods, serious injuries or even death, skin injuries, intoxication, radiation injuries or diseases in people or animals. Dangerous goods means also substances or articles, which are not accepted for carriage in compliance with provisions of Annex 2 to SMGS or can be accepted for carriage only under conditions prescribed therein.

Dangerous reaction means:

- a) combustion or evolution of considerable heat;
- b) evolution of flammable, asphyxiant, oxidizing or toxic gases;
- c) the formation of corrosive substances;
- d) the formation of unstable substances; or
- e) dangerous rise in pressure (for tanks only).

Design life, for composite cylinders and tubes, means the maximum life (in number of years) for which the cylinder or tube is designed and approved in accordance with the applicable standard.

Design, for the carriage of radioactive material, means the description of fissile material excepted under 2.2.7.2.3.5 (f), special form radioactive material, low dispersible radioactive material, package or packaging which enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation.

Diameter of a shell (for shells of tanks) means the internal diameter of the shell.

Discharge pressure means the maximum pressure actually built up in the tank when it is being discharged under pressure.

Dose rate means the ambient dose equivalent or the directional dose equivalent, as appropriate, per unit time, measured at the point of interest.

Drum means a flat-ended or convex-ended cylindrical packaging made out of metal, fibreboard, plastics, plywood or other suitable materials. This definition also includes packagings of other shapes, e.g. round, taper-necked packagings or pail-shaped packagings. Wooden barrels and jerricans are not covered by this definition.

² CSI – Critical safety index

E

EN means a standard published by the European Committee of Standardization (CEN) (CEN, Avenue Marnix 17, B-1000 Brussels);

Enterprise means any natural person, any legal person, whether profit-making or not, any association or group of persons without legal personality, whether profit-making or not, or any official body, whether it has legal personality itself or is dependent upon an authority that has such personality

Entity in charge of maintenance (ECM) means the entity in charge of the maintenance of a wagon, which had been certified accordingly thereto.

Examination of tank-wagons, portable tanks, battery-wagons, tank-containers, demountable tanks and multiple-element gas containers (MEGC) means technical activities to be carried out by experts or enterprise authorized by the competent authority in compliance with the requirements of 6.8.2.4, in the course of inspection (certification) of tank-wagons, portable tanks, battery-wagons, tank-containers, demountable tanks and multiple-element gas containers (MEGC); (for example leakproofness or test hydraulic test).

Exclusive use, for the carriage of radioactive material, means the sole use, by a single consignor, of a wagon or of a large container, in respect of which all initial, intermediate and final loading, shipment and unloading are carried out in accordance with the directions of the consignor or consignee, where so required by Annex 2 to SMGS.

F

Filler means any enterprise which fills dangerous goods into a tank (tank-wagon, wagon with demountable tank, portable tank or tank-container) and/or into a wagon, large container or small container for carriage in bulk, or into a battery-wagon or MEGC.

Filling pressure means the maximum pressure actually built up in the tank when it is being filled under pressure.

Filling ratio (applies to gas) means the ratio of the mass of gas to the mass of water at 15 °C that would fill completely the means of containment fitted ready for use.

Flammable component (for aerosols) means flammable liquids, flammable solids or flammable gases and gas mixtures as defined in Notes 1 to 3 of sub-section 31.1.3 of Part III of the Manual of Tests and Criteria. This designation does not cover pyrophoric, self-heating or water-reactive substances. The chemical heat of combustion shall be determined by one of the following methods ASTM D 240, ISO/FDIS 13943: 1999 (E/F) 86.1 to 86.3 or NFPA 30B.

Flash-point means the lowest temperature of a liquid at which its vapours form a flammable mixture with air.

Flexible bulk container means a flexible container with a capacity not exceeding 15 m³ and includes liners and attached handling devices and service equipment;

Fuel cell engine means a device used to power equipment and which consists of a fuel cell and its fuel supply, whether integrated with or separate from the fuel cell, and includes all appurtenances necessary to fulfill its function;

Fuel cell means an electrochemical device that converts the chemical energy of a fuel to electrical energy, heat and reaction products.

Full wagon load or **Full container load** means the use of a wagon or a large container, whether or not its loading space is used wholly or in part, and provided that all loading and unloading operation shall be carried out in compliance with instructions of consignor or consignee.

Note: The corresponding term for radioactive material is "exclusive use".

G

Gas means a substance which:

- a) at 50 °C has a vapour pressure greater than 300 kPa (3 bar); or
- b) is completely gaseous at 20 °C under standard pressure of 101.3 kPa;

Globally Harmonized System of Classification and Labelling of Chemicals means the ninth revised edition of the United Nations publication bearing this title (ST/SG/AC.10/30/Rev.9).

H

Handling device (for flexible IBCs) means any sling, loop, eye or frame attached to the body of the IBC or formed from the continuation of the IBC body material.

Holding time means the time that will elapse from the establishment of the initial filling condition until the pressure has risen due to heat influx to the lowest set pressure of the pressure limiting device(s) of tanks intended for the carriage of refrigerated liquefied gases.

Note: For portable tanks, see 6.7.4.1.

I

IAEA means the International Atomic Energy Agency (IAEA) (IAEA, P.O. Box 100, A-1400 Vienna).

IAEA Regulations for the Safe Transport of Radioactive Material means one of the editions of those Regulations, as follows: (a) For the 1985 and 1985 (as amended 1990) editions: IAEA Safety Series No. 6; (b) For the 1996 edition: IAEA Safety Series No. ST-1; (c) For the 1996 (revised) edition: IAEA Safety Series No. TS-R-1 (ST-1, Revised); (d) For the 1996 (as amended 2003), 2005 and 2009 editions: IAEA Safety Standards Series No. TS-R-1; (e) For the 2012 edition: IAEA Safety Standards Series No. SSR-6; (f) For the 2018 edition: IAEA Safety Standards Series No. SSR-6 (Rev.1)

IBC means "Intermediate bulk container".

Composite IBC with plastics inner receptacle means an IBC comprising structural equipment in the form of a rigid outer casing encasing a plastics inner receptacle together with any service or other structural equipment. It is so constructed that the inner receptacle and outer casing once assembled form, and are used as, an integrated single unit to be filled, stored, transported or emptied as such.

Note: "Plastics material", when used in connection with inner receptacles for composite IBCs, is taken to include other polymeric materials such as rubber.

Fibreboard IBC means a fibreboard body with or without separate top and bottom caps, if necessary an inner liner (but no inner packagings), and with appropriate service and structural equipment.

Flexible IBC means a body constituted of film, woven fabric or any other flexible material or combinations thereof, and if necessary, an inner coating or liner, together with any appropriate service equipment and handling devices.

Metal IBC means a metal body together with appropriate service and structural equipment.

Protected IBC (for metal IBCs) means an IBC provided with additional protection against impact, the protection taking the form of, for example, a multi-layer (sandwich) or double-wall construction, or a frame with a metal lattice-work casing.

Rigid plastics IBC means a rigid plastics body, which may have structural equipment together with appropriate service equipment.

Repaired IBC means a metal, rigid plastics or composite IBC that, as a result of impact or for any other cause (e.g. corrosion, embrittlement or other evidence of reduced strength as compared to the design type) is restored so as to conform to the design type and to be able to withstand the design type tests. For the purposes of Annex 2 to SMGS, the replacement of the rigid inner receptacle of a composite IBC with a receptacle conforming to the original design type from the same manufacturer is considered repair. However, routine maintenance of rigid IBCs is not considered repair. The bodies of rigid plastics IBCs and the inner receptacles of composite IBCs are not repairable. Flexible IBCs are not repairable unless approved by the competent authority.

Remanufactured IBC means a metal, rigid plastics or composite IBC that:

- a) is produced as a UN type from a non-UN type; or
- b) is converted from one UN design type to another UN design type.

Remanufactured IBCs are subject to the same requirements that apply to new IBCs of the same type (see also design type definition in 6.5.6.1.1).

Wooden IBC means a rigid or collapsible wooden body, together with an inner liner (but no inner packaging) and appropriate service and structural equipment.

ICAO means the International Civil Aviation Organization (ICAO, 999 University Street, Montreal, Quebec H3C 5H7, Canada).

ICAO Technical Instructions means the Technical Instructions for the Safe Transport of Dangerous Goods by Air, which complement Annex 18 to the Chicago Convention on International Civil Aviation (Chicago 1944), published by the International Civil Aviation Organization (ICAO) in Montreal.

IMDG – Code means the International Maritime Dangerous Goods Code, for the implementation of Chapter VII, Part A, of the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), published by the International Maritime Organization (IMO), London.

IMO means the International Maritime Organization (IMO, 4 Albert Embankment, London SE1 7SR, United Kingdom);.

Infrastructure (Railway infrastructure) – See Article 2 § 1 SMGS “Definitions”.

Inner vessel, for a closed cryogenic receptacle, means the pressure vessel intended to contain the refrigerated liquefied gas;

Inner receptacle means a receptacle which requires an outer packaging in order to perform its containment function.

Inspection (certification) of tank-wagons, demountable tanks, battery-wagons, tank-containers, tank swap-bodies and MEGCs means inspection of tank-wagons, demountable tanks, battery-wagons, tank-containers, swap-bodies and MEGCs in compliance with the requirements of 6.8.2.4 to be performed by experts on enterprise authorized by competent authority and certification verifying that they correspond to requirements of Annex 2 to SMGS. There are different types of inspection: initial inspection, periodic inspection, intermediate inspection and exceptional checks.

Inspection body means an independent inspection and testing body approved by the competent authority.

Intermediate bulk container (IBC) means a rigid, or flexible portable packaging, other than those specified in Chapter 6.1, that:

- a) has a capacity of:

- 1) not more than 3.0 m³ for solids and liquids of packing groups II and III;
 - 2) not more than 1.5 m³ for solids of packing group I when packed in flexible, rigid plastics, composite, fibreboard and wooden IBCs;
 - 3) not more than 3.0 m³ for solids of packing group I when packed in metal IBCs;
 - 4) more than 3.0 m³ for radioactive material of Class 7;
- b) is designed for mechanical handling;
- c) is resistant to the stresses produced in handling and transport as determined by the tests specified in Chapter 6.5

(see also "Composite IBC with plastics inner receptacle", "Fibreboard IBC", "Flexible IBC", "Metal IBC", "Rigid plastics IBC" and "Wooden IBC");

Note 1: Portable tanks or tank-containers that meet the requirements of Chapter 6.7 or 6.8 respectively are not considered to be intermediate bulk containers (IBCs).

Note 2: Intermediate bulk containers (IBCs) which meet the requirements of Chapter 6.5 are not considered to be containers for the purposes of Annex 2 to SMGS.

ISO means an international standard published by the International Organization for Standardization (ISO) (ISO, 1, rue de Varembé, CH-1204 Geneva 20).

J

Jerrican means a metal or plastics packaging of rectangular or polygonal cross-section with one or more orifices.

L

Large container means

- a) a container which does not meet the definition of a small container;
- b) in the meaning of the CSC, a container of a size such that the area enclosed by the four outer bottom corners is either
 - (i) at least 14 m² (150 square feet) or
 - (ii) at least 7 m² (75 square feet) if fitted with top corner fittings.

Leakproofness test means a test to determine the leakproofness of a tank, a packaging or an IBC and of the equipment and closure devices;

Note: For portable tanks, see Chapter 6.7.

Liner means a tube or bag inserted into a packaging, including large packagings or IBCs, but not forming an integral part of it, including the closures of its openings;

Liquefied Natural Gas (LNG) means a refrigerated liquefied gas composed of natural gas with a high methane content assigned to UN No. 1972 (See also the *List*, document No.3)

Liquefied Petroleum Gas (LPG) means a low pressure liquefied gas composed of one or more light hydrocarbons which are assigned to UN Nos. 1011, 1075, 1965, 1969 or 1978 only and which consists mainly of propane, propene, butane, butane isomers, butene with traces of other hydrocarbon gases (see also the *List*, document 3)

Note 1: Flammable gases assigned to other UN numbers shall not be regarded as LPG.

Note 2: For UN No. 1075 see Note 2 under 2F, UN No. 1965, in the table for liquefied gases in 2.2.2.3.

Liquid means a substance which at 50 °C has a vapour pressure of not more than 300 kPa (3 bar), which is not completely gaseous at 20 °C and 101.3 kPa, and which

- a) has a melting point or initial melting point of 20 °C or less at a pressure of 101.3 kPa, or
- b) is liquid according to the ASTM D 4359-90 test method or
- c) is not pasty according to the criteria applicable to the test for determining fluidity (penetrometer test) described in 2.3.4;

Note: "Carriage in the liquid state", for the purpose of tank requirements, means:

- Carriage of liquids according to the above definition, or
- Solids handed over for carriage in the molten state.

List (term written in italics) means the list of technical documents and regulations to be applied additionally for the purpose of implementing the requirements of Annex 2 to SMGS as provided by paragraph 1.1.6.

Loader means any enterprise which:

- a) Loads packaged dangerous goods, small containers or portable tanks into or onto a wagon or a container; or
- b) Loads a container, bulk-container, MEGC, tank-container, portable tank or road vehicle onto a wagon.

Loading means all actions carried out by the loader, in accordance with the definition of loader.

M

Management system, for the carriage of radioactive material, means a set of interrelated or interacting elements (system) for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner.

Manual of Tests and Criteria means the eighth revised edition of the United Nations publication bearing this title (ST/SG/AC.10/11/Rev.8)

Mass of package means gross mass of the package unless otherwise stated.

Maximum capacity means the maximum inner volume of receptacles or packagings including intermediate bulk containers (IBCs) and large packagings expressed in cubic metres or litres;

Maximum net mass means the maximum net mass of contents in a single packaging or maximum combined mass of inner packagings and the contents thereof expressed in kilograms.

Maximum normal operating pressure, for the carriage of radioactive material, means the maximum pressure above atmospheric pressure at mean sea-level that would develop in the containment system in a period of one year under the conditions of temperature and solar radiation corresponding to environmental conditions in the absence of venting, external cooling by an ancillary system, or operational controls during carriage.

Maximum permissible gross mass

- a) (for IBCs) means the mass of the IBC and any service or structural equipment together with the maximum net mass;
- b) (for tanks) means the tare of the tank and the heaviest load authorized for carriage;

Note: For portable tanks, see Chapter 6.7.

Maximum working pressure (gauge pressure) means the highest of the following three pressures, that may occur at the top of the tank in the operating position:

- a) the highest effective pressure allowed in the tank during filling (maximum filling pressure allowed);
- b) the highest effective pressure allowed in the tank during discharge (maximum discharge pressure allowed); and
- c) the effective gauge pressure to which the tank is subjected by its contents (including such extraneous gases as it may contain) at the maximum working temperature.

Unless the special requirements prescribed in Chapter 4.3 provide otherwise, the numerical value of this working pressure (gauge pressure) shall not be lower than the vapour pressure (absolute pressure) of the filling substance at 50 °C.

For tanks equipped with safety valves (with or without bursting disc) other than tanks for the carriage of compressed, liquefied or dissolved gases of Class 2., the maximum working pressure (gauge pressure) shall however be equal to the prescribed opening pressure of such safety valves.

Note 1: Maximum working pressure is not applicable to gravity-discharge tanks according to 6.8.2.1.14.

Note 2: For portable tanks, see Chapter 6.7.

Note 3: For closed cryogenic receptacles, see Note to 6.2.1.3.6.5.

MEGC, see "Multiple-element gas container.

Metal hydride storage system means a single complete hydrogen storage system, including a pressure receptacle shell, metal hydride, pressure relief device, shut-off valve, service equipment and internal components used for the carriage of hydrogen only.

Mild steel means a steel having a minimum tensile strength between 360 N/mm² and 440 N/mm²;

Note: For portable tanks, see Chapter 6.7.

Multilateral approval, for the carriage of radioactive material, means approval by the relevant competent authority of the country of origin of the design or shipment, as applicable, and by the competent authority of each country through or into which the consignment is to be carried.

Multiple-element gas container (MEGC) means a container consisting of elements which are linked to each other by a manifold and mounted on a frame. The following elements are considered to be elements of a multiple-element gas container: cylinders, tubes, pressure drums and bundles of cylinders as well as tanks for the carriage of gases as defined in 2.2.2.1.1 having a capacity of more than 450 litres,

Note: For UN MEGCs, see Chapter 6.7.

N

N.O.S. entry (not otherwise specified entry means a collective entry to which substances, mixtures, solutions or articles may be assigned if they:

- a) are not mentioned by name in Table A of Chapter 3.2, and
- b) exhibit chemical, physical and/or dangerous properties corresponding to the Class, classification code, packing group and the name and description of the n.o.s. entry.

N.O.S. see «N.O.S. entry.

Net explosive mass (NEM) means the total mass of the explosive substances, without the packagings, casings, etc. (Net explosive quantity (NEQ), net explosive contents (NEC), net explosive weight (NEW) or net mass of explosive contents are often used to convey the same meaning.).

Neutron radiation detector means a device that detects neutron radiation. In such a device, a gas may be contained in a hermetically sealed electron tube transducer that converts neutron radiation into a measureable electric signal.

O

Offshore bulk container means a bulk container specially designed for repeated use for carriage to, from and between offshore facilities. An offshore bulk container is designed and constructed in accordance with the guidelines for the approval of offshore containers handled in open seas specified by the International Maritime Organization (IMO) in document MSC/Circ.860.

Open container means a container without roof.

Open cryogenic receptacle means a transportable thermally insulated receptacle for refrigerated liquefied gases maintained at atmospheric pressure by continuous venting of the refrigerated liquefied gas.

Open wagon means a wagon without roof.

Operator of a tank-container, portable tank or tank-wagon means any enterprise in whose name the tank-container, portable tank or tank-wagon is registered or approved for transport.

Over-moulded cylinder means a cylinder intended for the carriage of LPG with a water capacity not exceeding 13 litres made of a coated welded steel inner cylinder body with an over-moulded protective case made from cellular plastic, which is non-removable and bonded to the outer surface of the steel cylinder wall.

Overpack means an enclosure used (by a single consignor in the case of radioactive material) to contain one or more packages, consolidated into a single unit easier to handle and stow during carriage.

Examples of overpacks:

- a) a loading tray such as a pallet, on which several packages are placed or stacked and secured by a plastics strip, shrink or stretch wrapping or other appropriate means; or
- b) an outer protective packaging such as a box or a crate.

P

Package means the complete product of the packing operation, consisting of the packaging or large packaging or IBC and its contents prepared for dispatch. The term includes pressure receptacles for gases as defined in this section as well as articles which, because of their size, mass or configuration may be carried unpackaged or carried in cradles, crates or handling devices. Except for the carriage of radioactive material, the term does not apply to goods which are carried in bulk, nor to substances carried in tanks.

Note: For radioactive material, see 2.2.7.2, 4.1.9.1.1 and Chapter 6.4.

Packaging means one or more receptacles and any other components or materials necessary for the receptacles to perform their containment and other safety functions.

Note: For radioactive material, see 2.2.7.2.

Combination packaging means a combination of packagings for carriage purposes, consisting of one or more inner packagings secured in an outer packaging in accordance with 4.1.1.5.

Note: The term "inner packaging" used for combination packagings shall not be confused with the term "inner receptacle" used for composite packagings.

Composite packaging means a packaging consisting of an outer packaging and an inner receptacle so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled it remains thereafter an integrated single unit; it is filled, stored, carried and emptied as such;

Note: The term "inner receptacle" used for composite packagings shall not be confused with the term "inner packaging" used for combination packagings. For example, the inner of a 6HA1 composite packaging (plastics material) is such an inner receptacle since it is normally not designed to perform a containment function without its outer packaging and is not therefore an inner packaging. Where a material is mentioned in brackets after the term "composite packaging", it refers to the inner receptacle.

Inner packaging means a packaging for which an outer packaging is required for carriage.

Intermediate packaging means a packaging placed between inner packagings or articles, and an outer packaging.

Large salvage packaging means a special packaging which

- a) is designed for mechanical handling; and
- b) exceeds 400 kg net mass or 450 litres capacity but has a volume of not more than 3 m³; into which damaged, defective or leaking dangerous goods packages, or dangerous goods that have spilled or leaked are placed for purposes of carriage for recovery or disposal.

Large packaging means a packaging consisting of an outer packaging which contains articles or inner packagings and which

- a) is designed for mechanical handling;
- b) exceeds 400 kg net mass or 0,45 m³ capacity but not more than 3.0 m³.

Light-gauge metal packaging means a packaging of circular, elliptical, rectangular or polygonal cross-section (also conical) and taper-necked and pail-shaped packaging made of metal, having a wall thickness of less than 0.5 mm (e.g. tinplate), flat or convex bottomed and with one or more orifices, which is not covered by the definitions for drums or jerricans.

Outer packaging means the outer protection of the composite or combination packaging together with any absorbent materials, cushioning and any other components necessary to contain and protect inner receptacles or inner packagings.

Reconditioned packaging means in particular

- a) metal drums that are:
 - cleaned to original materials of construction, with all former contents, internal and external corrosion, and external coatings and labels removed;
 - restored to original shape and contour, with chimes (if any) straightened and sealed and all non- integral gaskets replaced; and
 - inspected after cleaning but before painting, with rejection of packagings with visible pitting, significant reduction in the material thickness, metal fatigue, damaged threads or closures or other significant defects;
- b) plastics drums and jerricans that:
 - are cleaned to original materials of construction, with all former contents, external coatings and labels removed;
 - have all non-integral gaskets replaced; and

- are inspected after cleaning with rejection of packagings with visible damage such as tears, creases or cracks, or damaged threads or closures or other significant defects.

Remanufactured large packaging means a metal or rigid plastics large packaging that:

- a) Is produced as a UN type from a non-UN type; or
- b) Is converted from one UN design type to another UN design type.

Remanufactured large packagings are subject to the same requirements of Annex 2 to SMGS that apply to new large packagings of the same type (see also design type definition in 6.6.5.1.2);

Remanufactured packaging means in particular

- a) metal drums that:
 - are produced as a UN type complying with the requirements of Chapter 6.1 from a non-UN type;
 - are converted from one UN type complying with the requirements of Chapter 6.1 to another UN type; or
 - undergo the replacement of integral structural components (such as non-removable heads);
- b) plastics drums that:
 - are converted from one UN type to another UN type (e.g. 1H1 to 1H2); or
 - undergo the replacement of integral structural components.

Remanufactured drums are subject to the requirements of Chapter 6.1 which apply to new drums of the same type.

Reused large packaging means a large packaging to be refilled which has been examined and found free of defects affecting the ability to withstand the performance tests; the term includes those which are refilled with the same or similar compatible contents and are carried within distribution chains controlled by the consignor of the product.

Salvage packaging means a special packaging into which damaged, defective, leaking or non-conforming dangerous goods packages, or dangerous goods that have spilled or leaked are placed for purposes of carriage for recovery or disposal.

Sift-proof packaging means a packaging impermeable to dry contents, including fine solid material produced during carriage.

Packer means any enterprise which puts dangerous goods into packagings, including large packagings and intermediate bulk containers (IBCs) and, where necessary, prepares packages for carriage.

Packing group means a group to which, for packing purposes, certain substances may be assigned in accordance with their degree of danger. The packing groups have the following meanings which are explained more fully in Part 2:

Packing group I: Substances presenting high danger;

Packing group II: Substances presenting medium danger; and

Packing group III: Substances presenting low danger;

Piggyback transport means the carriage of road vehicles loaded with dangerous goods in combined road/rail transport.

Plastics – polymer material, which has to be moulded.

Plastics, fibre-reinforced means material consisting of reinforcement (fibrous and/or particulate) contained within a thermoset or thermoplastic polymer (matrix).

"Recycled plastics material" means material recovered from used industrial packagings or from other plastics material that has been pre-sorted and prepared for processing into new packagings, including IBCs. The specific properties of the recycled material used for production of new packagings shall be assured and documented regularly as part of a quality assurance programme recognized by the competent authority. The quality assurance programme shall include a record of proper pre-sorting and verification that each batch of recycled plastics material which is of homogeneous composition, is consistent with the material specifications (melt flow rate, density, and tensile properties) of the design type manufactured from such recycled material. This necessarily includes knowledge about the packaging material from which the recycled plastics have been derived, as well as awareness of the prior use, including prior contents, of the plastics material if that prior use might reduce the capability of new *packagings*, including *IBCs*, produced using that material. In addition, the packaging or IBC manufacturer's quality assurance programme under 6.1.1.4 or 6.5.4.1 shall include performance of the appropriate mechanical design type test in 6.1.5 or 6.5.6 on packagings or IBCs manufactured from each batch of recycled plastics material. In this testing, stacking performance may be verified by appropriate dynamic compression testing rather than static load testing.

Note: ISO 16103:2005 "*Packaging – Transport packages for dangerous goods – Recycled plastics material*", provides additional guidance on procedures which may be followed in approving the use of recycled plastics material. These guidelines have been developed based on the experience of the manufacturing of drums and jerricans from recycled plastics material and as such may need to be adapted for other types of packagings, IBCs and large packagings made of recycled plastics material.

Pressure drum means a welded transportable pressure receptacle of a water capacity exceeding 150 litres and of not more than 1 000 litres, (e.g. cylindrical receptacles equipped with rolling hoops, and receptacles on skids)."

Pressure receptacle means a transportable receptacle intended for holding substances under pressure including its closure(s) and other service equipment, and is a collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles, metal hydride storage systems, bundles of cylinders and salvage pressure receptacles.

Pressure receptacle shell means a cylinder, a tube, a pressure drum or a salvage pressure receptacle without its closures or other service equipment, but including any permanently attached device(s) (e.g. neck ring, foot ring);

Note: The terms "*cylinder shell*", "*pressure drum shell*" and "*tube shell*" are also used.

Pressurized gas cartridge, see "Aerosol packaging";

Protective lining (for tanks) means a lining or coating protecting the metallic tank material against the substances to be carried;

Note: This definition does not apply to a lining or coating used only to protect the substance to be carried.

Q

Quality assurance means a systematic programme of controls and inspections applied by any organization or body which is aimed at providing confidence that the safety prescriptions in Annex 2 to SMGS are met in practice.

R

Radiation detection system means an apparatus that contains radiation detectors as components.

Radioactive contents, for the carriage of radioactive material, mean the radioactive material together with any contaminated or activated solids, liquids, and gases within the packaging.

Railway infrastructure manager – See Article 2 § 1 SMGS “Definitions”.

Receptacle (Class 1) includes boxes, bottles, cans, drums, jars and tubes, including any means of closure used in the inner or intermediate packaging.

Receptacle means a containment vessel for receiving and holding substances or articles, including any means of closing. This definition does not apply to shells (see also "Closed cryogenic receptacle", "Open cryogenic receptacle", "Inner receptacle", "Pressure receptacle", "Rigid inner receptacle" and "Gas cartridge").

Recycled plastics material means material recovered from used industrial packagings that has been cleaned and prepared for processing into new packagings.

Reel (Class 1) means a device made of plastics, wood, fibreboard, metal or other suitable material comprising a central spindle with, or without, side walls at each end of the spindle. Articles and substances can be wound onto the spindle and may be retained by side walls;

Reference steel means a steel with a tensile strength of 370 N/mm² and an elongation at fracture of 27%.

RID means the Regulations concerning the international carriage of dangerous goods by rail (Appendix C to the Convention concerning international carriage by rail (COTIF)).

Rigid inner receptacle (for composite IBCs) means a receptacle which retains its general shape when empty without its closures in place and without benefit of the outer casing. Any inner receptacle that is not "rigid" is considered to be "flexible".

Road vehicle means motor vehicle, articulated vehicle, trailer or semi-trailer within the meaning of ADR, by means of which dangerous goods are carried;

Rolling stock means a vehicle suitable to circulate on its own wheels on railway lines with or without traction.

Routine maintenance of flexible IBCs means the routine performance on plastics or textile flexible IBCs of operations, such as:

- a) Cleaning;
- b) Replacement of non-integral components, such as non-integral liners and closure ties, with components conforming to the manufacturer's original specification;

provided that these operations do not adversely affect the containment function of the flexible IBC or alter the design type.

Routine maintenance of rigid IBCs means the routine performance on metal, rigid plastics or composite IBCs of operations such as:

- a) Cleaning;
- b) Removal and reinstallation or replacement of body closures (including associated gaskets), or of service equipment, conforming to the original manufacturer's specifications, provided that the leaktightness of the IBC is verified; or
- c) Restoration of structural equipment not directly performing a dangerous goods containment or discharge pressure retention function so as to conform to the design type (e.g. the straightening of legs or lifting attachments), provided that the containment function of the IBC is not affected.

S

SADT: See "Self-accelerating decomposition temperature".

Safety valve means a spring-loaded device which is activated automatically by pressure the purpose of which is to protect the tank against unacceptable excess internal pressure.

Salvage pressure receptacle means a pressure receptacle with a water capacity not exceeding 3000 litres into which are placed damaged, defective, leaking or non-conforming pressure receptacle(s) for the purpose of carriage e.g. for recovery or disposal.

SAPT: see "Self-accelerating polymerization temperature".

Self-accelerating decomposition temperature (SADT) means the lowest temperature at which self-accelerating decomposition may occur with substance in the packaging as used during carriage. Provisions for determining the SADT and the effects of heating under confinement are contained in Part II of the Manual of Tests and Criteria.

Self-accelerating polymerization temperature (SAPT) means the lowest temperature at which self-accelerating polymerization may occur with a substance in the packaging, IBC or tank as offered for carriage. The SAPT shall be determined in accordance with the test procedures established for the self-accelerating decomposition temperature for self-reactive substances in accordance with Part II, section 28 of the Manual of Tests and Criteria.

Self-operating ventilation valve means a venting device on shells with bottom discharge which is connected to the bottom valve and in normal operation is only opened during loading or unloading for the ventilation of shells.

Service equipment

a) of the tank means filling and discharge, breather, safety, heating and heat insulating devices and measuring instruments.

Note: For portable tanks, see Chapter 6.7.

b) of the elements of a battery-wagon or of a MEGC means filling and discharge devices, including the manifold, safety devices and measuring instruments;

c) of an IBC means the filling and discharge devices and any pressure-relief or venting, safety, heating and heat insulating devices and measuring instruments;

d) of a pressure receptacle, means closures, manifolds, piping, porous, absorbent or adsorbent material and any structural devices, e.g. for handling.

Service life, for composite cylinders and tubes, means the number of years the cylinder or tube is permitted to be in service.

Settled pressure means the pressure of the contents of a pressure receptacle in thermal and diffusive equilibrium.

Sheeted bulk container means an open top bulk container with rigid bottom (including hopper-type bottom), side and end walls and a non-rigid covering.

Sheeted container means an open container equipped with a sheet to protect the goods loaded.

Sheeted wagon means an open wagon provided with a sheet to protect the load.

Shell (for tanks) means the part of the tank which retains the substance intended for carriage, including openings and their closures, but does not include service equipment or external structural equipment;

Note: For portable tanks, see Chapter 6.7.

Small container means a container which has an internal volume of not more than 3 m³. Any other container shall be considered large container.

Note: With regard to radioactive materials see 2.2.7.2.

Small receptacle containing gas (gas cartridge) means a non-refillable receptacle having a water capacity not exceeding 1000 ml for receptacles made of metal and not exceeding 500 ml for receptacles made of synthetic material or glass, containing, under pressure, a gas or a mixture of gases. It may be fitted with a relieve valve.

Solid means:

- a) a substance with a melting point or initial melting point of more than 20 °C at a pressure of 101.3 kPa, or
- b) a substance which is not liquid according to the ASTM D 4359-90 test method or which is pasty according to the criteria applicable to the test for determining fluidity (penetrometer test) described in 2.3.4;

Structural equipment

- a) for tanks of a tank-wagon, means the external or internal reinforcing, fastening or protective members of the shell;
- b) for tanks of a tank-container, means the external or internal reinforcing, fastening, protective or stabilizing members of the shell.

Note: For portable tanks, see Chapter 6.7.

- c) for elements of a battery-wagon or an MEGC means the external or internal reinforcing, fastening, protective or stabilizing members of the shell or receptacle;
- d) for IBCs other than flexible IBCs means the reinforcing, fastening, handling, protective or stabilizing members of the body (including the base pallet for composite IBCs with plastics inner receptacle).

Swap body is a container which has the following characteristics (See also the List, document No.1):

- it is only built for carriage on a wagon or a vehicle on land or by roll-on roll-off ship;
- it cannot be stacked;
- it can be loaded into and unloaded from vehicles by means of equipment on board the vehicle.

Swap-body – demountable tank is considered tank-container.

T

Tank documentation set means technical tank documents in any form or on any media containing all technical information on tanks, battery-wagons or multiple-element gas containers (MEGC), as well as certificates referred to in 6.8.2.3, 6.8.2.4 and 6.8.3.4.

Tank means a shell, including its service and structural equipment. When used alone, the term tank means a tank-container, portable tank, fixed tank, tank-wagon, and demountable tank as defined in this Section, including tanks forming elements of battery-wagons or MEGCs.

Note: For portable tanks, see 6.7.4.1.

Demountable tank means a tank designed to fit the special apparatus of the wagon but which can only be removed from it after dismantling their means of attachment.

Fixed tank means a tank having a capacity of more than 1 000 litres which is permanently attached to a wagon (which then becomes a tank-wagon) or is an integral part of the frame of such wagon.

Hermetically closed tank means a tank that:

- is not equipped with safety valves, bursting discs, other similar safety devices or vacuum valves or with self-operating ventilation valves, or
- is equipped with safety valves preceded by a bursting disc according to 6.8.2.2.10, but is not equipped with vacuum valves or with self-operating ventilation valves.

A tank intended for the carriage of liquid substances with a calculation pressure of at least 4 bar or intended for the carriage of solid substances (powdery or granular) regardless of its calculation pressure is also considered hermetically closed if it:

- is equipped with safety valves preceded by a bursting disc according to 6.8.2.2.10 and vacuum valves or self-operating ventilation valves, in accordance with the requirements of 6.8.2.2.3.
- is not equipped with safety valves, bursting discs or other similar safety devices, but is equipped with vacuum valves or with self-operating ventilation valves, in accordance with the requirements of 6.8.2.2.3.

Portable tank means a multimodal tank having, when used for the carriage of gases as defined in 2.2.2.1.1, a capacity of more than 450 litres in accordance with the definitions in Chapter 6.7 or the IMDG Code and indicated by a portable tank instruction (T-Code) in Column (10) of Table A of Chapter 3.2.

Vacuum-operated waste tank means a tank-container or tank swap body primarily used for the carriage of dangerous wastes, with special constructional features and/or equipment to facilitate the filling and discharging of wastes as specified in Chapter 6.10. A tank which fully complies with the requirements of Chapter 6.7 or 6.8 is not considered to be a vacuum-operated waste tank.

Tank-container means an article of transport equipment meeting the definition of a container, and comprising a shell and items of equipment, including the equipment to facilitate movement of the tank-container without significant change of attitude, used for the carriage of gases, liquid, powdery or granular substances and, when used for the carriage of gases as defined in 2.2.2.1.1, having a capacity of more than 0.45 m³ (450 litres);

Note: IBCs which meet the requirements of Chapter 6.5 are not considered to be tank-containers.

In addition:

Extra-large tank-container means a tank-container with a capacity of more than 40 000 litres.

Tank-container or portable tank operator means any enterprise in whose name the tank-container or portable tank is operated;

Tank-wagon means a wagon intended for the carriage of gases, liquids, powdery or granular substances, consisting of one or more shells, which are permanently underframe-mounted;

Note: Tank-wagon also includes mounted tanks and wagons with demountable tanks.

Tank-wagon operator means any enterprise in whose name the tank-wagon is registered or approved for transport;

Technical name means a recognized chemical name, if relevant a biological name, or other name currently used in scientific and technical handbooks, journals and texts (see 3.1.2.8.1.1).

Test pressure means the required pressure applied during a pressure test for initial or periodic inspection.

Note: For portable tanks, see Chapter 6.7.

Through or into, for the carriage of radioactive material, means through or into the countries in which a consignment is carried but specifically excludes countries "over" which a consignment is carried by air provided that there are no scheduled stops in those countries.

TI³ means "Transport index (TI)" assigned to a package, overpack or container, or to unpackaged LSA-I or SCO-I or SCO-III, for the carriage of radioactive material, means a number which is used to provide control over radiation exposure

Tube (Class 2) means a pressure receptacle of seamless or composite construction having a water capacity exceeding 150 litres and of not more than 3 000 litres.

Transport index (TI) assigned to a package, overpack or container, or to unpackaged LSA-I, SCO-I or SCO-III, *for the carriage of radioactive material*, means a number which is used to provide control over radiation exposure.

Tray (Class 1) means a sheet of metal, plastics, fibreboard or other suitable material which is placed in the inner, intermediate or outer packaging and achieves a close-fit in such packaging. The surface of the tray may be shaped so that packagings or articles can be inserted, held secure and separated from each other.

U

UIC means the International Union of Railways (UIC, 16 rue Jean Rey, F-75015 Paris).

UN Model Regulations means the Model Regulations annexed to the twenty-third revised edition of the Recommendations on the Transport of Dangerous Goods published by the United Nations (ST/SG/AC.10/1/Rev.23).

UN (United Nations) number means the four-figure identification number of the substance or article taken from the United Nations Model Regulations on the Transport of Dangerous Goods.

UN Regulation means a regulation annexed to the Agreement concerning the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted and or used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions (1958 Agreement, as amended).

UNECE means the United Nations Economic Commission for Europe (UNECE, Palais des Nations, 8-14 avenue de la Paix, CH-1211 Geneva 10);

Unilateral approval, for the carriage of radioactive material, means an approval of a design which is required to be given by the competent authority of the country of origin of the design only. If the country of origin is not an SMGS Contracting State, the approval shall require validation by the competent authority of an SMGS Contracting State (see 6.4.22.8).

Unloader means any enterprise which:

³ «TI» - «Transport Index»

- a) Removes a container, bulk-container, MEGC, tank-container, portable tank or road vehicle from a wagon; or
- b) Unloads packaged dangerous goods, small containers or portable tanks out of or from a wagon or a container; or
- c) Discharges dangerous goods from a tank (tank-wagon, demountable tank, portable tank or tank-container) or from a battery-wagon or MEGC or from a wagon, large container or small container for carriage in bulk or a bulk-container.

Unloading means all actions carried out by the unloader, in accordance with the definition of unloader.

V

Vacuum valve means a spring-loaded device which is activated automatically by pressure the purpose of which is to protect the tank against unacceptable negative internal pressure.

W

Wagon means a railway vehicle, not provided with a means of traction, which is intended to carry goods.

Wastes means substances, solutions, mixtures or articles for which no direct use is envisaged but which are carried for reprocessing, dumping, elimination by incineration or other methods of disposal.

Wooden barrel means a packaging made of natural wood, of round cross-section, having convex walls, consisting of staves and heads and fitted with hoops.

Working pressure:

- a) For a compressed gas, means the settled pressure at a reference temperature of 15 °C in a full pressure receptacle;
- b) For UN 1001 acetylene, dissolved, means the calculated settled pressure at a uniform reference temperature of 15 °C in an acetylene cylinder containing the specified solvent content and the maximum acetylene content;
- c) For UN 3374 acetylene, solvent free, means the working pressure which was calculated for the equivalent cylinder for UN 1001 acetylene, dissolved;

Note: For tanks, see "Maximum working pressure (gauge pressure)".

the settled pressure of a compressed gas at a reference temperature of 15 °C in a full pressure receptacle;

Note: For tanks, see Maximum working pressure (gauge pressure).

Woven plastics (for flexible IBCs) mean a material made from stretch tapes or

1.2.2. UNITS OF MEASUREMENT

1.2.2.1 The following units of measurement are applicable in Annex 2 to SMGS ^{a)}

Measurement of	SI Unit ^{b)}	Acceptable alternative unit together with SI-Units	Relationship between units
Length	m (metre)	-	-

Area	m ² (square metre)	-	-
Volume	m ³ (cubic metre)	l (litre)	1l = 10 ⁻³ m ³
Time	s (second)	min (minute) h (hour) d (day)	1 min = 60 s 1 h = 3600 s 1 day = 86 400 s
Mass	kg (kilogram)	g (gramme) t (tonne)	1 g = 10 ⁻³ kg 1 t = 10 ³ kg
Density	kg/m ³	kg/l	1 kg/l = 10 ³ kg/m ³
Temperature	K (kelvin)	°C (degree Celsius)	0°C = 273,15K
Temperature difference	K (kelvin)	°C (degree Celsius)	+/-1°C = +/-1 K
Force	N (Newton)	-	1 N = 1 kg•m/s ²
Pressure	Pa (Pascal)	bar (bar)	1 Pa = 1 N/m ² 1 bar = 10 ⁵ Pa
Stress (metal stress)	N/m ²	N/mm ²	1 N/mm ² = 1 MPa
Work Energy Quantity of heat	J (Joule)	kWh (Kilowatt hours) eV (electronvolt)	1 J = 1N•m = 1 W•s 1 eV = 0,1602•10 ⁻¹⁸ J
Power	W (Watt)	-	1 W = 1 J/s = 1N•m/s
Electrical resistance	Ω (ohm)	-	1 Ω = 1 kg · m ² / s ⁻³ / A ⁻²
Kinematic viscosity	m ² /s	mm ² /s	1 mm ² /s = 10 ⁻⁶ m ² /s
Dynamic viscosity	Pa•s	mPa•s	1mPa•s = 10 ⁻³ Pa•s
Activity	Bq (Becquerel)		
Dose equivalen	Sv (Sievert)		

a) The following round figures are applicable for the conversion of the units hitherto used into SI Units.

Force:	Stress (Metal stress)
1 kg = 9,807 H	1 kg/mm ² = 9,807 N/mm ²
1 N = 0,102 kg	1 N/mm ² = 0,102 kg/mm ²
	1 N/mm ² = 1 MPa = 10 ⁶ Pa

Pressure

1 Pa = 1N/m² = 10⁻⁵ bar = 1,02 • 10⁻⁵ kg/cm² = 0,75 • 10⁻² torr

1 bar = 10⁵ Pa = 1,02 kg/cm² = 750 torr

1 kg/cm² = 9,807 • 10⁴ Pa = 0,9807 bar = 736 torr

1 torr = 1,33 • 10² Pa = 1,33 • 10⁻³ bar = 1,36 • 10⁻³ kg/cm²

Energy, Work, Quantity of heat

1 J = 1 Nm = 0,278 • 10⁻⁶ kWh = 1,102 kgm = 0,239 • 10⁻³ kcal

1 kWh = 3,6 • 10⁶ J = 367 • 10³ kgm = 860 kcal

1 kgm = 9,807 J = 2,72 • 10⁻⁶ kWh = 2,34 • 10⁻³ kcal

1 kcal = 4,19 • 10³ J = 1,16 • 10⁻³ kWh = 427 kgm

Power	Kinematic viscosity
1 W = 0,102 kgm/s = 0,86 kcal/h	1 m ² /s = 10 ⁴ St (Stokes)
1 kgm/s = 9,807 W = 8,43 kcal/h	1 St = 10 ⁻⁴ m ² /s
1 kcal/h = 1,16 W = 0,119 kgm/s	

Dynamic viscosity

1 Pa • s = 1 Ns/m² = 10 P (poise) = 0,102 kg s/m²

1 P = 0,1 Pa • s = 0,1 N s/m² = 1,02 • 10⁻² kg s/m²

1 kg s/m² = 9,807 Pa • c = 9,807 N s/m² = 98,07 P

b) The International System of Units (SI) is the result of decisions taken at the General Conference on Weights and Measures (Address: Pavillon de Breteuil, Parc de St-Cloud, F-92 310 Sèvres).

The decimal multiples and sub-multiples of a unit may be formed by prefixes or symbols, having the following meanings, placed before the name or symbol of the unit:

Factor		Prefix	Symbol
$1\ 000\ 000\ 000\ 000\ 000\ 000 = 10^{18}$	Quintillion	exa	E
$1\ 000\ 000\ 000\ 000\ 000 = 10^{15}$	Quadrillion	peta	P
$1\ 000\ 000\ 000\ 000 = 10^{12}$	Trillion	tera	T
$1\ 000\ 000\ 000 = 10^9$	Billion	giga	G
$1\ 000\ 000 = 10^6$	Million	mega	M
$1\ 000 = 10^3$	Thousand	kilo	k
$100 = 10^2$	Hundred	hecto	h
$10 = 10^1$	Ten	deca	da
$0,1 = 10^{-1}$	Tenth	deci	d
$0,01 = 10^{-2}$	Hundredth	centi	c
$0,001 = 10^{-3}$	Thousandth	milli	m
$0,000\ 001 = 10^{-6}$	Millionth	micro	μ
$0,000\ 000\ 001 = 10^{-9}$	Billionth	nano	n
$0,000\ 000\ 000\ 001 = 10^{-12}$	Trillionth	pico	p
$0,000\ 000\ 000\ 000\ 001 = 10^{-15}$	Quadrillionth	femto	f
$0,000\ 000\ 000\ 000\ 000\ 001 = 10^{-18}$	Quintillionth	atto	a

1.2.2.2 Unless expressly stated otherwise, the sign "%" in Annex 2 to SMGS represents:

- (a) In the case of mixtures of solids or of liquids, and also in the case of solutions and of solids wetted by a liquid, a percentage mass based on the total mass of the mixture, the solution or the wetted solid;
- (b) In the case of mixtures of compressed gases, when filled by pressure, the proportion of the volume indicated as a percentage of the total volume of the gaseous mixture, or, when filled by mass, the proportion of the mass indicated as a percentage of the total mass of the mixture;
- (c) In the case of mixtures of liquefied gases and dissolved gases, the proportion of the mass indicated as a percentage of the total mass of the mixture.

1.2.2.3 Pressures of all kinds relating to receptacles (such as test pressure, internal pressure, safety valve opening pressure) are always indicated in gauge pressure (pressure in excess of atmospheric pressure); however, the vapour pressure of substances is always expressed in absolute pressure.

1.2.2.4 Where Annex 2 to SMGS specifies a degree of filling for receptacles, this is always related to a reference temperature of the substances of 15 °C, unless some other temperature is indicated.

1.2.3 List of abbreviations (acronyms)

In Annex 2 to SMGS, abbreviations, acronyms and abbreviated designations of regulatory texts are used, with the following meaning:

A

"**ADN**" means the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.

“ADR” means the Agreement concerning the International Carriage of Dangerous Goods by Road, including all special agreements signed by those states involved in the transport operation.

"ASTM" means the American Society for Testing and Materials (ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959, United States of America), www.astm.org;

C

“CGA” means the Compressed Gas Association, 8484 Westpark Drive, Suite 220, McLean, Virginia 22102, United States of America, www.cganet.com.

CNG means compressed natural gas (see 1.2.1);

CSC means the International Convention for Safe Containers (Geneva, 1972) as amended and published by the International Maritime Organization (IMO), London;

"CSI"* means criticality safety index (see 1.2.1);

E

EIGA means European Industrial Gas Association, 30 Avenue de l'Astronomie, 1210 Brussels (Belgium), www.eiga.eu.

"EN" (standard) means a European standard published by the European Committee for Standardization (CEN) (CEN, Avenue Marnix 17, 1000 Brussels, Belgium), www.cen.eu;

F

FRP means fibre-reinforced plastics (see 1.2.1);

G

GHS (Globally Harmonized System of Classification and Labelling of Chemicals) means the tenth revised edition of the United Nations publication bearing this title (ST/SG/AC.10/30/Rev.10).

I

IAEA means the International Atomic Energy Agency, P.O. Box 100, 1400 Vienna, Austria, www.iaea.org;

IBC means intermediate bulk container (see 1.2.1);

ICAO means the International Civil Aviation Organization, 999 University Street, Montreal, Quebec H3C 5H7, Canada, www.icao.org;

IMDG – Code means the International Maritime Dangerous Goods Code, for the implementation of Chapter VII, Part A, of the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), published by the International Maritime Organization (IMO), London.

IMO means the International Maritime Organization, 4 Albert Embankment, London SE1 7SR, United Kingdom, www.imo.org;

"ISO"*** (standard) means an international standard published by the International Organization for Standardization, 1, rue de Varembé, 1204 Geneva 20, Switzerland, www.iso.org;

L

LNG means liquefied natural gas (see 1.2.1);

"LPG" means liquefied petroleum gas (see 1.2.1);

"LSA"*** (material) means low specific activity material (see 2.2.7.1.3);

M

“MEGC” means multiple-element gas container (see 1.2.1);

“MEMU” means a unit, or a vehicle mounted with a unit, for manufacturing and charging explosives from dangerous goods that are not explosives. The unit consists of various tanks and bulk containers and process equipment as well as pumps and related equipment. The MEMU may have special compartments for packaged explosives.

N

N.O.S. not otherwise specified see entry N.O.S. (see 1.2.1);

R

RID means the Regulations concerning the international carriage of dangerous goods by rail (Appendix C to the Convention concerning international carriage by rail (COTIF)).

S

SADT means self-accelerating decomposition temperature (see 1.2.1);

SAPT means self-accelerating polymerization temperature (see 1.2.1);

“SCO”**** means an object with surface radioactive contamination (see 2.2.7.1.3);

T

“TI”***** means transport index (see 1.2.1);

U

UIC means the International Union of Railways, 16 rue Jean Rey, 75015 Paris, France, www.uic.org;

UNECE means the United Nations Economic Commission for Europe, Palais des Nations, 8-14 avenue de la Paix, 1211 Geneva 10, Switzerland, www.unece.org.

* “CSI” is an acronym for the English term “Criticality Safety Index”.

** “ISO” is an acronym for the English term “International Organization for Standardization”.

*** “LSA” is an acronym for the English term “Low Specific Activity”.

**** “SCO” is an acronym for the English term “Surface Contaminated Object”.

***** “TI” is an acronym for the English term “Transport Index”.

CHAPTER 1.3

TRAINING OF PERSONS INVOLVED IN THE CARRIAGE OF DANGEROUS GOODS

1.3.1 SCOPE OF APPLICATION

Persons involved in the carriage of dangerous goods shall be trained in the requirements governing the carriage of such goods appropriate to their responsibilities and duties. Employees shall be trained in accordance with 1.3.2 before assuming responsibilities and shall only perform functions, for which required training has not yet been provided, under the direct supervision of a trained person. Training requirements specific to security of dangerous goods in Chapter 1.10 shall also be addressed.

Note 1: *Training of personnel involved in the carriage of dangerous goods shall be carried out in all cases in compliance with national law and rules.*

Note 2: *With regard to the training for the safety adviser, see 1.8.3 instead of this section.*

Note 3: *With regard to the training of personnel involved in the carriage of goods of Class 7, see also 1.7.2.5.*

Note 4: *Training of personnel involved in the carriage of dangerous goods shall be carried out before they start work on their allotted task and fulfill their obligations.*

1.3.2 NATURE OF TRAINING

The training shall take the following form, appropriate to the responsibility and duties of the individual concerned.

1.3.2.1 General awareness training

Personnel shall be familiar with the general requirements of the provisions for the carriage of dangerous goods.

1.3.2.2 Function-specific training

Personnel shall be trained, commensurate directly with their duties and responsibilities in the requirements of the regulations concerning the carriage of dangerous goods.

Where the carriage of dangerous goods involves a multimodal transport operation, the personnel shall be aware of the requirements concerning other transport modes.

The carrier's and railway infrastructure manager's personnel shall also be trained in matters specific to rail transport. This training shall be in the form of basic training and specialized training.

a) Basic training for all personnel:

All personnel shall be trained in the meaning of the danger labels and of the orange-coloured marking. In addition, personnel shall be aware of the procedure for reporting irregularities.

b) Specialized training for operational personnel directly involved in the carriage of dangerous goods:

In addition to the basic training described under (a), personnel shall be trained commensurate with their duties.

Personnel shall be trained on the subjects covered by the specialized training, which are divided into three categories in 1.3.2.2.2, on the basis of the groups in 1.3.2.2.1.

1.3.2.2.1 Categories of personnel:

Category	Description of category	Personnel
1	Operations personnel involved directly in the transport of dangerous goods	Drivers and marshalling staff or personnel with an equivalent function
2	Personnel responsible for the technical control of wagons used for the transport of dangerous goods	Rolling stock technician or personnel with an equivalent function
3	Personnel responsible for guiding and controlling rail and marshalling services and management personnel of the railway infrastructure manager	Train dispatchers, station operators, switchmen, signalers, control centre personnel or personnel with an equivalent function

1.3.2.2.2 Special subjects to be covered by the specialized training shall be, at least:

a) For personnel of category 1.

Drivers or personnel with an equivalent function:

- gaining of necessary information concerning the composition of the train, the presence of dangerous goods and where they are situated in the train;
- dealing in critical (emergency) situations with irregularities, taking measures relating to the protection of their own train and nearby traffic.

Marshallers or personnel with an equivalent function:

- understanding the meaning of the shunting labels in accordance with Models 13 and 15 of Annex 2 to SMGS (see 5.3.4.2) as well as 7.5.6;
- observing the protective distances for goods of Class 1 in accordance with 7.5.3 (Annex 2 to SMGS);
- dealing in critical (emergency) situation with irregularities.

b) For personnel of category 2.

Wagon technician or personnel with an equivalent function:

- carrying out wagon inspection;
- performing inspections and checks in compliance with 1.4.2.2.1;
- dealing in critical (emergency) situation with irregularities.

c) For personnel of category 3.

Dispatchers, station operators, switchmen, control centre personnel or personnel with an equivalent function:

- dealing in critical (emergency) situation with irregularities;
- observing the internal emergency plans for marshaling yards in compliance with Chapter 1.11.

1.3.2.3 **Safety training**

Personnel involved in the carriage of dangerous goods shall get familiar with the characteristics of dangerous goods, conditions of their carriage, shall be trained in the hazards and dangers presented by dangerous goods. The training provided shall aim to make personnel aware of the safe handling and emergence response procedures.

1.3.2.4 **Refresher training**

The training shall be periodically supplemented with refresher training to take account of changes in regulations.

1.3.3 Documentation

Records of training received in the field of carriage of dangerous goods shall be kept in compliance with national law.

CHAPTER 1.4

SAFETY OBLIGATION OF THE PARTICIPANTS IN THE CARRIAGE OF DANGEROUS GOODS

1.4.1 GENERAL SAFETY MEASURES

1.4.1.1 The participants in the carriage of dangerous goods shall take appropriate measures so as to avoid damage or injury and, if necessary, to minimize their effects. They shall, in all events, comply with the requirements of Annex 2 to SMGS in their respective fields.

1.4.1.2 In the case of an emergency situation, depending on its nature and extent the participants shall immediately notify the emergency services and shall make available to them the information they require to take emergency response action.

1.4.1.3 Annex 2 to SMGS may specify certain of obligations falling to the various participants. If the SMGS Contracting States consider that no lessening of safety is involved, they may in their domestic legislation transfer the obligations falling to a specific participant to one or several other participants, provided that the obligations of 1.4.2 and 1.4.3 are met.

The requirements of 1.2.1, 1.4.2 and 1.4.3 concerning the definitions of participants and their respective obligations shall not affect the provisions of domestic law concerning the legal consequences (civil liability, criminal liability, etc.) stemming from the fact that the participant in question is e.g. a legal entity, a self-employed worker, an employer or an employee.

1.4.2 OBLIGATIONS OF THE PARTICIPANTS IN THE CARRIAGE

Note 1. *Several participants to which safety obligations are assigned in this section may be one and the same enterprise. Also, the activities and the corresponding safety obligations of a participant can be assumed by several enterprises.*

Note 2: *For radioactive materials see also 1.7.6.*

1.4.2.1 Consignor

1.4.2.1.1 The consignor of dangerous goods is required to hand over for carriage only consignments which conform to the requirements of Annex 2 to SMGS. As regards the observance of general safety regulations of paragraph 1.4.1 he shall in particular:

- a) ascertain that the dangerous goods are classified and authorized for carriage in accordance with Annex 2 to SMGS,
- b) furnish the carrier with information and data in a traceable form and, if necessary, the required transport documents and accompanying documents (authorizations, approvals, notifications, certificates, etc.), taking into account in particular the requirements of Chapter 5.4 and of Table A of Chapter 3.2,
- c) use packagings, large packagings, intermediate bulk containers (IBCs) and tanks (tank-wagons, wagons with demountable tanks, battery-wagons, MEGCs, portable tanks and tank-containers) approved for and suited to the carriage of the substances concerned and bearing the marks prescribed by Annex 2 to SMGS,
- d) comply with the requirements on the means of dispatch and on forwarding restrictions,
- e) ensure that even empty uncleaned and not degassed tanks (tank-wagons, wagons with demountable tanks, battery-wagons, MEGCs, portable tanks and tank-containers) or empty uncleaned wagons and containers for carriage in bulk are placarded, marked and labelled in accordance with Chapter 5.3 and that empty uncleaned tanks are closed and present the same degree of leakproofness as if they were full,
- g) in the case of tanks carrying refrigerated liquefied gases ensure that the actual holding time is determined or, in the case of empty, uncleaned tanks, ensure that the pressure is sufficiently reduced,

- f) ensure (also in agreement with the consignee) the fulfillment of requirements of special additional provisions of CW46-CW58 and CW60-CW69 as provided for in 7.5.11 during transshipment of goods from standard gauge wagons (1435 mm) onto broad gauge wagons (1520 mm).

If the consignor does not use the services of other participants (loader, packer, filler), for which operations and activities he, as a party to the contract of carriage, would bear liability, as provided by Article 38 of SMGS, he shall take appropriate measures to ensure that the consignment meets the requirements of Annex 2 to SMGS including those which fulfillment shall be ensured by participants in compliance with paragraph 1.4.3, whose operations and activities fall under the responsibility of the parties to the contract of carriage.

1.4.2.1.2 If the consignor uses the services of other participants (packer, loader, filler, etc.), for which operations and activities he, as a party to the contract of carriage, would bear liability, as provided by Article 38 of SMGS, he shall take appropriate measures to ensure that the consignment meets the requirements of Annex 2 to SMGS.

1.4.2.1.3 When the consignor acts on behalf of a third party, the latter shall inform the consignor in writing that dangerous goods are involved and make available to him all the information and documents he needs to perform his obligations.

1.4.2.2 Carrier

1.4.2.2.1 As regards the observance of general safety regulations of paragraph 1.4.1 the carrier by taking over the dangerous shall in particular:

- a) ascertain that the dangerous goods are classified and authorized for carriage in accordance with Annex 2 to SMGS;
- b) ascertain that all information prescribed in Annex 2 to SMGS related to the dangerous goods to be taken over for the carriage has been provided by the consignor before carriage, that the prescribed data or documentation is attached to the transport document, and transport documents are drawn up by the consignor in compliance with requirements of SMGS or if electronic data processing (EDP) or if electronic data interchange (EDI) techniques are used instead of paper documentation, that data is available during transport in a manner at least equivalent to that of paper documentation;
- c) ascertain visually that the wagons or containers have no obvious defects, leakages or cracks, missing equipment, etc.;
- d) ascertain that the date specified for the next test for tank-wagons, battery-wagons, wagons with demountable tanks, portable tanks, tank-containers and MEGCs has not expired;

Note: *Tanks, battery-wagons and MEGCs may exceptionally be carried after the expiry of this deadline under the conditions of 4.1.6.10 (in the case of battery-wagons and MEGCs containing pressure receptacles as elements), 4.2.4.4, 4.3.2.3.7, 4.3.2.4.4, 6.7.2.19.6, 6.7.3.15.6 or 6.7.4.14.6.*

- e) verify that the wagons are not overloaded;
- f) ascertain that the placards, marks and orange-coloured plates as well as white-coloured plates prescribed for the wagons in Chapter 5.3 have been affixed;
- g) ascertain that the equipment prescribed in the instructions in writing is in the driver's cab (See 5.4.3).

This shall be done on the basis of the consignment note and accompanying documents, by a visual inspection of the wagon or the containers and, where appropriate, the load.

- 1.4.2.2.2** The carrier may, however, in the case of 1.4.2.2.1 (a), (b), (d), (e) and (f), rely on information and data made available to him by other participants in the carriage (See paragraph 1.4.2) or by persons, whose operations and activities fall under the responsibility of the parties to the contract of carriage (See paragraph 1.4.3). In the case of 1.4.2.2.1 (c) the carrier may rely on what is certified in the "container/vehicle packing certificate" provided in accordance with 5.4.2.
- 1.4.2.2.3** If the carrier observes an infringement of the requirements of 1.4.2.2.1, he shall not take over the goods for the carriage until the matter has been rectified..
- 1.4.2.2.4** If, during the journey, an infringement which could jeopardize the safety of the operation is observed, the consignment shall be halted as soon as possible bearing in mind the requirements of traffic safety, of the safe immobilisation of the consignment, and of public safety.
- The transport operation may only be continued once the consignment complies with applicable regulations. The competent authority concerned by the rest of the journey may grant an authorization to pursue the transport operation.
- In case the required compliance cannot be achieved and no authorization is granted for the rest of the journey, the competent authority shall provide the carrier with the necessary administrative assistance. The same shall apply in case the carrier informs this/these competent authority that the dangerous nature of the goods carried was not communicated to him by the consignor and that he wishes, by virtue of the law applicable in particular to the contract of carriage, to unload, destroy or render the goods harmless.
- 1.4.2.2.5** The carrier shall ensure that the manager of the railway infrastructure being used is able to obtain at any time during carriage rapid and unrestricted access to the information allowing him to meet the requirements of 1.4.3.6 (b).
- Note:** The arrangements by which the data are provided shall be laid down in the rules for using the railway infrastructure.
- 1.4.2.2.6** The carrier shall provide the locomotive crew with the instructions in writing as prescribed in 5.4.3.
- 1.4.2.2.7** The carrier shall inform the driver of the dangerous goods on board and their position on the train before the train starts its journey.
- 1.4.2.2.8** (reserved)
- 1.4.2.3 Consignee**
- 1.4.2.3.1** The consignee has the obligation not to defer acceptance of the goods without compelling reasons and to verify, after unloading, that the requirements of Annex 2 to SMGS concerning him have been complied with.
- 1.4.2.3.2** A wagon or container may only be returned or reused once the requirements of Annex 2 to SMGS concerning the unloading have been complied with.
- 1.4.2.3.3** If the consignee makes use of the services of other participants (unloader, cleaner, decontamination facility, etc.) for which operations and activities he, as a party to the contract of carriage, would bear liability, as provided by Article 38 of SMGS, he shall take appropriate measures to ensure that the requirements of 1.4.2.3.1 and 1.4.2.3.2 of Annex 2 to SMGS have been complied with.
- 1.4.2.3.4** The consignee shall ensure (also in agreement with the consignor) the fulfillment of requirements of special additional provisions of CW46-CW58 and CW60-CW-69 as provided for in 7.5.1 during transshipment of goods from standard gauge wagons (1435 mm) onto broad gauge wagons (1520 mm).
- 1.4.3 OBLIGATIONS OF OTHER PARTICIPANTS FOR WHICH OPERATIONS AND ACTIVITIES THE PARTIES TO THE CONTRACT OF CARRIAGE BEAR LIABILITY AS PROVIDED BY ARTICLE 38 OF SMGS.**

A non-exhaustive list of the other participants and their respective obligations is given below. The obligations of the other participants whose operations and activities fall under the responsibility of the parties to the contract of carriage, flow from section 1.4.1 above insofar as they know or should have known that their duties are performed as part of a transport operation subject to Annex 2 to SMGS.

1.4.3.1 Loader

1.4.3.1.1. As regards the observance of general safety regulations of paragraph 1.4.1 the loader shall in particular:

- a) hand over the dangerous goods to the carrier if they are allowed to be transported in compliance with the requirements of Annex 2 to SMGS;
- b) he shall, when handing over for carriage packed dangerous goods or uncleaned empty packagings, check whether the packaging is damaged. He shall not hand over a package the packaging of which is damaged, especially if it is not leakproof, and there are leakages or the possibility of leakages of the dangerous substance, until the damage has been repaired; this obligation also applies to empty uncleaned packagings;
- c) he shall comply with the special requirements concerning loading and handling;
- d) he shall, when he hands dangerous goods over for carriage directly, comply with the requirements concerning placarding, marking and orange-coloured plates and white-coloured plates on the wagon or large container conforming to Chapter 5.3;
- e) he shall, when loading packages, comply with the prohibitions on mixed loading taking into account dangerous goods already in the wagon or large container and requirements concerning the separation of foodstuffs, other articles of consumption or animal feedstuffs.

1.4.3.1.2 The loader may, however, in the case of 1.4.3.1.1 (a), (d) and (e), rely on information and data made available to him by other participants in the carriage (See paragraph 1.4.2) or by participants for which operations and activities the parties to the contract of carriage shall bear liability (See paragraph 1.4.3).

1.4.3.2 Packer

As regards the observance of general safety regulations of paragraph 1.4.1 the packer shall comply with in particular:

- a) the requirements concerning packaging conditions, or mixed packing conditions and,
- b) when he prepares packages for carriage, the requirements concerning marking and labeling of the packages.

1.4.3.3 Filler

As regards the observance of general safety regulations of paragraph 1.4.1 the filler has the following obligations in particular:

- a) he shall ascertain prior to the filling of tanks that both they and their equipment are technically in a satisfactory condition
- b) he shall ascertain that the date specified for the next inspection for tank-wagons, battery-wagons, wagons with demountable tanks, portable tanks, tank-containers and MEGCs has not expired;
- c) he shall only fill tanks with the dangerous goods authorized for carriage in those tanks;
- d) he shall, during the filling of the tank, comply with the requirements concerning dangerous goods in adjoining compartments;

- e) he shall, during the filling of the tank, observe the permissible degree of filling or the permissible mass of contents per litre of capacity for the substance being filled;
- f) he shall, after filling the tank, ensure that all closures are in a closed position and that there is no leakage;
- g) he shall ensure that no dangerous residue of the filling substance adheres to the outside of the tanks filled by him
- h) he shall, in preparing the dangerous goods for carriage, ensure that the placards, marks, orange-coloured plates and labels (being used for environmentally hazardous substances or for elevated temperature substances etc.) and as well as shunting labels, white-coloured plates and emergency card numbers are affixed on the tanks, on the wagons and on the containers in accordance with the Chapter 5.3;
- i) he shall, before and after filling tank-wagons with a liquefied gas, observe the applicable special checking requirements;
- j) he shall, when filling wagons or containers with dangerous goods in bulk, ascertain that the relevant provisions of Chapter 7.3 are complied with.

Note: *The filler shall establish procedures to ensure that he fulfils all his obligations.*

1.4.3.4 Tank-container/portable tank operator

As regards the observance of general safety regulations of paragraph 1.4.1 the tank-container/portable tank operator shall in particular:

- a) ensure compliance with the requirements for construction, equipment, tests and marking;
- b) ensure that the maintenance of shells and their equipment is carried out in such a way as to ensure that, under normal operating conditions, the tank-container/portable tank satisfies the requirements of Annex 2 to SMGS until the next inspection;
- c) have an exceptional check made when the safety of the shell or its equipment is liable to be impaired by a repair, an alteration or an accident;

1.4.3.5 Tank-wagon operator

As regards the observance of general safety regulations of paragraph 1.4.1 the tank-wagon operator shall in particular:

- a) ensure compliance with the requirements for construction, equipment, tests and marking;
- b) ensure that the maintenance of tank-wagons and their equipment is carried out in such a way as to ensure that, under normal operating conditions, the tank-wagon satisfies the requirements of Annex 2 to SMGS;
- c) have an exceptional check made when the safety of the shell or its equipment is liable to be impaired by a repair, an alteration or an accident;
- d) ensure that all results of actions, which have been undertaken in compliance with a) and b), would be included in the set of technical documents relating to a tank.

1.4.3.6 Railway infrastructure manager

As regards the observance of general safety regulations of paragraph 1.4.1 the railway infrastructure manager has the following obligations in particular. The railway infrastructure manager

- a) shall ensure that internal emergency plans for marshalling yards are prepared in accordance with Chapter 1.11;
- b) shall ensure that he has rapid and unrestricted access to the following information:

- composition of the train by indicating the number of each wagon and the wagon type if this is not included in the wagon number,
- UN numbers of the dangerous goods being carried in or on each wagon insofar as they are required to be shown in the consignment note, or if only dangerous goods packed in limited quantities in accordance with Chapter 3.4 are being carried, information indicating their presence when marking of the wagon or large container in accordance with Chapter 3.4 is required,
- position of each wagon in the train (wagon order).

This information shall only be disclosed to those parties that require it for safety, security or emergency response purposes.

Note: *The arrangements by which the data are provided shall be laid down in the rules for using the railway infrastructure.*

1.4.3.7 Unloader

1.4.3.7.1 As regards the observance of general safety regulations of paragraph 1.4.1 the unloader shall in particular:

- a) ascertain that the correct goods are unloaded by comparing the relevant information in the consignment note with the information on the package, container, tank, MEGC or wagon;
- b) before and during unloading, check whether the packagings, the tank, the wagon or container have been damaged to an extent which would endanger the unloading operation. If this is the case, ascertain that unloading is not carried out until appropriate measures have been taken;
- c) comply with all relevant requirements concerning unloading and handling;
- d) immediately following the unloading of the tank, wagon or container:
 - 1) remove any dangerous residues which have adhered to the outside of the tank, wagon or container during the process of unloading; and
 - 2) ensure the closure of valves and inspection openings;
- e) ensure that the prescribed cleaning and decontamination of the wagons or containers is carried out;
- f) ensure that the wagons and containers once completely unloaded, cleaned, degassed and decontaminated, no longer display placards, marks, orange-coloured plates and white-coloured plates that had been displayed in accordance with Chapter 5.3.

Note: *The unloader shall establish procedures to ensure that he fulfils all his obligations.*

1.4.3.7.2 If the unloader makes use of the services of other participants (cleaner, decontamination facility, etc.) whose operations and activities fall under the responsibility of the parties to the contract of carriage, he shall take appropriate measures to ensure that the requirements of Annex 2 to SMGS have been complied with.

1.4.3.8 (reserved)

CHAPTER 1.5 DEROGATIONS

1.5.1 TEMPORARY DEROGATIONS

1.5.1.1 In contrast to the regulations under Annex 2 to SMGS certain dangerous goods, which don't fully meet the requirements of Annex 2 to SMGS may be allowed to be transported, provided that safety is not compromised thereby and the transport of such dangerous goods is agreed by the parties involved in its carriage.

The consignor shall request the carrier from the country of dispatch to conclude the special agreement and provide relevant data to be required for the conclusion of such special agreement.

The carrier from the country of dispatch shall submit these data to the carriers of the countries involved in the carriage, in order to agree the content of such agreement. The carriers from the involved countries shall inform each other as soon as possible of their decisions concerning this matter.

The carriers shall make special arrangements with competent authorities of their countries about the carriage of such dangerous goods.

The carrier from the country of dispatch, who has been requested to conclude the special agreement, shall inform the consignor about the conclusion of the special agreement concerning the carriage of such dangerous goods and submit to him the specified number of this special agreement (for example RZD I/2005. The consignor shall enter in the consignment note (box "Description of the goods") the following additional information "Agreed under the SMGS, Annex 2 RZD I/2005" in conjunction with data prescribed in 5.4.1.1.

***Note:** "Special arrangement" in accordance with 1.7.4 is not considered to be a temporary derogation in accordance with this section.*

1.5.1.2 The period of validity of the temporary derogation shall not be more than five years from the date of its entry into force. The temporary derogation shall automatically cease as from the date of the entry into force of a relevant amendment to Annex 2 to SMGS.

1.5.1.3 Transport operations on the basis of temporary derogations shall constitute transport operations in compliance with the requirements of the Annex 2 to SMGS.

1.5.2 MILITARY CONSIGNMENTS

Other provisions shall apply to military consignments, i.e. consignments with substances or articles of Class 1 belonging to the armed forces or for which the armed forces are responsible (see 5.2.1.5, sub-sections 5.2.2.1.8, 5.3.1.1.2 and 5.4.1.2.1(f) and 7.2.4, special requirement W2).

CHAPTER 1.6 TRANSITIONAL MEASURES

1.6.1 GENERAL PROVISIONS

1.6.1.1 Unless otherwise provided, the substances and articles falling within the scope of Annex 2 to SMGS may be carried until 31 December 2025 in accordance with the requirements of Annex 2 to SMGS applicable up to 1 July 2025.

Note: For the information in the consignment note, see 5.4.1.1.12.

1.6.1.2 – 1.6.1.5 (reserved)

1.6.1.6 Intermediate bulk containers (IBCs) manufactured before 1 January 2005 in accordance with the requirements applicable up to 1 July 2005 and which do not conform to the requirements applicable as from 1 July 2005 may continue to be used.

1.6.1.7 Type approvals for drums, jerricans and composite packagings made of high or medium molecular mass polyethylene issued before 1 July 2006 in accordance with the requirements of 6.1.5.2.6 in force until 1 July 2006, but which are not in accordance with the requirements of 4.1.1.21, continue to be valid until 1 January 2010. Any such packagings manufactured and marked on the basis of these type approvals may be used until the end of their period of use determined in 4.1.1.15.

1.6.1.8 Existing orange-coloured plates which meet the requirements of 5.3.2.2 applicable up to 1 July 2026 may continue to be used, provided that the requirements of 5.3.2.2.1 and 5.3.2.2.2 that the plate, numbers and letters shall remain affixed irrespective of the orientation of the wagon are met even when the wagon overturns).

1.6.1.9 (reserved)

1.6.1.10 (reserved)

1.6.1.11 Type approvals for drums, jerricans and composite packagings made of high or medium molecular mass polyethylene, and for high molecular mass polyethylene IBCs, issued before 1 July 2007 in accordance with the requirements of 6.1.6 (a) in force until 1 July 2007, but which are not in accordance with the requirements of 6.1.6.1 (a) applicable as from 1 July 2007, continue to be valid.

1.6.1.12 (reserved)

1.6.1.13 (reserved)

1.6.1.14 IBCs manufactured before 1 July 2011 and conforming to a design type which has not passed the vibration test of 6.5.6.13 or which was not required to meet the criteria of 6.5.6.9.5 (d) at the time it was subjected to the drop test, may still be used.

1.6.1.15 IBCs manufactured, remanufactured or repaired before 1 January 2011 need not be marked with the maximum permitted stacking load in accordance with 6.5.2.2.2. Such IBCs, not marked in accordance with 6.5.2.2.2, may still be used after 31 December 2010. If they are remanufactured or repaired after that date, then they must be marked in accordance with 6.5.2.2.2.

1.6.1.1 – 1.6.1.25 (reserved)

1.6.1.26 Large packagings manufactured or remanufactured before 1 January 2014 and which do not conform to the requirements of 6.6.3.1 regarding the height of letters, numerals and symbols applicable as from 1 January 2013 may continue to be used. Those manufactured or remanufactured before 1 January 2015 need not be marked with the maximum permitted stacking load in accordance with 6.6.3.3. Such large packagings not marked in accordance with 6.6.3.3 may still be used after 31 December 2014 but must be marked in accordance with 6.6.3.3 if they are remanufactured after 31 December 2014.

Large packagings manufactured or remanufactured between 1 January 2011 and 31 December 2016 and marked with the maximum permitted stacking load in accordance with 6.6.3.3 in force until 1 July 2015 may continue to be used.

1.6.1.27 Means of containment integral to equipment or machinery containing liquid fuels of UN Nos. 1202, 1203, 1223, 1268, 1863 and 3475 constructed before 1 July 2013, which do not conform to the requirements of paragraph (a) of special provision 363 of Chapter 3.3 applicable as from 1 July 2013, may still be used.

1.6.1.28 (reserved)

1.6.1.29 Lithium cells and batteries manufactured according to a type meeting the requirements of sub-section 38.3 of the revised version of Manual of Tests and Criteria, Amendment 1 or any subsequent revision and amendment applicable at the date of the type testing may continue to be carried, unless otherwise provided in Annex 2 to SMGS.

Lithium cells and batteries manufactured before 1 July 2003 meeting the requirements of the revised version of Manual of Tests and Criteria may continue to be carried if all other applicable requirements are fulfilled.

1.6.1.30 – 1.6.1.32 (reserved)

1.6.1.33 Electric double layer capacitors of UN No. 3499, manufactured before 1 January 2014, need not be marked with the energy storage capacity in Wh as required by paragraph (e) of special provision 361 of Chapter 3.3.

1.6.1.34 Asymmetric capacitors of UN No. 3508, manufactured before 1 January 2016, need not be marked with the energy storage capacity in Wh as required by paragraph (c) of special provision 372 of Chapter 3.3.

1.6.1.35 – 1.6.1.42 (reserved)

1.6.1.38 SMGS Contracting States may continue to issue training certificates for dangerous goods safety advisers conforming to the model applicable until 30 June 2019, instead of those conforming to the requirements of 1.8.3.18 applicable from 1 July 2019, until 31 December 2019. Such certificates may continue in use to the end of their five year validity."

1.6.1.39 – 1.6.1.42 (reserved)

1.6.1.43 Vehicles registered or brought into service before 1 July 2019, as defined in special provisions 388 and 669 of Chapter 3.3, and their equipment intended for use during carriage, which conform to the requirements of Annex 2 to SMGS applicable until 1 July 2019 but containing lithium cells and batteries which do not conform to the provisions of 2.2.9.1.7.1 may continue to be carried as a load in accordance with the requirements of special provision 666 of Chapter 3.3.

1.6.1.44 (reserved)

1.6.1.45 SMGS Contracting States may, until 31 December 2020, continue to issue training certificates for dangerous goods safety advisers conforming to the model applicable until 1 July 2019, instead of those conforming to the requirements of 1.8.3.18 applicable from 1 July 2019. Such certificates may continue in use to the end of their five year validity.

1.6.1.46 – 1.6.1.48 (reserved)

1.6.1.49 The mark shown in Figure 5.2.1.9.2 applicable until 1 July 2023, may continue to be applied until 31 December 2026.

1.6.1.50 For articles that meet the definition for "DETONATORS, ELECTRONIC" as described in 2.2.1.4 Glossary of names, and assigned to UN Nos. 0511, 0512 and 0513, the entries for "DETONATORS, ELECTRIC" (UN Nos. 0030, 0255 and 0456) may continue to be used until 30 June 2025.

1.6.1.51 Adhesives, paint and paint related materials, printing inks and printing ink related materials and resin solutions assigned to UN 3082 environmentally hazardous substance, liquid, n.o.s., packing group III in accordance with 2.2.9.1.10.6 as a consequence of 2.2.9.1.10.5* containing 0.025 % or more of the following substances, on their own or in combination:

- 4,5-dichloro-2-octyl-2H-isothiazol-3-one (DCOIT);
- octhilinone (OIT); and
- zinc pyrithione (ZnPT);

may be carried until 30 June 2027 in steel, aluminium, other metal or plastic packagings, which do not meet the requirements of 4.1.1.3, when carried in quantities of 30 litres or less per packaging as follows:

- a) In palletized loads, a pallet box or unit load device, e.g. individual packagings placed or stacked and secured by strapping, shrink or stretch-wrapping or other suitable means to a pallet; or
- b) As inner packagings of combination packagings with a maximum net mass of 40 kg.

* See Document No. 9A0 of the *List*.

1.6.1.52 Inner receptacles of composite IBCs manufactured before 1 July 2021 in accordance with the requirements of 6.5.2.2.4 in force up to 31 December 2020 and which are not in accordance with the requirements of 6.5.2.2.4 regarding the marks on the inner receptacles that are not readily accessible for inspection due to the design of the outer casing applicable as from 1 January 2021 may continue be used until the end of their period of use determined in 4.1.1.15.

1.6.1.53 (Deleted)

1.6.1.54 Vats for the carriage of molten aluminium of UN No. 3257 which have been constructed and approved before 1 July 2025 in accordance with the provisions of national law but which do not, however, conform to the construction and approval requirements of additional provision AP 11 in 7.3.3.2.7 applicable as from 1 January 2025 may continue to be used with the approval of the competent authorities in the countries of use.

1.6.1.55 Substances assigned to UN No. 1835 or 3560 may be carried until 31 December 2026 in accordance with the classification provisions and transport conditions of RID applicable to UN 1835 TETRAMETHYLAMMONIUM HYDROXIDE SOLUTION up to 1 July 2025.

1.6.1.56 Substances assigned to UN No. 3423 may be carried until 31 December 2026 in accordance with the classification provisions and transport conditions of RID applicable up to 1 July 2025.

1.6.1.57 Packagings manufactured before 1 January 2027 and which do not conform to the requirements of 6.1.3.1 regarding the affixing of marks on non-removable components applicable as from to 1 July 2025 may continue to be used.

1.6.2 PRESSURE RECEPTACLES FOR CLASS 2

1.6.2.1 Receptacles built before 1 July 2000 and which do not conform to the requirements of Annex 2 to SMGS applicable as from 1 July 2000, but the carriage of which was permitted under the requirements of Annex 2 to SMGS applicable up to 30 June 2000, may continue to be transported after that date if the periodic test requirements in packing instructions P200 and P203 are complied with.

1.6.2.2 (reserved)

- 1.6.2.3** Receptacles intended for the carriage of Class 2 substances constructed before 1 July 2005, may continue to bear, after 1 July 2005, the marks conforming to the requirements of Annex 2 to SMGS applicable until 1 July 2005.
- 1.6.2.4** Pressure receptacles designed and constructed in accordance with technical rules no longer recognized according to 6.2.5 may still be used.
- 1.6.2.5** Pressure receptacles and their closures designed and constructed in accordance with standards applicable at the time of their construction (see 6.2.4) according to the provisions of Annex 2 to SMGS which were applicable at that time may still be used unless restricted by a specific transitional measure.
- 1.6.2.6** Pressure receptacles for substances other than those of Class 2, built before 1 July 2010 in accordance with the requirements of 4.1.4.4 in force up to 30 June 2009, but which do not conform to the requirements of 4.1.3.6 applicable as from 1 July 2009, may continue to be used, provided that the requirements of 4.1.4.4 in force up to 30 June 2009 are complied with.
- 1.6.2.7 – 1.6.2.8** (reserved)
- 1.6.2.9** The provisions of packing instruction P 200 (10), special packing provision v of 4.1.4.1 applicable until 1 July 2011 may be applied by SMGS Contracting States to cylinders constructed before 1 January 2015.
- 1.6.2.10** Refillable welded steel cylinders for the carriage of gases of UN Nos. 1011, 1075, 1965, 1969 or 1978, granted 15 year intervals for periodic inspection in accordance with packing instruction P 200 (10), special packing provision v of 4.1.4.1 as applicable until 1 July 2011 by the competent authority of the country (countries) of carriage, may continue to be periodically inspected according to those provisions.
- 1.6.2.11** Gas cartridges constructed and prepared for carriage before 1 January 2013 for which the requirements of 1.8.6, 1.8.7 or 1.8.8 for the conformity assessment of gas cartridges have not been applied may still be carried after this date, provided all the other applicable provisions of Annex 2 to SMGS are met.
- 1.6.2.12** Salvage pressure receptacles may continue to be constructed and approved according to national regulations up to 31 December 2013. Salvage pressure receptacles constructed and approved in accordance with national regulations before 1 January 2014 may continue to be used with the approval of the competent authorities of the countries of use.
- 1.6.2.13** Bundles of cylinders manufactured before 1 July 2013 which are not marked in accordance with 6.2.3.9.7.2 and 6.2.3.9.7.3 applicable from 1 July 2013 or 6.2.3.9.7.2 applicable from 1 July 2015 may be used until the next periodic inspection after 1 July 2015.
- 1.6.2.14** Cylinders constructed before 1 January 2016 in accordance with 6.2.3 and a specification approved by the competent authorities of the countries of transport and use, but not in accordance with ISO 11513:2011 or ISO 9809-1:2010 as required in 4.1.4.1, packing instruction P 208 (1), may be used for the carriage of adsorbed gases provided the general packing requirements of 4.1.6.1 are met.
- 1.6.2.15.** Bundles of cylinders periodically inspected before 1 July 2015 which are not marked in accordance with 6.2.3.9.7.3 applicable from 1 July 2015 may be used until the next periodic inspection after 1 July 2015.
- 1.6.2.16 - 1.6.2.17** (reserved)
- 1.6.2.18** Closed cryogenic receptacles constructed before 1 July 2023 which were subject to the initial inspection and test requirements of 6.2.1.5.2 applicable until 1 July 2023

but which do not however conform to the requirements of 6.2.1.5.2 relating to the initial inspection and test applicable as from 1 July 2023, may continue to be used.

- 1.6.2.19** Acetylene cylinders constructed before 1 July 2023 which are not marked in accordance with 6.2.2.7.3 k) or l) applicable from 1 July 2023 may continue to be used until the next periodic inspection and test after 1 July 2023.
- 1.6.2.20** Closures of refillable pressure receptacles constructed before 1 July 2023 which are not marked in accordance with 6.2.2.11 or 6.2.3.9.8 applicable from 1 July 2023 may continue to be used.
- 1.6.2.21 - 1.6.2.22 (reserved)**
- 1.6.2.23** The requirements of Note 3 of 6.2.1.6.1 applicable until 1 July 2025 may continue to be applied until 31 December 2026.
- 1.6.2.24** For the carriage of gases of UN Nos. 1006, 1013, 1046 and 1066 in cylinders having a test pressure capacity product of maximum 15.2 MPa·l (152 bar·l), the provisions of special provision 653 of Chapter 3.3 applicable until 31 December 2024 may continue to be applied until 31 December 2026.
- 1.6.3 TANK-WAGONS AND BATTERY-WAGONS**
- 1.6.3.1** Tank-wagons built before 1 January 2005 in compliance with the requirements of Annex 2 to SMGS applicable up to 31 December 2004 and which do not conform to the requirements of Annex 2 to SMGS applicable as from 1 January 2005, may continue to be used after that date taking account of transitional provisions as prescribed in 1.6.3.4 – 1.6.3.7.
- 1.6.3.2** Periodic inspections (examinations) of the tank-wagons, which are still used in compliance with the transitional provisions, shall be carried out in accordance with the requirements applicable to different goods.
- 1.6.3.3** Tank-wagons built before 1 July 2005 in compliance with the requirements of Annex 2 to SMGS applicable up to 31 December 2004 and which do not conform to the requirements of Annex 2 to SMGS applicable as from 1 July 2005, may continue to be used after that date.
- 1.6.3.4** Bottom discharge tank-wagons intended for the carriage of petroleum products built before 1 January 2005 may be equipped with two independent closures (main closure and stopper, which is installed on the discharging device), provided that all parts of discharging device ensure the operational safety and the environmental protection. These tank-wagons shall be used only for the carriage of substances of Class 3 presenting no additional risk as well as of UN No. 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S (Class 9).
- 1.6.3.5** (reserved)
- 1.6.3.6** Plates may be affixed to the transverse beam ends of broad-gauge tank-wagons (1520 mm) built before 1 January 2005.
- 1.6.3.7** The tank-wagons which are currently in operation may be allowed to be used without valves and closure devices as prescribed in 6.8.3.2.3 and 6.8.3.2.4 until 1 January 2014 provided that safety and environmental requirements are met.
- 1.6.3.8** When, because of amendments to Annex 2 to SMGS, some proper shipping names of gases have been modified, it is necessary to modify the names on the plate or on the shell itself (see 6.8.3.5.2 or 6.8.3.5.3). The names of the gases on the tank-wagons, battery-wagons and wagons with demountable tanks or on the plates (see 6.8.3.5.6 (b) or (c)) shall be adapted at the first periodic test thereafter.
- 1.6.3.9 – 1.6.3.15** (Reserved)

- 1.6.3.16** For tank-wagons and battery-wagons constructed before 1 January 2007 which do not conform to the requirements of 4.3.2, 6.8.2.3, 6.8.2.4 and 6.8.3.4 concerning the tank record, the retention of files for the tank record shall start at the latest at the first periodic inspection after 30 June 2007.
- 1.6.3.17** (reserved)
- 1.6.3.18** The tank-wagons without an assigned code, relevant marks and alphanumeric codes of special provisions TC and TE in compliance with 6.8.4 may be allowed to be used until 1 July 2011.
Date of test (certification) to be identified in compliance with 6.8.2.5.2 shall be mentioned after most recent date periodic test (certification) in compliance with 6.8.2.5.2 after 1 January 2012.
- 1.6.3.19** (reserved)
- 1.6.3.20** Tank-wagons constructed before 1 July 2006 in accordance with the requirements in force up to 30 June 2006 but which do not, however, conform to the requirements of 6.8.2.1.7 applicable as from 1 July 2006 and special provision TE15 of 6.8.4 (b) applicable from 1 July 2006 to 1 July 2007 may still be used.
- 1.6.3.21** Tank-wagons constructed before 1 July 2006 in accordance with the requirements in force up to 30 June 2006 and which conform to the requirements of 6.8.2.2.10, but which are not, however, equipped with a pressure gauge or other appropriate measurement instrument, shall be regarded as leak-proof until the next periodic test (certification) in compliance with 6.8.2.4.2 but not later than 31 December 2010.
- 1.6.3.22 – 1.6.3.25** (Reserved)
- 1.6.3.26** Tank-wagons constructed before 1 January 2008 in accordance with the requirements in force up to 30 June 2007 but which do not, however, conform to the requirements applicable as from 1 Jul 2007 regarding the marking of the external design pressure in accordance with 6.8.2.5.1, may still be used.
External pressure design data may be shown on shells of tank-wagons, which are built from 1 January 2008 until 1 January 2009, in printed letters and digits using data entry screen.
- 1.6.3.27** (a) For tank-wagons and battery-wagons not fitted with automatic couplers
- for gases of Class 2 with classification codes containing the letter(s) T, TF, TC, TO, TFC or TOC, and
 - for substances of classes 3 to 8 carried in the liquid state and to which tank code L15CH, L15DH or L21DH is assigned in column (12) of Table A of Chapter 3.2,
- constructed before 1 July 2006 the devices defined in special provision TE 22 of 6.8.4 need to be capable of absorbing at least 500 kJ of energy at each end of the wagon.
- b) Tank-wagons and battery-wagons not fitted with automatic couplers
- for gases of Class 2 with classification codes containing only the letter F, and
 - for substances of classes 3 to 8 carried in the liquid state and to which tank code L10BH, L10CH or L10DH is assigned in column (12) of Table A of Chapter 3.2,
- constructed before 1 January 2007 and which do not conform to the applicable requirements of special provision TE 22 of 6.8.4 in force from 1 January 2007, may still be used.
- Tank-wagons and battery-wagons for the carriage of these gases and substances fitted with automatic couplers, constructed before 1 July 2015 and which do not conform to the

applicable requirements of special provision TE 22 of 6.8.4 in force from 1 July 2015, may still be used.

1.6.3.28 Tank-wagons constructed before 1 July 2006 in accordance with the requirements applicable up to 30 June 2006 and which do not conform to the requirements of the second paragraph of 6.8.2.2.1, shall be refitted at the latest at the time of the next refurbishment or the next repair, where this is practicable.

1.6.3.29 Tank-wagons constructed before 1 July 2006 and which do not conform to the requirements of 6.8.2.2.4 in force from 1 July 2006, may still be used.

1.6.3.30 – 1.6.3.31 (Reserved)

1.6.3.32 Tank-wagons

- for gases of Class 2 with classification codes containing the letter(s) T, TF, TC, TO, TFC or TOC, and
- for liquids of classes 3 to 8 to which tank code L15CH, L15DH or L21DH is assigned in column (12) of Table A of Chapter 3.2,

constructed before 1 July 2007 and which do not conform to the applicable requirements of special provision TE 25 of 6.8.4 (b) in force from 1 July 2007 may still be used.

1.6.3.33 Tank-wagons and battery-wagons intended for the carriage of gases of Class 2 built before 1 January 1986, which don't conform to the requirements of 6.8.3.1.6 concerning the buffers and energy absorption devices may be allowed to be used.

1.6.3.34 – 1.6.3.37 (Reserved)

1.6.3.38 Tank-wagons and battery-wagons designed and constructed in accordance with standards applicable at the time of their construction (see 6.8.2.6 and 6.8.3.6) according to the provisions of Annex 2 to SMGS which were applicable at that time may still be used unless restricted by a specific transitional measure.

1.6.3.39 Tank-wagons constructed before 1 July 2011 in accordance with the requirements of 6.8.2.2.3 in force up to 30 June 2011 but which do not, however, conform to the requirements of 6.8.2.2.3, third paragraph, concerning the position of the flame trap or flame arrester may still be used.

1.6.3.40 (reserved)

1.6.3.41 Tank-wagons constructed before 1 July 2013 in accordance with the requirements in force up to 30 June 2013, but which do not, however, meet the marking provisions of 6.8.2.5.2 or 6.8.3.5.6 applicable as from 1 July 2013, may continue to be marked in accordance with the requirements applicable up to 30 June 2013 until the next periodic inspection after 1 July 2013.

1.6.3.42 – 1.6.3.44 (Reserved)

1.6.3.45 Tank-wagons for refrigerated liquefied gases constructed before 1 July 2019 in accordance with the requirements in force up to 30 June 2019 but which do not conform to the requirements of 6.8.3.4.10, 6.8.3.4.11 and 6.8.3.5.4 applicable from 1 July 2019 may continue to be used until the next inspection after 1 July 2019. Until this time, to meet the requirements of 4.3.3.5 and 5.4.1.2.2 (d), the actual holding times may be estimated without recourse to the reference holding time.

1.6.3.46 (reserved)

1.6.3.47 Tank-wagons constructed before 1 July 2019, fitted with safety valves meeting the requirements in force up to 1 July 2019 but which do not meet the requirements of 6.8.3.2.9 last sub-paragraph concerning their design or protection applicable from 1 July 2019 may continue to be used until the next intermediate or periodic inspection after 1 January 2021.

- 1.6.3.48** Notwithstanding the requirements of special provision TU 42 of 4.3.5 applicable from 1 July 2019, tank-wagons with a shell constructed of aluminium alloy, including those with protective lining, which were used before 1 July 2019 for the carriage of substances with a pH value less than 5.0 or more than 8.0, may continue to be used for the carriage of such substances until 31 December 2026.
- 1.6.3.49** Tank-wagons constructed before 1 July 2019 in accordance with the requirements in force up to 1 July 2019 but which do not conform to the requirements of 6.8.2.2.10 concerning the burst pressure of the bursting disc applicable as from 1 July 2019 may continue to be used.
- 1.6.3.50 – 1.6.3.51** (reserved)
- 1.6.3.52** Tank-wagons constructed before 1 July 2019 in accordance with the requirements in force up to 1 July 2019 but which however do not conform to the requirements of 6.8.2.2.11 applicable from 1 July 2019 may continue to be used.
- 1.6.3.53** Type approval certificates issued for tank-wagons and battery-wagons before 1 July 2019 in accordance with the requirements of 6.8.2.3.1 in force up to 1 July 2019 but which do not, however, conform to the requirements of 6.8.2.3.1 relating to the distinguishing sign used on vehicles in international road traffic⁴ of the state whose territory the approval was granted and a registration number applicable as from 1 July 2019 may continue to be used.
- 1.6.3.54** Procedures used by the competent authority for the approval of experts performing activities concerning tank-wagons intended for the carriage of substances other than those for which TA4 and TT9 of 6.8.4 apply which conform to the requirements of Chapter 6.8 in force up to 31 July 2023 but which do not conform to the requirements of 1.8.6 applicable to inspection bodies from 1 July 2023 may continue to be used until 31 December 2032.
- Note:** The term "expert" has been replaced by the term "inspection body".
- 1.6.3.55** Type approval certificates issued for tank-wagons intended for the carriage of substances other than those for which TA4 and TT9 of 6.8.4 apply, issued before 1 July 2023 in compliance with Chapter 6.8 which not comply with 1.8.7 as applicable from 1 July 2023 may continue to be used until the end of their validity.
- 1.6.3.56** (reserved)
- 1.6.3.57** Tank-wagons constructed before 1 January 2024 in accordance with the requirements in force up to 1 July 2023 but which do not, however, conform to the requirements applicable as from 1 July 2023 regarding the fitting of safety valves in accordance with 6.8.3.2.9, may still be used.
- 1.6.3.58** Procedures used by the competent authority for the approval of experts, the performance of inspections concerning tank-wagons and the mutual recognition of such inspections in accordance with the requirements of 6.8.2.4.6 in force up to 1 July 2023, but which do not, however, conform to the requirements applicable as from 1 July 2023, may continue to be used until 31 December 2032.
- 1.6.3.59** Tank-wagons constructed before 1 July 2023 in accordance with the requirements in force up to 1 July 2023, but which do not, however, meet the requirements of special provision TE26 of 6.8.4 b) applicable as from 1 July 2023 may continue to be used.

⁴ Distinguishing sign of the state of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

- 1.6.3.60** Tank-wagons that meet the requirements of Chapter 6.8, and that are already fitted with safety valves meeting the requirements of 6.8.3.2.9 as applicable from 1 July 2023 do not need to display the marks in accordance with 6.8.3.2.9.6 until the next intermediate or periodic inspection after 31 December 2023.
- 1.6.3.61** Tank-wagons constructed before 1 July 2025 in accordance with the requirements in force up to 1 July 2025 but which do not conform to the requirements under 6.8.2.2.11 applicable as from 1 July 2025 may still be used.
- 1.6.3.61 – 1.6.3.149** (reserved)
- 1.6.3.150** Tank-wagons constructed before 1 July 2007 in accordance with the requirements in force up to 30 June 2007 but which don't, however, conform to the requirements of 6.8.2.1.8 and 6.8.2.1.10 concerning allowable temperature range applicable as from 1 July 2007 may still be used.
- 1.6.3.151** When the shell of a tank-container was already divided by partitions or surge plates into sections of not more than 7 500 litres capacity before 1 July 2009 , the capacity of the shell needs not to be supplemented with the symbol "S" in the particulars required by 6.8.2.5.1 until the next periodic inspection according to 6.8.2.4.2 is performed.
- 1.6.3.152** Notwithstanding the provisions of 4.3.2.2.4, tank-containers intended for the carriage of liquefied gases or refrigerated liquefied gases, which meet the applicable construction requirements of Annex 2 to SMGS but which were not divided, before 1 July 2009, by partitions or surge plates into sections of more than 7 500 litres capacity may still be filled to more than 20% and less than 80% of their capacity.
- Note:** The requirements of this paragraph shall not be applied for the carriage through the territory of Russia.*
- 1.6.3.153** Tank-wagons may be marked until 1 July 2023 with the strips in accordance with the requirements of 5.3.5.2 in force until 1 July 2015.
- 1.6.3.154** Broad-gauge tank-wagons (1520 mm) constructed before 1 July 2021 with the shells which do not conform the current requirements of 6.8.2.1.8 concerning allowable temperature range but meet the requirements of 6.8.2.1.8 in force until 1 July 2019 may continue to be used
- 1.6.3.155** Broad-gauge tank-wagons (1520 mm) constructed before 1 July 2021 with the shells which do not conform the current requirements of 6.8.2.1.10 concerning allowable temperature range but meet the requirements of 6.8.2.1.10 in force until 1 July 2019 may continue to be used.
- 1.6.3.156** Manifolds constructed before 1 July 2021 for the use on broad-gauge rail networks, which do not conform the current requirements of 6.8.3.2.20 concerning allowable temperature range but meet the requirements of 6.8.3.2.20 in force up until 1 July 2019 may continue to be used.
- 1.6.3.157** (reserved)
- 1.6.3.158** Tank-wagons constructed before 1 January 2023 for the use on broad-gauge 1520 mm rail networks in compliance with requirements of Chapter 6.8 in force until 1 July 2022 may continue to be used.
- 1.6.3.159** Tank-wagons constructed before 1 January 2023 for the use on broad-gauge 1520 mm rail networks with the shells which do not conform the current requirements of 6.20.2.1.8 concerning allowable temperature range but meet the requirements of 6.8.2.1.8 in force until 1 July 2022 may continue to be used.
- 1.6.3.160** Tank-wagons constructed before 1 January 2023 for the use on broad-gauge 1520 mm rail networks with the shells which do not conform the current requirements of 6.20.2.1.10

concerning allowable temperature range but meet the requirements of 6.8.2.1.10 in force until 1 July 2022 may continue to be used.

- 1.6.3.161** Tank-wagons constructed before 1 January 2023 for the use on broad-gauge 1520 mm rail networks which do not conform the current requirements of 6.20.2.1.27 but meet the requirements of 6.8.2.1.27 may continue to be used.
- 1.6.3.162** Tank-wagons constructed before 1 July 2014 for the use on broad-gauge 1520 mm rail networks with the energy-absorbing devices which do not conform the current requirements of 6.20.2.1.28 may continue to be used in compliance with technical specifications concerning use of a tank-wagon before the expiry of the next maintenance or overall repair period.
- 1.6.3.163** Tank-wagons constructed before 1 January 2023 for the use on broad-gauge 1520 mm rail networks with the safety devices which do not conform the current requirements of 6.20.2.2.7 or 6.20.2.2.8 but meet the requirements of 6.8.2.2.7 or 6.8.2.2.8 in force until 1 July 2022 may continue to be used.
- 1.6.3.164** Tank-wagons constructed before 1 July 2014 for the use on broad-gauge 1520 mm rail networks with the energy-absorbing devices which do not conform the current requirements of 6.20.3.1.6 may continue to be used in compliance with technical specifications concerning the use of a tank-wagon before the expiry of the next maintenance or overall repair period.
- 1.6.3.165** Tank-wagons constructed before 1 January 2023 for the use on broad-gauge 1520 mm rail networks with the shells which do not conform the current requirements of 6.20.5 but meet the requirements of 6.8.5 in force until 1 July 2022 may continue to be used.
- 1.6.3.166** Tank-wagons for the carriage of petroleum products constructed between 1985 and 1 July 2023 which don't conform the current requirements of 6.20.2.4.2 may be submitted to an periodic inspection (certification) before the expiry of the service life at least once per 13 years unless the shorter tme is not provided by the technical specifications concerning the use of a tank-wagon. The decision on the use of tank-wagons for the carriage of petroleum products constructed after 1985 after the expiry of 8 years after last periodic repair shall be taken by the competent authorities of Belarus, Hungary, Iran, Kazakhstan, Poland, Russia, Romania, Slovakia, Uzbekistan, Ukraine in compliance with the separate agreements.
- 1.6.3.167** Tank-wagons for the carriage of spirits constructed between 1985 and 1 July 2023, which don't conform the current requirements of 6.20.2.4.2 may be submitted to an periodic inspection (certification) before the expiry of the service life at least once per 10 years unless the shorter tme is not provided by the technical specifications concerning the use of a tank-wagon. The decision on the use of tank-wagons for the carriage of spirits constructed after 1985 after the expiry of 8 years after last periodic repair shall be taken by the competent authorities of Belarus, Hungary, Iran, Kazakhstan, Poland, Russia, Romania, Slovakia, Uzbekistan, Ukraine in compliance with the separate agreements.

1.6.4 TANK-CONTAINERS, PORTABLE TANKS AND MEGCs

- 1.6.4.0.1** Tank-containers and MEGCs constructed before 30 June 2015 in compliance with the requirements of Annex 2 to SMGS in force up to 30 June 2015 but which don't fully conform to the requirements of Annex 2 to SMGS applicable as from 1 July 2015, may still be used.
- 1.6.4.0.2** Tank-containers and MEGCs constructed before 30 June 2015 in compliance with the transitional provisions of paragraph 1.6.4 of RID in force up to 30 June 2015 but which don't meet to the requirements of Annex 2 to SMGS and RID applicable as from 1 July 2015 and as from 1 January 2015 respectively may still be used.
- 1.6.4.1** Tank-containers and MEGCs constructed before 31 December 2004, which don't fully conform to the requirements of Annex 2 to SMGS applicable as from 1 January 2005, may

still be used provided that the conditions laid down by the relevant provisions of 6.8.2.4.2 and 6.8.2.4.3 are met.

1.6.4.2 Tank-containers and MEGCs constructed before 1 July 2005, which don't fully conform to the requirements of Annex 2 to SMGS applicable as from 1 July 2005, may still be used.

1.6.4.3 – 1.6.4.4 (reserved)

1.6.4.5 When, because of amendments to Annex 2 to SMGS, some proper shipping names of gases have been modified, it is necessary to modify the names on the plate or on the shell itself (see 6.8.3.5.2 or 6.8.3.5.3), as well as the names of the gases on the tank-containers and MEGCs or on the plates (see 6.8.3.5.6 (b) or (c)) at the first periodic inspection (certification).

1.6.4.6 Tank-containers constructed before 1 January 2007 in accordance with the requirements in force up to 30 June 2007 but which do not, however, conform to the requirements applicable as from 1 July 2007 regarding the marking of the external design pressure in accordance with 6.8.2.5.1, may still be used.

1.6.4.7 – 1.6.4.8 (reserved)

1.6.4.9 Tank-containers and MEGCs designed and constructed in accordance with a technical code which was recognized at the time of their construction according to the provisions of 6.8.2.7 which were applicable at that time may still be used.

1.6.4.10 – 1.6.4.11 (Reserved)

1.6.4.12 Tank-containers and MEGCs constructed before 1 July 2005 in accordance with the requirements applicable up to 30 June 2005, but which do not, however, conform to the requirements applicable as from 1 July 2005, may still be used. However, they shall be marked with the relevant tank code and if applicable the relevant alphanumeric codes of special provisions TC and TE in accordance with 6.8.4.

1.6.4.13 Tank-containers constructed before 1 July 2006 in accordance with the requirements in force up to 30 June 2006 but which do not, however, conform to the requirements of 6.8.2.1.7 applicable as from 1 July 2006 and special provision TE15 of 6.8.4 (b) applicable from 1 July 2006 to 1 July 2007 may still be used.

1.6.4.14 – 1.6.4.17 (reserved)

1.6.4.18 For tank-containers and MEGCs constructed before 1 January 2007 which do not conform to the requirements of 4.3.2, 6.8.2.3, 6.8.2.4 and 6.8.3.4 concerning the tank record, the retention of files for the tank record shall start at the latest at the first periodic inspection after 30 June 2007.

1.6.4.19 (reserved)

1.6.4.20 Vacuum-operated waste tank-containers constructed before 1 July 2006 but which don't conform to the requirements of 6.10.3.9 applicable as from 1 July 2006, may still be used.

1.6.4.21 – 1.6.4.29 (reserved)

1.6.4.30 Portable tanks and UN MEGCs which do not meet the design requirements applicable as from 1 July 2007 but which have been constructed according to a design approval certificate which has been issued before 1 January 2008 may continue to be used.

1.6.4.31 - 1.6.4.32 (reserved)

1.6.4.33 Notwithstanding the provisions of 4.3.2.2.4, tank-containers intended for the carriage of liquefied gases or refrigerated liquefied gases, which meet the applicable construction requirements of Annex 2 to SMGS but which were not divided, before 1 July 2009, by partitions or surge plates into sections of more than 7 500 litres capacity may still be filled to more than 20% and less than 80% of their capacity.

Note: The requirements of this paragraph shall not be applied for the carriage through the territory of Russia.

1.6.4.34 – 1.6.4.36 (reserved)

1.6.4.37 Portable tanks and MEGCs manufactured before 1 January 2012, that conform to the marking requirements of 6.7.2.20.1, 6.7.3.16.1, 6.7.4.15.1 or 6.7.5.13.1 applicable up to 30 June 2011, as relevant, may continue to be used if they comply with all other relevant requirements of Annex 2 to SMGS applicable as from 1 July 2011 including, when applicable, the requirement of 6.7.2.20.1 (g) for marking the symbol "S" on the plate when the shell or the compartment is divided by surge plates into sections of not more than 7 500 litres capacity.

1.6.4.38 (reserved)

1.6.4.39 Tank-containers and MEGCs designed and constructed in accordance with standards applicable at the time of their construction (see 6.8.2.6 and 6.8.3.6) according to the provisions of Annex 2 to SMGS which were applicable at that time may still be used unless restricted by a specific transitional measure.

1.6.4.40 Tank-containers constructed before 1 July 2011 in accordance with the requirements of 6.8.2.2.3 in force up to 30 June 2011 but which do not, however, conform to the requirements of 6.8.2.2.3, last paragraph, concerning the position of the flame trap or flame arrester may still be used.

1.6.4.41 (reserved)

1.6.4.42 Tank-containers constructed before 1 July 2013 in accordance with the requirements in force up to 30 June 2013, but which do not, however, meet the marking provisions of 6.8.2.5.2 or 6.8.3.5.6 applicable as from 1 July 2013, may continue to be marked in accordance with the requirements applicable up to 30 June 2013 until the next periodic inspection (certification) after 1 July 2013.

1.6.4.43 Portable tanks and MEGCs manufactured before 1 January 2014 need not comply with the requirements of 6.7.2.13.1 (f), 6.7.3.9.1 (e), 6.7.4.8.1 (e) and 6.7.5.6.1 (d) concerning the marking of the pressure relief devices.

1.6.4.44 – 1.6.4.45 (reserved)

1.6.4.46 Tank-containers constructed before 1 July 2013 in accordance with the requirements in force up to 30 June 2013, but which do not however conform to the requirements of 6.8.2.6 relating to standards mentioned in the List (documents Nos. 4,5) applicable as from 1 July 2013, may still be used. In the case of transportation of tank-wagons on broad gauge tracks (1520 mm) the requirements of paragraph 4.3.2.1.8 shall be met additionally.

1.6.4.47 Tank-containers for refrigerated liquefied gases constructed before 1 July 2017 in accordance with the requirements in force up to 30 June 2019 but which do not conform to the requirements of 6.8.3.4.10, 6.8.3.4.11 and 6.8.3.5.4 applicable from 1 July 2019 may continue to be used until the next inspection after 1 July 2019. Until this time, to meet the requirements of 4.3.3.5 and 5.4.1.2.2 (d), the actual holding times may be estimated without recourse to the reference holding time.

1.6.4.48 (reserved)

1.6.4.49 Tank-containers constructed before 1 July 2019, fitted with safety valves meeting the requirements in force up to 30 June 2019 but which do not meet the requirements of 6.8.3.2.9 last sub-paragraph concerning their design or protection applicable from 1 July 2019 may continue to be used until the next intermediate or periodic inspection after 1 January 2021.

1.6.4.50 Notwithstanding the requirements of special provision TU 42 of 4.3.5 applicable from 1 July 2019, tank-containers with a shell constructed of aluminium alloy, including those with

a protective lining, which were used before 1 July 2019 for the carriage of substances with a pH value less than 5.0 or more than 8.0, may continue to be used for the carriage of such substances until 31 December 2026.

- 1.6.4.51** Tank-containers constructed before 1 July 2019 in accordance with the requirements in force up to 30 June 2019 but which do not conform to the requirements of 6.8.2.2.10 concerning the burst pressure of the bursting disc applicable as from 1 July 2019 may continue to be used.
- 1.6.4.52** Tank-containers constructed before 1 July 2019 in accordance with the requirements of 6.8.2.2.3 in force up to 30 June 2019 but which however do not conform to the requirements of 6.8.2.2.3 last paragraph concerning the flame arresters on breather devices applicable from 1 July 2019 may continue to be used.
- 1.6.4.53** (reserved)
- 1.6.4.54** Tank-containers constructed before 1 July 2019 in accordance with the requirements in force up to 30 June 2019 but which however do not conform to the requirements of 6.8.2.2.11 applicable from 1 July 2019 may continue to be used.
- 1.6.4.55** Fibre-reinforced plastics tank-containers constructed before 1 July 2021 in accordance with the requirements in force up to 31 December 2020 but which do not, however, meet the requirements for the marking of the tank code of 6.9.6.1 applicable as from 1 January 2021 may continue to be marked in accordance with the requirements applicable up to 31 December 2020 until the next periodic inspection after 1 July 2021.
- 1.6.4.56** Tank-containers not complying with the requirements of 6.8.3.4.6 applicable from 1 July 2022 may continue to be used, if intermediate inspection is performed at least every 6 years after each periodic inspection carried out after 1 July 2023.
- 1.6.4.57** Except in relation to 6.8.1.5, second paragraph, second indent, procedures used by the competent authority for the approval of experts performing activities concerning tank-containers intended for the carriage of substances other than those for which TA4 and TT9 of 6.8.4 apply which conform to the requirements of Chapter 6.8 in force up to 1 July 2023 but which do not conform to the requirements of 1.8.6 applicable to inspection bodies from 1 January 2023 may continue to be used until 31 December 2032.
- Note:** The term "expert" has been replaced by the term "inspection body".
- 1.6.4.58** Type approval certificates issued for tank-containers intended for the carriage of substances other than those for which TA4 and TT9 of 6.8.4 apply, issued before 1 July 2023 in compliance with Chapter 6.8, but which do not comply with 1.8.7 as applicable from 1 July 2023, may continue to be used until the end of their validity.
- 1.6.4.59** Fibre-reinforced plastics tank-containers constructed before 1 July 2033 in accordance with the requirements of Chapter 6.9 in force up to 1 July 2023 may still be used in accordance with the provisions of Chapter 4.4 in force up to 1 July 2023.
- 1.6.4.60** Tank-containers constructed before 1 January 2024 in accordance with the requirements in force up to 1 July 2023 but which do not, however, conform to the requirements applicable as from 1 July 2023 regarding the fitting of safety valves in accordance with 6.8.3.2.9, may still be used.
- 1.6.4.61** Tank-containers constructed before 1 July 2023 in accordance with the requirements in force up to 1 July 2023, but which do not meet the requirements of 6.8.2.2.4, second and third paragraph, applicable from 1 July 2023, may still be used.
- 1.6.4.62** Extra-large tank-containers constructed before 1 July 2023 in accordance with the requirements in force up to 1 July 2023, but which do not meet the requirements of 6.8.2.1.18, third paragraph, concerning the minimum thickness of the shell applicable as from 1 July 2023 may still be used.

- 1.6.4.63** Tank-containers constructed before 1 July 2023 in accordance with the requirements in force up to 1 July 2023, but which do not, however, meet the requirements of special provision TE26 of 6.8.4 b) applicable as from 1 July 2023 may continue to be used.
- 1.6.4.64** Tank-containers that are already fitted with safety valves meeting the requirements of 6.8.3.2.9 as applicable from 1 July 2023 do not need to display the marks in accordance with 6.8.3.2.9.6 until the next intermediate or periodic inspection after 31 December 2023.
- 1.6.4.65** Tank-containers constructed before 1 July 2025 in accordance with the requirements in force up to 1 July 2025, but which however do not conform to the requirements of 6.8.2.2.11 applicable from 1 July 2025, may continue to be used.
- 1.6.4.66** Portable tanks constructed before 1 January 2027 in accordance with the requirements in force up to 1 July 2025, but which do not, however, conform to the requirements of 6.7.4.15.1 (i) (iv) applicable as from 1 July 2025 may continue to be used.

1.6.5 (reserved)

1.6.6 CLASS 7

1.6.6.1 Packages not requiring competent authority approval of design under the 1985, 1985 (as amended 1990), 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material.

Packages not requiring competent authority approval of design (excepted packages, Type IP-1, Type IP-2, Type IP-3 and Type A packages) shall meet the requirements of Annex 2 to SMGS in full, except

- a) that packages that meet the requirements of the 1985 or 1985 (as amended 1990) Editions of IAEA Regulations for the Safe Transport of Radioactive Material (IAEA Safety Series No.6:
- 1) may continue to be carried provided that they were prepared for carriage prior to 31 December 2003, and are subject to the requirements of 1.6.6.2.3, if applicable;
 - 2) may continue to be used provided that all the following conditions are met:
 - they were not designed to contain uranium hexafluoride;
 - the applicable requirements of 1.7.3 are applied;
 - the activity limits and classification in 2.2.7 are applied;
 - the requirements and controls for carriage in Parts 1, 3, 4, 5 and 7 are applied;
 - the packaging was not manufactured or modified after 31 December 2003;
- b) Packages that meet the requirements of the 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material:
- 1) may continue to be carried provided that they were prepared for carriage prior to 31 December 2025 and are subject to the requirements of 1.6.6.2.3, if applicable; or
 - 2) may continue to be used, provided that all the following conditions are met:
 - the applicable requirements of 1.7.3 are applied;
 - the activity limits and classification in 2.2.7 are applied;
 - the requirements and controls for carriage in Parts 1, 3, 4, 5 and 7 are applied; and

- the packaging was not manufactured or modified after 31 December 2025.

1.6.6.2 Package designs approved under the 1985, 1985 (as amended 1990), 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material

1.6.6.2.1 Packages requiring competent authority approval of the design shall meet the requirements of Annex 2 to SMGS in full except that:

- a) packagings that were manufactured to a package design approved by the competent authority under the provisions of the 1985 or 1985 (as amended 1990) or the 1985 or 1985 (as amended 1990) editions of the IAEA Regulations for the Safe Transport of Radioactive Material may continue to be used provided that all of the following conditions are met;

- 1) the package design is subject to multilateral approval;
- 2) the applicable requirements of 1.7.3 are applied;
- 3) the activity limits and classification in 2.2.7 are applied;
- 4) the requirements and controls for carriage in Parts 1, 3, 4, 5 and 7 are applied;
- 5) (reserved)

- b) complete packagings that were manufactured to a package design approved by the competent authority under the provisions of the 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material may continue to be used provided that all of the following conditions are met:

- 1) the package design is subject to multilateral approval after 31 December 2025;
- 2) the applicable requirements of 1.7.3 are applied;
- 3) the activity limits and material restrictions of 2.2.7 are applied;
- 4) the requirements and controls for carriage in Parts 1, 3, 4, 5 and 7 are applied.

1.6.6.2.2 No new manufacture of packagings to a package design meeting the provisions of the 1985 and 1985 (as amended 1990) editions of the IAEA Regulations for the Safe Transport of Radioactive Material shall be permitted to commence.

1.6.6.2.3 No new manufacture of packagings of a package design meeting the provisions of the 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material shall be permitted to commence after 31 December 2028.

1.6.6.3 Packages excepted from the requirements for fissile materials under the 2011 and 2013 editions of Annex 2 to SMGS (2009 Edition of the IAEA Regulations for the Safe Transport of Radioactive Material)

Packages containing fissile material that is excepted from classification as "FISSILE" according to 2.2.7.2.3.5 a) 1) or 3) of the 2011 and 2013 editions of Annex 2 to SMGS (paras. 417 a) i) or iii) of the 2009 Edition of IAEA Regulations for the Safe Transport of Radioactive Material) prepared for carriage before 1 July 2015 may continue in carriage and may continue to be classified as non-fissile or fissile-excepted except that the consignment limits in Table 2.2.7.2.3.5 of these editions shall apply to the wagon. The consignment shall be carried under exclusive use.

1.6.6.4 Special form radioactive material approved under the 1985, 1985 (as amended 1990), 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material

Special form radioactive material manufactured to a design that had received unilateral approval by the competent authority under the 1985, 1985 (as amended 1990), 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material may continue to be used when in compliance with the mandatory management system in accordance with the applicable requirements of 1.7.3. There shall be no new manufacture of special form radioactive material to a design that had received unilateral approval by the competent authority under the 1985 or 1985 (as amended 1990) editions of the IAEA Regulations for the Safe Transport of Radioactive Material. No new manufacture of special form radioactive material to a design that had received unilateral approval by the competent authority under the 1996, 1996 (revised), 1996 (as amended 2003), 2005, 2009 or 2012 editions of the IAEA Regulations for the Safe Transport of Radioactive Material shall be permitted to commence after 31 December 2025.

CHAPTER 1.7

GENERAL PROVISIONS CONCERNING RADIOACTIVE MATERIAL

1.7.1 SCOPE OF APPLICATION

Note 1: *In the event of a nuclear or radiological emergency during the carriage of radioactive material, provisions as established by relevant national and/or international organizations, shall be observed to protect persons, property and the environment. This includes arrangements for preparedness and response established in accordance with the national and/or international requirements and in a consistent and coordinated manner with the national and/or international emergency arrangements.*

Note 2: *The arrangements for preparedness and response shall be based on the graded approach and take into consideration the identified hazards and their potential consequences, including the formation of other dangerous substances that may result from the reaction between the contents of a consignment and the environment in the event of a nuclear or radiological emergency. Guidance for the establishment of such arrangements is contained in "Preparedness and Response for a Nuclear or Radiological Emergency", IAEA Safety Standards Series No. GSR Part 7, IAEA, Vienna (2015); "Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency", IAEA Safety Standards Series No. GSG-2, IAEA, Vienna (2011); "Arrangements for Preparedness for a Nuclear or Radiological Emergency", IAEA Safety Standards Series No. GS-G2.1, IAEA, Vienna (2007), and "Arrangements for the Termination of a Nuclear or Radiological Emergency", IAEA Safety Standards Series No. GSG-11, IAEA, Vienna (2018).*

1.7.1.1 Annex 2 to SMGS establishes standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to people, property and the environment that are associated with the carriage of radioactive material. Annex 2 to SMGS is based on the 2018 edition of the IAEA Regulations for the Safe Transport of Radioactive Material. Explanatory material can be found in "Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2018 Edition)", Safety Standard Series No. SSG-26 (Rev.1), IAEA, Vienna (2019).

1.7.1.2 The objective of Annex 2 to SMGS is to establish requirements that shall be satisfied to ensure safety and to protect people, property and the environment from harmful effects of ionizing radiation during the carriage of radioactive material.

This protection is achieved by requiring:

- a) Containment of the radioactive contents;
- b) Control of external dose rate;
- c) Prevention of criticality; and
- d) Prevention of damage caused by heat.

These requirements are satisfied firstly by applying a graded approach to contents limits for packages and wagons and to performance standards applied to package designs depending upon the hazard of the radioactive contents. Secondly, they are satisfied by imposing conditions on the design and operation of packages and on the maintenance of packagings, including a consideration of the nature of the radioactive contents. Thirdly, they are satisfied by requiring administrative controls including, where appropriate, approval by competent authorities. Finally, further protection is provided by making arrangements for planning and preparing emergency response to protect people, property and the environment.

1.7.1.3 Annex 2 to SMGS applies to the carriage of radioactive material by rail including carriage which is incidental to the use of the radioactive material. Carriage comprises operations and conditions associated with and involved in the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation,

consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of loads of radioactive material and packages. A graded approach is applied to the conditions of carriage of radioactive material, three general levels of which approach may be characterized as follows:

- a) routine conditions of carriage (incident free);
- b) normal conditions of carriage (minor mishaps);
- c) accident conditions of carriage.

1.7.1.4 The provisions laid down in Annex 2 to SMGS do not apply to:

- a) radioactive material that is an integral part of the means of transport;
- b) radioactive material moved within an establishment which is subject to appropriate safety regulations in force in the establishment and where the movement does not involve public roads or railways;
- c) radioactive material implanted or incorporated into a person or live animal for diagnosis or treatment;
- d) radioactive material in or on a person who is to be transported for medical treatment because the person has been subject to accidental or deliberate intake of radioactive material or to contamination;
- e) radioactive material in consumer products which have received regulatory approval, following their sale to the end user;
- f) natural material and ores containing naturally occurring radionuclides (which may have been processed), provided the activity concentration of the material does not exceed 10 times the values specified in Table 2.2.7.2.2.1, or calculated in accordance with 2.2.7.2.2.2 a) and 2.2.7.2.2.3 to 2.2.7.2.2.6. For natural materials and ores containing naturally occurring radionuclides that are not in secular equilibrium the calculation of the activity concentration shall be performed in accordance with 2.2.7.2.2.4;
- g) non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the limit set out in the definition for "radioactive contamination" in 2.2.7.1.2

1.7.1.5 Specific provisions for the carriage of excepted packages

1.7.1.5.1 Excepted packages which may contain radioactive material in limited quantities, instruments, manufactured articles or empty packagings as specified in 2.2.7.2.4.1 shall be subject only to the following provisions of Parts 5 to 7:

- a) the applicable provisions specified in 5.1.2.1, 5.1.3.2, 5.1.5.2.2, 5.1.5.2.3, 5.1.5.4, 5.2.1.10, 5.4.1.2.5.1 f) 1) and 2), 5.4.1.2.5.1 1), 7.5.11 CW 33 (3.1), (4.3), (5.1) to (5.4) and (6); and
- b) the requirements for excepted packages specified in 6.4.4, except when the radioactive material possesses other hazardous properties and has to be classified in a class other than Class 7 in accordance with special provision 290 or 369 of Chapter 3.3, where the provisions listed in a) and b) above apply only as relevant and in addition to those relating to the main class.

1.7.1.5.2 Excepted packages are subject to the relevant provisions of all other parts of Annex 2 to SMGS.

1.7.2 RADIATION PROTECTION PROGRAMME

1.7.2.1 The carriage of radioactive material shall be subject to a radiation protection programme which shall consist of systematic arrangements aimed at providing adequate consideration of radiation protection measures.

1.7.2.2 Doses to persons shall be below the relevant dose limits. Protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account within the restriction that the doses to individuals be subject to dose constraints. A structured and systematic approach shall be adopted and shall include consideration of the interfaces between carriage and other activities.

1.7.2.3 The nature and extent of the measures to be employed in the programme shall be related to the magnitude and likelihood of radiation exposures. The programme shall incorporate the requirements in 1.7.2.2, 1.7.2.4, 1.7.2.5 and 7.5.11 CW 33 (1.1). Programme documents shall be available, on request, for inspection by the relevant competent authority.

1.7.2.4 For occupational exposures arising from transport activities, where it is assessed that the effective dose either:

- a) is likely to be between 1 mSv and 6 mSv in a year, a dose assessment programme via work place monitoring or individual monitoring shall be conducted; or
- b) is likely to exceed 6 mSv in a year, individual monitoring shall be conducted.

When workplace monitoring or individual monitoring or work place monitoring is conducted, appropriate records shall be kept.

Note: *For occupational exposures arising from transport activities, where it is assessed that the effective dose is unlikely to exceed 1 mSv in a year, no special work patterns, detailed monitoring, dose assessment programmes or individual record keeping need be required.*

1.7.2.5 Workers (see 7.5.11, CW 33 Note 3) shall be appropriately trained in radiation protection including the precautions to be observed in order to restrict their occupational exposure and the exposure of other persons who might be affected by their actions.

1.7.3 MANAGEMENT SYSTEM

1.7.3.1 A management system based on international, national or other standards acceptable to the competent authority shall be established and implemented for all activities within the scope of Annex 2 to SMGS, as identified in 1.7.1.3, to ensure compliance. Certification that the design specification has been fully implemented shall be available to the competent authority. The manufacturer, consignor or user shall be prepared:

- a) to provide facilities for inspection during manufacture and use:

and

- b) to demonstrate compliance with Annex 2 to SMGS to the competent authority.

Where competent authority approval is required, such approval shall take into account and be contingent upon the adequacy of the management system.

1.7.4 SPECIAL ARRANGEMENT

1.7.4.1 Special arrangement shall mean those provisions, approved by the competent authority, under which consignments which do not satisfy all the requirements of Annex 2 to SMGS applicable to radioactive material may be carried.

Note: *Special arrangement is not considered to be a temporary derogation in accordance with 1.5.1.*

1.7.4.2 Consignments for which conformity with any provision applicable to radioactive material is impracticable shall not be carried except under special arrangement. Provided the competent authority is satisfied that conformity with the radioactive material provisions of Annex 2 to SMGS is impracticable and that the required standards of safety have been

met through through means alternative to the other provisions of Annex 2 to SMGS, the competent authority may approve special arrangement transport operations for single or a planned series of multiple consignments. The overall level of safety in carriage shall be at least equivalent to that which would be provided if all the applicable requirements of Annex 2 to SMGS had been met. For international consignments of this type, multilateral approval shall be required.

1.7.5 RADIOACTIVE MATERIAL POSSESSING OTHER DANGEROUS PROPERTIES

In addition to the radioactive and fissile properties, any subsidiary hazard of the contents of the package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, shall also be taken into account in the documentation, packing, labelling, marking, placarding, stowage, segregation and carriage, in order to be in compliance with all relevant provisions for dangerous goods of Annex 2 to SMGS.

1.7.6 NON-COMPLIANCE

1.7.6.1 In the event of non-compliance with any limit in Annex 2 to SMGS applicable to radiation level or contamination,

- a) The consignor, consignee, carrier and any organization involved during carriage who may be affected, as appropriate, shall be informed of the non-compliance by:
 - 1) the carrier if the non-compliance is identified during carriage; or
 - 2) the consignee if the non-compliance identified at receipt;
- b) The carrier, consignor or consignee, as appropriate shall:
 - 1) take immediate steps to mitigate the consequences of the non-compliance;
 - 2) investigate the non-compliance and its causes, circumstances and consequences;
 - 3) take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of similar circumstances that led to the non-compliance; and
 - 4) communicate to the competent authority(ies) on the causes of the non-compliance and on corrective or preventive actions taken or to be taken;
- c) The communication of the non-compliance to the consignor and competent authority, respectively, shall be made as soon as possible and it shall be immediate whenever an emergency exposure situation has developed or is developing.

CHAPTER 1.8

CHECKS AND OTHER SUPPORT MEASURES TO ENSURE COMPLIANCE WITH SAFETY REQUIREMENTS ⁵

1.8.1 ADMINISTRATIVE CONTROLS OF DANGEROUS GOODS

1.8.1.1 The competent authorities may on their national territory, at any time, conduct checks to verify whether the requirements concerning the carriage of dangerous goods have been met, including the requirements of 1.10.1.5.

These checks shall be made without endangering persons, property or the environment and without major disruption of rail services.

1.8.1.2 Participants in the carriage of dangerous goods (Chapter 1.4) shall, without delay, in the context of their respective obligations, provide the competent authorities and their agents with the necessary information for carrying out the checks.

1.8.1.3 The competent authorities may also, for the purposes of carrying out checks on the premises of the enterprises participating in the carriage of dangerous goods (Chapter 1.4), make inspections, consult the necessary documents and remove samples of dangerous goods or packagings for examination, provided that safety is not jeopardized thereby. The participants in the carriage of dangerous goods (Chapter 1.4) shall also make the wagons or parts of wagons and the equipment and installations accessible for the purpose of checking where this is possible and reasonable. They may, if they deem necessary, designate a person from the enterprise to accompany the representative of the competent authority.

1.8.1.4 If the competent authorities establish that the requirements of Annex 2 to SMGS have not been met, they may prohibit a consignment or interrupt a transport operation until the defects observed are rectified, or they may prescribe other appropriate measures. Immobilization may take place on the spot or at another place selected by the authorities for safety reasons. These measures shall not cause a major disruption in rail services.

1.8.2 MUTUAL ADMINISTRATIVE SUPPORT

1.8.2.1 The SMGS Contracting States shall agree on mutual administrative support for the implementation of Annex 2 to SMGS.

1.8.2.2 When one of the SMGS Contracting States has reasons to observe that the safety of the carriage of dangerous goods on its territory is compromised as a result of serious or repeated infringements by an enterprise which has its headquarters on the territory of another SMGS Contracting State, it shall notify the competent authorities of this SMGS Contracting State of such infringements. The competent authorities of the SMGS Contracting State on the territory of which the serious or repeated infringements were observed may request the competent authorities of the SMGS Contracting State on the territory of which the enterprise has its headquarters to take appropriate measures against the offender(s). The transmission of data referring to persons shall not be permitted unless it is necessary for the prosecution of serious or repeated infringements.

1.8.2.3 The authorities notified shall communicate to the competent authorities of the State on the territory of which the infringements were observed, the measures which have, if necessary, been taken with respect to the enterprise.

1.8.3 SAFETY ADVISER

³ Provisions of Chapter 1.8 shall be applied so far as it is authorized by national law.

1.8.3.1 Each undertaking, the activities of which include the consigning or the carriage of dangerous goods by rail, or the related packing, loading, filling or unloading shall appoint one or more safety advisers for the carriage of dangerous goods, responsible for helping to prevent the danger inherent in such activities with regard to persons, property and the environment.

1.8.3.2 Competent authorities may provide that these requirements shall not apply to undertakings:

- a) the activities of which include the carriage of dangerous goods in means of transport belonging to the armed forces or for which the armed forces are responsible, or
- b) the activities of which concern quantities in each wagon not exceeding than those referred to in 1.1.3.6, 1.7.1.4 and in Chapters 3.3, 3.4 and 3.5

1.8.3.3 The main task of the adviser shall be, under the responsibility of the head of the undertaking, to seek by all appropriate means and by all appropriate action, within the limits of the relevant activities of that undertaking, to facilitate the conduct of those activities in accordance with the requirements applicable and in the safest possible way.

With regard to the undertaking's activities, the adviser has the following duties in particular:

- monitoring compliance with the requirements governing the carriage of dangerous goods;
- advising his undertaking on the carriage of dangerous goods;
- preparing an annual report to the management of his undertaking or a local public authority, as appropriate, on the undertaking's activities in the carriage of dangerous goods. Such annual reports shall be preserved for five years and made available to the national authorities at their request.

The adviser's duties also include monitoring the following practices and procedures relating to the relevant activities of the undertaking:

- the procedures for compliance with the requirements governing the identification of dangerous goods being transported;
- the undertaking's practice in taking account, when purchasing or leasing means of transport, of any special requirements in connection with the dangerous goods being transported;
- the procedures for checking the equipment used in connection with the carriage, packing, filling, loading or unloading of dangerous goods;
- the proper training of the undertaking's employees, including on the changes to the regulations, and the maintenance of records of such training;
- the implementation of proper emergency procedures in the event of any accident or incident that may affect safety during the carriage, packing, filling, loading or unloading of dangerous goods;
- investigating and, where appropriate, preparing reports on serious accidents, incidents or serious infringements recorded during the carriage, packing, filling, loading or unloading of dangerous goods;
- the implementation of appropriate measures to avoid the recurrence of accidents, incidents or serious infringements;
- the account taken of the legal prescriptions and special requirements associated with the carriage of dangerous goods in the choice and use of sub-contractors or third parties;
- verification that employees involved in the consigning, carriage, packing, filling, loading or unloading of dangerous goods have detailed operational procedures and instructions,
- the introduction of measures to increase awareness of the risks inherent in the carriage, packing, filling, loading and unloading of dangerous goods;

- the implementation of verification procedures to ensure the presence on board means of transport of the documents and safety equipment which must accompany transport and the compliance of such documents and equipment with the regulations;
- the implementation of verification procedures to ensure compliance with the requirements governing packing, filling, loading and unloading;
- the existence of the security plan indicated in 1.10.3.2.

1.8.3.4 The adviser may also be the head of the undertaking, a person with other duties in the undertaking, or a person not directly employed by that undertaking, provided that that person is capable of performing the duties of adviser.

1.8.3.5 Each undertaking concerned shall, on request, inform the competent authority of the identity of its adviser.

1.8.3.6 Whenever an accident affects or may affect persons, property or the environment or results or may result in damage to property or the environment during carriage, packing, filling, loading or unloading carried out by the undertaking concerned, the adviser shall, after collecting all the relevant information, prepare an accident report to the management of the undertaking or to a local public authority, as appropriate. That report shall not replace any report by the management of the undertaking which might be required under any other international or national legislation.

1.8.3.7 An adviser shall hold a vocational training certificate, valid for transport by rail. That certificate shall be issued by the competent authority or the body designated for that purpose.

1.8.3.8 To obtain a certificate, a candidate shall undergo training and pass an examination approved by the competent authority.

1.8.3.9 The main aims of the training shall be to provide candidates with sufficient knowledge

- of the risks inherent in the carriage, packing, filling, loading or unloading of dangerous goods,
- of the applicable laws, regulations and administrative provisions,
- of the duties listed in 1.8.3.3.

1.8.3.10 The examination shall be organized by the competent authority or by an examining body designated by the competent authority. The examining body shall not be a training provider.

The examining body shall be designated in writing. This approval may be of limited duration and shall be based on the following criteria:

- competence of the examining body;
- specifications of the form of the examinations the examining body is proposing, including, if necessary, the infrastructure and organisation of electronic examinations (see 1.8.3.12.5), if these are to be carried out;
- measures intended to ensure that examinations are impartial;
- independence of the body from all natural or legal persons employing safety advisers.

1.8.3.11 The aim of the examination is to ascertain whether candidates possess the necessary level of knowledge to carry out the duties incumbent upon a safety adviser (see 1.8.3.3), for the purpose of obtaining the certificate prescribed in sub-section 1.8.3.7, and it shall cover at least the following subjects:

- a) knowledge of the types of consequences which may be caused by an accident involving dangerous goods and knowledge of the main causes of accidents;

- b) requirements under national law, international conventions and agreements, with regard to the following in particular:
- classification of dangerous goods (procedure for classifying solutions and mixtures, structure of the list of substances, classes of dangerous goods and principles for their classification, nature of dangerous goods transported, physical, chemical and toxicological properties of dangerous goods);
 - general packing provisions and provisions for tanks and tank-containers (types, code, marking, construction, initial and periodic inspection (certification) and testing);
 - marking and labelling, placarding and orange-coloured plate and white-coloured plate marking (marking and labelling of packages, placing and removal of placards and orange-coloured and white-coloured plates, carriage in tanks);
 - particulars in the consignment note (required information);
 - method of consignment and forwarding restrictions (full wagon load or full container load, carriage in bulk, carriage in intermediate bulk containers, carriage in containers, carriage in fixed or demountable tanks);
 - transport of passengers;
 - prohibitions and precautions relating to mixed loading;
 - segregation of goods;
 - limitation of the quantities carried and quantities exemptions;
 - handling and stowage (packing, filling, loading and unloading – filling ratios –, stowage and segregation);
 - cleaning and/or degassing after unloading;
 - crews, vocational training;
 - documents to be carried on board (consignment note, copies of any derogations, other documents);
 - instructions in writing, emergency cards (implementation of the instructions, emergency cards and equipment for personal protection);
 - operational discharges or accidental leaks of pollutants;
 - requirements relating to transport equipment.

1.8.3.12 Examinations

1.8.3.12.1 The examination shall consist of a written test which may be supplemented by an oral examination.

1.8.3.12.2 The competent authority or an examining body designated by the competent authority shall invigilate every examination. Any manipulation and deception shall be ruled out as far as possible. Authentication of the candidate shall be ensured. The use in the written test of documentation other than international or national regulations is not permitted. All examination documents shall be recorded and kept as a print-out or electronically as a file.

1.8.3.12.3 Electronic media may be used only if provided by the examining body. There shall be no means of a candidate introducing further data to the electronic media provided; the candidate may only answer the questions posed.

1.8.3.12.4 The written test shall consist of two parts:

- a) Candidates shall receive a questionnaire. It shall include at least 20 open questions covering at least the subjects mentioned in the list in 1.8.3.11. However, multiple choice questions may be used. In this case, two multiple choice questions count as one open question. Amongst these subjects particular attention shall be paid to the following subjects:
- general preventive and safety measures;
 - classification of dangerous goods;
 - general packing provisions, including tanks, tank-containers, tank-wagons, etc.;

- danger markings, labeling and placarding orange-coloured plates and white-coloured plates ;
- information in the consignment note;
- handling and stowage;
- crew, vocational training;
- accompanying documents;
- instructions in writing;
- requirements concerning means of transport.

b) Candidates shall undertake a case study in keeping with the duties of the adviser referred to in 1.8.3.3, in order to demonstrate that they have the necessary qualifications to fulfill the task of adviser.

1.8.3.12.5 Written examinations may be performed, in whole or in part, as electronic examinations, where the answers are recorded and evaluated using electronic data processing (EDP) processes, provided the following conditions are met:

- a) The hardware and software shall be checked and accepted by the competent authority or by an examining body designated by the competent authority;
- b) Proper technical functioning shall be ensured. Arrangements as to whether and how the examination can be continued shall be made for a failure of the devices and applications. No aids shall be available on the input devices (e.g. electronic search function), the equipment provided according to 1.8.3.12.3 shall not allow the candidates to communicate with any other device during the examination;
- c) Final inputs of each candidate shall be logged. The determination of the results shall be transparent.

1.8.3.13 The Competent authorities may decide that candidates who intend working for undertakings specializing in the carriage of certain types of dangerous goods need only be questioned on the substances relating to their activities.

These types of specialization are:

- Class 1;
- Class 2;
- Class 7;
- Classes 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, 8 and 9;
- UN Nos. 1202, 1203, 1223, 3475 and aviation fuel classified under UN Nos. 1268 or 1863.

The certificate prescribed in 1.8.3.7 shall clearly indicate that it is only valid for one type of the dangerous goods referred to in this sub-section and on which the adviser has been questioned under the conditions defined in 1.8.3.12.

1.8.3.14 The competent authority or the examining body shall keep a running list of the questions that have been included in the examination.

1.8.3.15 The certificate prescribed in 1.8.3.7 shall take the form laid down in 1.8.3.18 and shall be recognized by all SMGS Contracting States.

1.8.3.16 Validity and renewal of certificates

1.8.3.16.1 The certificate shall be valid for five years, and the period of the validity of a certificate shall be extended from the date of its expiry for five years at a time where, during the year before its expiry, its holder has undergone refresher training and passed an examination. The examination results shall be approved by the competent authority.

1.8.3.16.2 The aim of the examination is to ascertain that the holder has the necessary knowledge to carry out the duties set out in 1.8.3.3. The knowledge required is set out in 1.8.3.11 b) and shall include the amendments to the regulations introduced since the award of the last

certificate. The examination shall be held and supervised on the same basis as in 1.8.3.10 and 1.8.3.12 to 1.8.3.14. However, the holder of a valid certificate needs not undertake the case study specified in 1.8.3.12.4 b).

1.8.3.17 (reserved)

1.8.3.18 Model of certificate (confirmation)

Certificate of training as safety adviser for the transport of dangerous goods

Certificate No:

Distinguishing sign of the State issuing the certificate:.....

Surname:

Forename(s):

Date and place of birth:

Nationality:

Signature of holder:

Valid until (date) for undertakings which transport dangerous goods and for undertakings carry out related consigning, packing, filling, loading or unloading:

- ☐ by road
- ☐ by rail
- ☐ by inland waterway

Issued by:

Date: Signature:

1.8.3.19 Extention of the certificate

Where an adviser extends the scope of his certificate during its period of validity by meeting the requirements of 1.8.3.16.2, the period of validity of a new certificate shall remain that of the previous certificate.

1.8.4 LIST OF COMPETENT AUTHORITIES AND BODIES DESIGNATED BY THEM

The SMGS Contracting States shall communicate to the Committee of OSJD the address of the authority or organization that under the national law has the competence in carriage of dangerous goods (including any issues related to the actions of competent authorities or organizations designated by them) in its State.

The SMGS Contracting States shall also communicate to the OSJD Committee the names and addresses of the authorities and organizations which are competent in accordance with national law in specific issues of implementing Annex 2 to SMGS, referring in each case to the relevant requirement of Annex 2 to SMGS.

The OSJD Committee shall establish a list on the basis of the information received and shall keep it up-to-date and communicate this list to the SMGS Contracting States.

Note: For the purpose of the implementation of Annex 2 to SMGS, each State shall designate the competent authorities or bodies having competence for the specific issues of implementation of Annex 2 to SMGS, such as:

- general conditions of carriage;
- verification of compliance with the requirements of Annex 2 to SMGS (1.8.1);
- safety advisers (1.8.3);
- statistical information on accidents (1.8.5);
- classification requirements, packaging requirements, certification, carriage of radioactive materials of Class 7;
- classification of dangerous goods, including:
- explosive substances of Class 1;

- *self-reacting substances of Class 4.1 and organic peroxides of Class 5.2;*
- *infectious substances of Class 6.2;*
- *requirements for the construction and testing of packagings (Chapter 6.1);*
- *requirements for the construction and testing of pressure receptacles, aerosol dispensers, small receptacles containing gas (gas cartridges)(Chapter 6.2);*
- *requirements for the construction and testing of packagings for class 6.2 infectious substances (Chapter 6.3);*
- *requirements for the construction and testing of intermediate bulk containers (IBCs) (Chapter 6.5);*
- *requirements for the construction and testing of large packagings (Chapter 6.6);*
- *requirements for the design, construction, inspection and testing of portable tanks and UN multiple element gas containers (Chapter 6.7);*
- *requirements for the construction, equipment, type approval, inspections and tests, and marking of tank-wagons, demountable tanks and tank-containers and tank swap bodies, battery-wagons and multiple element gas containers (MEGCs) (Chapter 6.8)*
- *requirements for the design, construction, inspection and testing of bulk containers (Chapter 6.11);*

As well as inspection bodies or testing experts shall be designated for the verification of:

- *pressure receptacles (Chapter 6.2);*
- *intermediate bulk containers (IBCs) (Chapter 6.5);*
- *portable tanks and UN multiple elements gas containers (UN MEGCs) (Chapter 6.7);*
- *tank-wagons, demountable tanks and tank-containers and battery-wagons and multiple element gas containers (MEGCs) (Chapter 6.8)*

1.8.5 NOTIFICATIONS OF ACCIDENTS OR OCCURENCES

1.8.5.1 If a serious accident or incident takes place during loading, filling, carriage or unloading of dangerous goods on the territory of an SMGS Contracting State, the loader, filler, carrier, unloader, consignee or if the case may be the railway infrastructure manager, respectively, shall ascertain that a report conforming to the model prescribed in 1.8.5.4 is made to the competent authority of the SMGS Contracting State concerned at the latest one month after the occurrence.

1.8.5.2 (reserved)

1.8.5.3 An occurrence subject to report in accordance with 1.8.5.1 has occurred if the occurrence satisfies one or more of the following criteria has/have been met:

- dangerous goods were released or if there was an imminent risk of loss of product;
- personal injury, material or environmental damage occurred;
- the authorities were involved.

Personal injury means an occurrence in which death or injury directly relating to the dangerous goods carried has occurred, and where the injury

- a) requires intensive medical treatment,
- b) requires a stay in hospital of at least one day, or
- c) results in the inability to work for at least three consecutive days.

Loss of product means the release of dangerous goods depending on transport category (see 1.1.3.6) in quantities:

Transport category	Quantity of dangerous goods
0 or 1	50 kg/50 l or more
2	333 kg/333 l or more
3, 4	1 000 / 1 000 or more

The loss of product criterion also applies if there was an imminent risk of loss of product in the above-mentioned quantities. As a rule, this has to be assumed if, owing to structural damage, the means of containment is no longer suitable for further carriage or if, for any other reason, a sufficient level of safety is no longer ensured (e.g. owing to distortion of tanks or containers, overturning of a tank or fire in the immediate vicinity).

If dangerous goods of Class 6.2 are involved, the obligation to report applies without quantity limitation.

In occurrences involving radioactive material, the criteria for loss of product are:

- a) Any release of radioactive material from the packages;
- b) Exposure leading to a breach of the limits set out in the regulations for protection of workers and members of the public against ionizing radiation ("Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards", IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014)); or
- c) Where there is reason to believe that there has been a significant degradation in any package safety function (containment, shielding, thermal protection or criticality) that may have rendered the package unsuitable for continued carriage without additional safety measures.

Note: See the requirements of 7.5.11 CW33 (6) for undelivered consignments.

Material damage or environmental damage means the release of dangerous goods, irrespective of the quantity, where the estimated amount of damage exceeds 80,000 CHF. Damage to any directly involved means of carriage containing dangerous goods and to the modal infrastructure shall not be taken into account for this purpose.

Involvement of authorities means the direct involvement of the authorities or emergency services during the occurrence involving dangerous goods and the evacuation of persons or closure of public traffic routes (roads/railways) for at least three hours owing to the danger posed by the dangerous goods.

If necessary, the competent authority may request further relevant information.

1.8.5.4 Model for report on occurrences during the carriage of dangerous goods

**Report on occurrences during the carriage of dangerous goods in accordance with
Annex 2 to SMGS (See 1.8.5)**

Railway (Carrier or railway infrastructure manager): Address: Contact name: Phone: Fax:

1. Mode of transport	
☐ Railway transport Wagon number 	
2. Date and location of occurrence	
Year: Month: Day: Time:	
State/Location description: ☐ Station ☐ Shunting/Marshalling yard ☐ Place of loading/unloading/transshipment or ☐ Open line Description of line: Kilometers:	
3. Topography	
☐ Gradient/incline ☐ Tunnel ☐ Bridge/Underpass ☐ Crossing ☐ Platform	
4. Particular weather conditions	
☐ Rain ☐ Snow ☐ Ice ☐ Fog ☐ Thunderstorm ☐ Storm Temperature: ... °C	
5 Description of occurrence	

☐ Derailment ☐ Collision ☐ Overturning/Rolling over ☐ Fire ☐ Explosion ☐ Loss (leakage/spillage) of product ☐ Technical fault Additional description of occurrence

6. Dangerous goods involved						

UN Number ¹	Class	Packing Group	Estimated quantity of loss of products (kg or l) ²	Means of containment ³	Means of containment material	Type of failure of means of containment ⁴

¹ For dangerous goods assigned to collective entries to which special provision 274 applies, also the technical name shall be indicated.	² For Class 7, indicate values according to the criteria in 1.8.5.3.

³ Indicate the appropriate number: 1 Packaging 2 IBC 3 Large packaging 4 Small container 5 Wagon 7 Tank-wagon 9 Battery-wagon 11 Wagon with demountable tanks 12 Demountable tank 13 Large container 14 Tank-container 15 MEGC 16 Portable tank 17 MEMU 19 Extra-large tank container	⁴ Indicate the appropriate number: 1 Leakage/spillage 2 Fire 3 Explosion 4 Structural failure

7. Cause of occurrence (indicate precisely)

☐ Technical fault ☐ Faulty load securing: ☐ Operational cause: ☐ Other:

8. Consequences of occurrence

Personal injury in connection with the dangerous goods involved:

- ☐ Death (number of deaths:)
- ☐ Body injured (number of injured people:)

Loss of product:

- ☐ Yes
- ☐ No
- ☐ Imminent risk of loss of product

Material/Environmental damage

- ☐ Estimated level of damage $\leq$ 80 000 Swiss francs
- ☐ Estimated level of damage $>$ 80 000 Swiss francs

Involvement of authorities:

- ☐ Yes
 - ☐ Evacuation of persons for a duration of at least three hours caused by the dangerous goods involved
 - ☐ Closure of public traffic routes for a duration of at least three hours caused by the dangerous goods involved.
- ☐ No

If necessary, the competent authority may request further relevant information.

1.8.6 ADMINISTRATIVE CONTROLS FOR THE ACTIVITIES DESCRIBED IN 1.8.7 AND 1.8.8.

Note 1: For the purposes of this section the terms:

- "approved inspection body" means an inspection body approved by the competent authority to perform different activities according to 1.8.6.1; and
- "recognized inspection body" means an approved inspection body recognized by another competent authority.

Note 2: An inspection body may be designated by the competent authority to act as the competent authority (see the definition of competent authority in 1.2.1).

Note 3 In this section, the term "inspection" includes the terms "inspection and testing" and "inspection" as used in Chapters 6.2 and 6.8.

1.8.6.1 General provisions

The competent authority of an SMGS Contracting State may approve inspection bodies for the following activities: conformity assessments, periodic inspections, intermediate inspections, exceptional inspections, entry into service verifications and authorization and surveillance of the in-house inspection service as relevant in Chapters 6.2 and 6.8.

1.8.6.2 Obligations of the competent authority

1.8.6.2.1 When the competent authority approves an inspection body to perform the activities specified in 1.8.6.1, the accreditation of the inspection body shall be according to EN ISO/IEC 17020:2012 (except clause 8.1.3) type A requirements.

When the competent authority approves an inspection body to perform periodic inspections of pressure receptacles according to Chapter 6.2, the accreditation of the inspection body shall be according to EN ISO/IEC 17020:2012 (except clause 8.1.3) type A requirements or type B requirements.

The accreditation shall clearly cover the activities of the approval.

When the competent authority performs the tasks of the inspection body itself, the competent authority shall comply with the provisions of 1.8.6.3. However, when a competent authority designates an inspection body to act as the competent authority the designated body shall be accredited according to the standard EN ISO/IEC 17020:2012 (except clause 8.1.3) type A.

1.8.6.2.2 Approval of inspection bodies

1.8.6.2.2.1 Type A inspection bodies shall be established under domestic law and be a legal entity in the SMGS Contracting State where the application for approval is made.

Type B inspection bodies shall be established under domestic law and be part of a legal entity supplying gas in the SMGS Contracting State where the application for approval is made.

1.8.6.2.2.2 The competent authority shall ascertain that the inspection body continuously meets the conditions for its approval and shall revoke the approval if these conditions are not met. However, in the case of suspension of the accreditation, the approval is only suspended during the suspension period of the accreditation.

1.8.6.2.2.3 An inspection body starting a new activity may be approved temporarily. Before temporary approval, the competent authority shall ensure that the inspection body meets the requirements of 1.8.6.3.1. The inspection body shall be accredited according to EN ISO/IEC 17020:2012 (except clause 8.1.3) in its first year of activity to be able to continue this new activity.

1.8.6.2.3 *Monitoring of inspection bodies*

1.8.6.2.3.1 Wherever the activities of an inspection body are performed, the competent authority that approved this body shall ensure the monitoring of the activities of this body, including on-site monitoring. The competent authority shall revoke or restrict the approval given if this body is no longer in compliance with the approval, the requirements of 1.8.6.3.1 or does not follow the procedures specified in the provisions of Annex 2 to SMGS.

Note: *Monitoring of subcontractors as mentioned in 1.8.6.3.3 by the inspection body shall also be included in the monitoring of the inspection body.*

1.8.6.2.3.2 If the approval of the inspection body is revoked or restricted or if the inspection body ceased activity, the competent authority shall take the appropriate steps to ensure that the files are either processed by another inspection body or kept available.

1.8.6.2.4 *Information obligations*

1.8.6.2.4.1 SMGS Contracting States shall publish their national procedures for the assessment, approval and monitoring of inspection bodies and of any changes to that information.

1.8.6.2.4.2 The competent authority of the SMGS Contracting State shall publish an up-to-date list of all the inspection bodies it has approved, including inspection bodies approved temporarily as described in 1.8.6.2.2.3. This list shall at least contain the following information:

- a) Name, address(es) of the office(s) of the inspection body;
- b) The scope of activities for which the inspection body is approved;
- c) Confirmation that the inspection body is accredited according to EN ISO/IEC 17020:2012 (except clause 8.1.3) by the national accreditation body and that the accreditation covers the scope of activities for which the inspection body is approved;
- d) The identity mark or stamp, as specified in Chapters 6.2 and 6.8, of the inspection body and the mark of any in-house inspection service authorized by the inspection body.

A reference to this list shall be made on the OSJD website.

1.8.6.2.4.3 An inspection body approved by a competent authority may be recognized by another competent authority.

Where a competent authority wishes to engage the services of an inspection body already approved by another competent authority to carry out activities related to conformity assessments and inspections on its behalf, then that competent authority shall add this inspection body, the scope of activities for which it is recognized, and the competent authority that approved the inspection body, to the list mentioned in 1.8.6.2.4.2 and inform the OSJD Committee. If the approval is withdrawn or suspended, the recognition is no longer valid.

Note: *In that context, reciprocal recognition agreements between SMGS Contracting States shall be respected.*

1.8.6.3 **Obligations of the inspection bodies**

1.8.6.3.1 *General rules*

The inspection body shall:

- a) Have a staff with an organisational structure, capable, trained, competent and skilled, to satisfactorily perform its technical functions;
- b) Have access to suitable and adequate facilities and equipment;

- c) Operate in an impartial manner and be free from any influence which could prevent it from doing so;
- d) Ensure commercial confidentiality of the commercial and proprietary activities of the manufacturer and other bodies;
- e) Maintain clear demarcation between actual inspection body functions and unrelated functions;
- f) Have a documented quality system, equivalent to that set out in EN ISO/IEC 17020:2012 (except clause 8.1.3);
- g) Ensure that the tests and inspections specified in the relevant standards and in Annex 2 to SMGS are performed;
- h) Maintain an effective and appropriate report and record system in accordance with 1.8.7 and 1.8.8;
- i) Be free from any commercial or financial pressure and not remunerate its personnel depending on the number of the inspections carried out or on the results of those inspections;
- j) Have a liability insurance covering the risks in relation to the conducted activities;

Note: *This is not necessary if the SMGS Contracting State assumes liability in accordance with domestic law.*

- k) Appoint person(s) responsible for carrying out the inspections who shall:
 - 1) Not be directly involved in the design, manufacture, supply, installation, purchase, ownership, use or maintenance of the product (pressure receptacle, tank, battery-wagon or MEGC) to be inspected;
 - 2) Have been trained in all aspects of the activities in relation to which the inspection body has been approved;
 - 3) Have appropriate knowledge, technical skills and understanding of the applicable requirements, of the applicable standards and of the relevant provisions of Parts 4 and 6;
 - 4) Have the ability to draw up certificates, records and reports demonstrating that assessments have been carried out;
 - 5) Observe professional secrecy with regard to information obtained in carrying out their tasks or any provision of domestic law giving effect to it, except in relation to the competent authorities of the SMGS Contracting State in which its activities are carried out. At the request of other inspection bodies, information may be shared as far as necessary for the performance of inspections and tests.

The requirements above are deemed to be met in the case of accreditation according to the standard EN ISO/IEC 17020:2012 (except clause 8.1.3).

1.8.6.3.2 *Operational obligations*

1.8.6.3.2.1 The competent authority or inspection body shall carry out conformity assessments, periodic inspections, intermediate inspections, exceptional inspections and entry into service verifications in a proportionate manner, avoiding unnecessary burdens. The competent authority or inspection body shall perform its activities taking into consideration the size, the sector and the structure of the undertakings involved, the relative complexity of the technology and the serial character of production.

1.8.6.3.2.2 The competent authority or inspection body shall respect the degree of rigour and the level of protection required for the compliance with the provisions of Parts 4 and 6 as applicable.

1.8.6.3.2.3 Where a competent authority or inspection body finds out that requirements laid down in Parts 4 or 6 have not been met by the manufacturer, it shall require the manufacturer to take appropriate corrective measures and it shall not issue any type approval certificate or initial inspection and test certificate until the appropriate corrective measures have been implemented.

1.8.6.3.3 *Delegation of inspection tasks*

Note: *The following provisions only apply to type A inspection bodies. Type B inspection bodies are not allowed to delegate the activities for which they are approved. For in-house inspection services see 1.8.7.7.2.*

1.8.6.3.3.1 Where an inspection body uses the services of a subcontractor to carry out specific tasks connected with its activities, the subcontractor shall be assessed and monitored by the inspection body, or it shall be accredited separately. In the case of separate accreditation, the subcontractor shall be duly accredited according to EN ISO/IEC 17025:2017 (except clause 8.1.3) or EN ISO/IEC 17020:2012 (except clause 8.1.3) as an independent and impartial testing laboratory or inspection body in order to perform testing tasks in accordance with its accreditation. The inspection body shall ensure that this subcontractor meets the requirements set out for the tasks given to it with the same level of competence and safety as laid down for inspection bodies (see 1.8.6.3.1) and the inspection body shall monitor it. The inspection body shall inform the competent authority about the above-mentioned arrangements.

1.8.6.3.3.2 The inspection body shall take full responsibility for the tasks performed by such subcontractors wherever the tasks are performed by them.

1.8.6.3.3.3 The type A inspection body may delegate only a part of each of its activities. In any case, the assessment and the issue of certificates shall be carried out by the inspection body itself.

1.8.6.3.3.4 Activities shall not be delegated without the agreement of the manufacturer, owner or operator as appropriate.

1.8.6.3.3.5 The inspection body shall keep at the disposal of the competent authority the relevant documents concerning the assessment of the qualifications and the work carried out by the above-mentioned subcontractors.

1.8.6.3.4 *Information obligations*

Any inspection body shall inform the competent authority, which had approved it, of the following:

- a) Except when the provisions of 1.8.7.2.2.2 apply, any refusal, restriction, suspension or withdrawal of type approval certificates;
- b) Any circumstance(s) affecting the scope of and conditions for the approval as granted by the competent authority;
- c) Any refusal of inspection certificates;
- d) Any request for information on activities performed which they have received from competent authorities monitoring compliance according to this section;
- e) On request, all activities performed within the scope of their approval, including delegation of tasks;
- f) Any authorization or suspension or withdrawal of an in-house inspection service.

1.8.7 **PROCEDURES FOR CONFORMITY ASSESSMENT, TYPE APPROVAL CERTIFICATE ISSUE AND INSPECTIONS**

Note 1: In this section, "relevant body" means a body assigned in Chapters 6.2 and 6.8.

Note 2: In this section, "manufacturer" means the enterprise who is responsible to the competent authority for all aspects of the conformity assessment and for ensuring the conformity of construction whose name and mark appear in the approvals and on the markings. It is not essential that the enterprise is directly involved in all stages of the construction of the product (see 1.8.7.1.5) which is subject to the conformity assessment.

Note 3: In this section, the term "inspection" includes the terms "inspection and testing" and "inspection" as used in Chapters 6.2 and 6.8.

1.8.7.1 General provisions

1.8.7.1.1 The procedures in section 1.8.7 shall be applied as specified in Chapters 6.2 and 6.8.

If the competent authority performs the tasks itself, the competent authority shall meet the provisions of this section.

1.8.7.1.2 Each application for

- a) The type examination in accordance with 1.8.7.2.1;
- b) The type approval certificate issue in accordance with 1.8.7.2.2;
- c) The supervision of manufacture in accordance with 1.8.7.3; or
- d) The initial inspection and tests in accordance with 1.8.7.4

shall be lodged by the manufacturer with a competent authority or an inspection body, as applicable, in conformity with Chapters 6.2 and 6.8.

Each application for

- e) The entry into service verification in accordance with 1.8.7.5; or
- f) The periodic inspection, intermediate inspection and exceptional inspection in accordance with 1.8.7.6

shall be lodged by the owner or its authorized representative, or by the operator or its authorized representative, with a competent authority or an inspection body.

When the in-house inspection service is authorized for c), d), or f), it is not necessary to lodge an application for c), d), or f).

1.8.7.1.3 The application shall include:

- a) The name and address of the applicant according to 1.8.7.1.2;
- b) A written declaration that the same application has not been lodged with any other competent authority or inspection body;
- c) The relevant technical documentation in 1.8.7.8;
- d) A statement allowing the competent authority or the inspection body, as appropriate, access for conformity assessment or inspection purposes to the locations of manufacture, inspection, testing and storage and providing it with all necessary information to perform their tasks.

1.8.7.1.4 Where the manufacturer or an enterprise with a testing facility is allowed to establish an in-house inspection service according to 6.2.2.12, 6.2.3.6.1, 6.8.1.5.3 (b) or 6.8.1.5.4 (b), it shall demonstrate to the satisfaction of the inspection body that the in-house inspection service is able to perform inspections and tests in conformity with 1.8.7.

1.8.7.1.5 Type approval certificates, inspection certificates and reports for the products (pressure receptacles, tanks, service equipment and the assembly of the elements, structural

equipment and service equipment of battery-wagons or MEGCs), including the technical documentation, shall be kept:

- a) By the manufacturer for a period of at least 20 years from the expiry date of the type approval;
- b) By the issuing competent authority or the issuing inspection body, for a period of at least 20 years from the issuing date;
- c) By the owner or operator for a period of at least 15 months after the product is taken out of service.

1.8.7.2 Type examination and type approval certificate issue

1.8.7.2.1 Type examination

1.8.7.2.1.1 The manufacturer shall:

- a) In the case of pressure receptacles, place at the disposal of the inspection body representative samples of the production envisaged. The inspection body may request further samples if required by the test programme;
- b) In the case of tanks, battery-wagons or MEGCs, give access to the prototype for type testing;
- c) In the case of service equipment, place at the disposal of the inspection body representative samples of the production envisaged. The inspection body may request further samples if required by the test programme.

Note: *The results of assessments and tests according to other regulations or standards may be taken into account.*

1.8.7.2.1.2 The inspection body shall:

- a) Examine the technical documentation specified in 1.8.7.8.1 to verify that the design is in accordance with the relevant provisions of Annex 2 to SMGS, and the prototype or the prototype lot has been manufactured in conformity with the technical documentation and is representative of the design;
- b) Perform the examinations and the tests, or perform the examinations and verify the test conditions and supervise the tests on site, as specified in Annex 2 to SMGS, including the relevant standards, to determine that the provisions have been applied and fulfilled, and the procedures adopted by the manufacturer meet the requirements;
- c) Check the material(s) certificate(s) issued by the manufacturer(s) of the materials against the relevant provisions of Annex 2 to SMGS;
- d) As applicable, approve the procedures for the permanent joining of parts or check that they have been previously approved, and verify that the staff undertaking the permanent joining of parts and the non-destructive tests are qualified or approved;
- e) Agree with the manufacturer the location(s) where the examinations and necessary tests are to be carried out.

The inspection body shall issue a report of the type examination to the manufacturer.

1.8.7.2.2 Type approval certificate issue

Type approvals authorize the construction of products within the period of validity of that approval.

1.8.7.2.2.1 Where the type satisfies all applicable provisions, the competent authority or the inspection body, shall issue a type approval certificate to the manufacturer in conformity with Chapters 6.2 and 6.8.

This certificate shall contain:

- a) The name and address of the issuer;
- b) The competent authority under whom the certificate is issued;
- c) The name and address of the manufacturer;
- d) A reference to the version of Annex 2 to SMGS and standards used for the type examination;
- e) Any requirements resulting from the type examination;
- f) The data contained in the documents for the type-examination according to 1.8.7.8.1, necessary for the identification of the type and variation, as defined by the relevant standards. The documents, or a list identifying the documents, containing the data shall be included or annexed to the certificate;
- g) The reference to the type examination report(s);
- h) The maximum period of validity of the type approval; and
- i) Any specific requirements in accordance with Chapters 6.2 and 6.8.

1.8.7.2.2.2 The type approval shall be valid for a maximum of ten years. If within that period the relevant technical requirements of RID have changed so that the approved type is no longer in conformity with them, then the type approval is no longer valid. If within that period, the withdrawal date according to column (3) of the tables in 6.2.2.1 and 6.2.2.3 or column (5) of the tables in 6.2.4.1, 6.8.2.6.1 and 6.8.3.6 applies, the type approval is also no longer valid. It shall then be withdrawn by the competent authority or the inspection body which issued the type approval certificate.

Note: *For the latest date for withdrawal of existing type approvals, see column (5) of the tables in 6.2.4.1 and 6.8.2.6.1 or 6.8.3.6 as appropriate.*

If a type approval has expired, or has been withdrawn, the manufacture of the products according to that type approval is no longer authorized.

Note: *The relevant provisions concerning the use, periodic inspection and intermediate inspection of products contained in a type approval which has expired or has been withdrawn shall continue to apply to the products constructed according to that type approval before its expiry or its withdrawal if they may continue to be used.*

Type approvals may be renewed on the basis of a new type examination. Results of the previous type examination tests shall be taken into account if these tests are still in accordance with the provisions of Annex 2 to SMGS including the standards applicable at the date of renewal. Renewal is not permitted after a type approval has been withdrawn.

Note: *The type examination for renewal may be performed by an inspection body other than the one which issued the original type examination report.*

Interim amendments of an existing type approval (e.g. for pressure receptacles minor amendments such as the addition of further sizes or volumes not affecting conformity, or for tanks see 6.8.2.3.3) do not extend or modify the original validity of the certificate.

1.8.7.2.2.3 In the case of a modification of a product with a valid, expired or withdrawn type approval, the relevant type examination, testing, inspection and approval are limited to the parts of the product that have been modified.

The modification shall meet the provisions of RID applicable at the time of the modification. For all parts of the product not affected by the modification, the documentation of the initial type approval remains valid.

A modification may apply to one or more product(s) covered by the same type approval.

Where the modified product satisfies all applicable provisions, a supplementary approval certificate for the modification shall be issued to the owner or operator by the competent authority or inspection body of any RID Contracting State in conformity with Chapters 6.2

and 6.8. For tanks, battery-wagons or MEGCs, a copy shall be kept as part of the tank record.

1.8.7.3 Supervision of manufacture

1.8.7.3.1 The manufacturer shall take all the necessary measures to ensure that the manufacturing process complies with the applicable provisions of Annex 2 to SMGS and of the type approval certificate, the technical documentation according to 1.8.7.8.3 and reports.

1.8.7.3.2 The manufacturing process shall be subject to supervision by the relevant body.

The relevant body shall:

- a) Verify the conformity with the technical documentation specified in 1.8.7.8.3 and with the applicable provisions of Annex 2 to SMGS and of the type approval certificate and reports;
- b) Verify that the manufacturing process produces products in conformity with the requirements and the documentation which apply to it;
- c) Verify the traceability of materials and check the material(s) certificate(s) against the specifications;
- d) As applicable, verify that the personnel undertaking the permanent joining of parts and the non-destructive tests are properly attested or approved;
- e) Agree with the manufacturer on the location where the examinations and necessary tests are to be carried out
- f) Provide a written report of the results of the supervision of manufacture.

1.8.7.4 Initial inspection and tests

1.8.7.4.1 The manufacturer shall:

- a) Affix the marks specified in Annex 2 to SMGS;
- b) Supply to the relevant body the technical documentation specified in 1.8.7.8.4.

1.8.7.4.2 The relevant body shall:

- a) Perform the examinations and the tests, or perform the examinations and verify the test conditions and supervise the tests on site to ensure that the product is manufactured in accordance with the type approval and the relevant provisions;
- b) Check the certificates supplied by the manufacturers of service equipment against the service equipment;
- c) Issue an initial inspection and tests report relating to the detailed tests and verifications carried out and the verified technical documentation;
- d) Issue an initial inspection and tests certificate and affix its mark in accordance with Annex 2 to SMGS when the manufacture satisfies the provisions; and;
- e) Check if the type approval remains valid after provisions of Annex 2 to SMGS (including the referenced standards) relevant to the type approval have changed. If the type approval is no longer valid, the relevant body shall issue a refusal inspection report and inform the competent authority or the inspection body which issued the type approval certificate.

The certificate in d) and report in c) may cover a number of items of the same type (group certificate or report).

1.8.7.4.3 The certificate in 1.8.7.4.2 d) shall contain as a minimum:

- a) The name and address of the inspection body and the name and address of the in-house inspection service when applicable;
- b) The name and address of the manufacturer;

- c) The location of the initial inspection;
- d) A reference to the version of Annex 2 to SMGS and the standards used for the initial inspections and tests;
- e) The results of the inspections and tests;
- f) The data for identification of the inspected product(s), at least the serial number or for non-refillable cylinders the batch number;
- g) The type approval number, and
- h) The reference to the certificate of authorization of the in-house inspection service when applicable.

1.8.7.5 Entry into service verification

1.8.7.5.1 If an entry into service verification is required by the competent authority under 6.8.1.5.5, the owner or operator shall engage a single inspection body to perform the entry into service verification and shall provide it with the type approval certificate and the technical documentation specified in 1.8.7.8.4.

1.8.7.5.2 The inspection body shall review the documentation and:

- a) Perform external checks (e.g. marking, condition);
- b) Verify conformity with the official type approval certificate;
- c) Verify the validity of the official approvals of the inspection bodies who performed the previous inspections and tests;
- d) Verify that the transitional measures of 1.6.3 or 1.6.4 have been fulfilled.

1.8.7.5.3 The inspection body shall issue an entry into service verification report that contains the results of the assessment. The owner or operator shall present this report at the request of the competent authority requiring the entry into service verification, and to the inspection body(ies) in charge of subsequent inspections and tests.

In the event of a failed entry into service verification, the non-conformities shall be rectified and a new entry into service verification passed before the tank is used.

The inspection body in charge of the entry into service verification shall, without delay, inform its competent authority of any refusal.

1.8.7.6 Periodic inspection, intermediate inspection and exceptional inspection

1.8.7.6.1 The relevant body shall:

- a) Perform the identification and verify the conformity with the documentation;
- b) Perform the inspections and the tests, or perform the inspections and verify the test conditions and supervise the tests on site in order to check that the requirements are met;
- c) Issue reports and certificates, as appropriate, of the results of the inspections and tests, which may cover a number of products; and
- d) Ensure that the required marks are applied.

1.8.7.6.2 Reports of periodic inspections and tests of pressure receptacles shall be retained by the owner or operator at least until the next periodic inspection.

Note: For tanks, see provisions for tank records in 4.3.2.1.7.

1.8.7.7 Authorization and surveillance of the in-house inspection service

1.8.7.7.1 Where an in-house inspection service is used according to 6.2.2.12, 6.2.3.6.1, 6.8.1.5.3 b) or 6.8.1.5.4 b), the manufacturer or the testing facility shall:

- a) Implement a quality system for the in-house inspection service, including technical procedures, for conducting inspections and tests documented in 1.8.7.8.6 and subject to surveillance;
- b) Fulfil the obligations arising out of the quality system as approved and ensure that it remains satisfactory and efficient, in particular:
 - 1) Authorize trained and competent personnel for the in-house inspection service; and
 - 2) Affix the identity mark or stamp, as specified in Chapters 6.2 and 6.8, of the inspection body, and the mark of the in-house inspection service where appropriate on the product to ensure traceability

1.8.7.7.2 The inspection body shall carry out an initial audit at each site. If satisfactory the inspection body shall inform the competent authority of the authorization of the in-house inspection service and issue a certificate of authorization for a period not exceeding three years. The following provisions shall be met:

- a) This audit shall be undertaken at each site to confirm that the inspections and tests performed on the product are in compliance with the requirements of Annex 2 to SMGS;
- b) The inspection body may authorise the in-house inspection service to affix identity mark or stamp, as specified in Chapter 6.2 and 6.8, of the inspection body to each approved product;
- c) The authorisation may be renewed after a satisfactory audit at each site in the last year prior to the expiry. The new period of validity shall begin with the date of expiry of the authorisation;
- d) The inspectors of the inspection body undertaking the audits shall be competent to carry out the assessment of conformity of the product covered by the quality system and to assess the quality system itself; and
- e) The in-house inspection service shall be engaged in activities at a frequency which ensures the necessary level of competence.

The in-house inspection service may, in specific cases only, subcontract specific parts of its activities if approved by the inspection body which has authorized it. The subcontractor shall additionally be accredited according to EN ISO/IEC 17025:2017 (except clause 8.1.3) or EN ISO/IEC 17020:2012 (except clause 8.1.3) as an independent and impartial testing laboratory or inspection body in order to perform testing tasks in accordance with its accreditation.

1.8.7.7.3 The certificate of authorization shall contain as a minimum:

- a) The name and address of the inspection body;
- b) The name and address of the manufacturer or testing facility and addresses of all in-house inspection service sites;
- c) A reference to the version of Annex 2 to SMGS used for authorization of the in-house inspection service and standards or recognised technical codes according to 6.2.5 used for initial inspection and tests or periodic inspections;
- d) The reference to the initial audit report;
- e) As necessary, further information to define the scope of the in-house inspection service (e.g. type approvals of the products for initial inspection and tests);
- f) The mark of the in-house inspection service, if applicable; and
- g) The expiry date.

1.8.7.7.4 The inspection body shall carry out periodic audits at each site within the duration of the authorisation to make sure that the in-house inspection service maintains and applies the quality system, including the technical procedures. The following provisions shall be met:

- a) The audits shall be carried out no later than every six months;
- b) The inspection body may require additional visits, training, technical changes, modifications of the quality system, restrict or prohibit the inspections and tests to be done by the in-house inspection service;
- c) The inspection body shall assess any changes in the quality system and decide whether the modified quality system still satisfies the requirements of the initial audit or whether a full reassessment is required;
- d) The inspectors of the inspection body undertaking the audits shall be competent to carry out the assessment of conformity of the product covered by the quality system and to assess the quality system itself; and;
- e) The inspection body shall provide the manufacturer or the testing facility, as applicable, and the in-house inspection service, with the report of the audit and, if tests have taken place, with a test report.

1.8.7.7.5 In cases of non-conformity with the relevant requirements the inspection body shall ensure that corrective measures are taken. If corrective measures are not taken in due time, the inspection body shall suspend or withdraw the permission for the in-house inspection service to carry out its activities. The notice of suspension or withdrawal shall be transmitted to the competent authority. A report shall be provided to the manufacturer or the testing facility, as applicable, and to the in-house inspection service giving detailed reasons for the decisions taken by the inspection body.

1.8.7.8 Documents

The technical documentation shall enable an assessment to be made of conformity with the relevant requirements

1.8.7.8.1 Documents for the type examination

The manufacturer shall provide as appropriate:

- a) The list of standards used for the design and manufacture;
- b) A description of the type including all variations;
- c) The instructions according to the relevant column of Table A of Chapter 3.2 or a list of dangerous goods to be carried for dedicated products;
- d) A general assembly drawing or drawings;
- e) The detailed drawings, including the dimensions used for the calculations, of the product, the service equipment, the structural equipment, the marking and the labelling necessary to verify the conformity;
- f) The calculation notes, results and conclusions;
- g) The list of the service equipment with the relevant technical data and information on the safety devices including the calculation of the relief capacity if relevant;
- h) The list of material requested in the standard for manufacture used for every part, sub-part, lining, service and structural equipment and the corresponding material specifications or the corresponding declaration of conformity to Annex 2 to SMGS;
- i) The approved qualification of the staff carrying out permanent joining process (for example, welding);
- j) The description of the heat treatment process;
- k) The procedures, descriptions and records of all relevant tests listed in the standards or Annex 2 to SMGS for the type approval and for the manufacture.

1.8.7.8.2 Documents for the type approval certificate issue

The manufacturer shall provide as appropriate:

- a) A list of standards used for the design and manufacture;
- b) A description of the type, including all variations;

- c) The instructions according to the relevant column of table A of Chapter 3.2 or a list of dangerous goods to be carried for dedicated products;
- d) A general assembly drawing or drawings;
- e) The list of materials in contact with the dangerous goods;
- f) The list of service equipment;
- g) The type-examination report; and
- h) Further documents mentioned under 1.8.7.8.1 on request of the competent authority or inspection body

1.8.7.8.3 *Documents for the supervision of manufacture*

The manufacturer shall make available as appropriate:

- a) The documents listed in 1.8.7.8.1 and 1.8.7.8.2;
- b) A copy of the type approval certificate;
- c) The manufacturing procedures including test procedures;
- d) The manufacturing records;
- e) The approved qualifications of permanent joining operators (for example, welding operators);
- f) The approved qualifications of the non destructive test operators;
- g) The reports of the destructive and non destructive tests;
- h) The heat treatment records; and
- i) The calibration records.

1.8.7.8.4 *Documents for initial inspection and tests, and for entry into service verification*

The manufacturer for initial inspection and tests, and the owner or operator for the entry into service verification shall provide as appropriate:

- a) The documents listed in 1.8.7.8.1, 1.8.7.8.2 and 1.8.7.8.3;
- b) The material certificates of the product and any sub-parts including the service equipment;
- c) The certificates of conformity of the service equipment; and
- d) A declaration of conformity including the description of the product and all the variations adopted from the type approval.

1.8.7.8.5 *Documents for periodic inspections, intermediate inspections and exceptional inspection*

The owner or operator, or its authorized representative shall provide as appropriate:

- a) For pressure receptacles, the documents specifying special requirements when the manufacturing and periodic inspections and tests standards so require;
- b) For tanks,
 - the tank record (see 1.2.1);
 - any relevant document mentioned in 1.8.7.8.1 to 1.8.7.8.4 if requested by the inspection body.

1.8.7.8.6 *Documents for the surveillance of in-house inspection service*

The in-house inspection service shall provide the quality system documentation as appropriate:

- a) The organisational structure and responsibilities of the staff;
- b) The relevant inspection and test, quality control, quality assurance and process operation instructions;
- c) The quality data records, such as inspection reports, test data, calibration data and certificates;

- d) The management reviews to ensure the effective operation of the quality system arising from the on-site audits in accordance with 1.8.7.7;
- e) The process describing how customer and regulation requirements are met;
- f) The process for control of documents and their revision;
- g) The procedures for dealing with non-conforming products;
- h) The training programmes and qualification procedures for relevant personnel.

1.8.8 PROCEDURES FOR CONFORMITY ASSESSMENT OF GAS CARTRIDGES

When assessing the conformity of gas cartridges, one of the following procedures shall be applied:

- a) The procedure in section 1.8.7 for non-UN pressure receptacles, with the exception of 1.8.7.6;
- b) The procedure in sub-sections 1.8.8.1 to 1.8.8.7.

1.8.8.1 General provisions

1.8.8.1.1 The supervision of manufacture shall be carried out by an Xa body and the tests as required in 6.2.6 shall be carried out either by that Xa body or by an IS authorized by that Xa body; for definition of Xa and IS see definitions in 6.2.3.6.1. Conformity assessment shall be carried out by the competent authority, its delegate or its approved inspection body of an SMGS Contracting State.

1.8.8.1.2 By the application of 1.8.8, the applicant shall demonstrate, ensure and declare on his sole responsibility the conformity of gas cartridges with the provisions of 6.2.6 and all further applicable provisions of Annex 2 to SMGS.

1.8.8.1.3 The applicant shall

- a) Carry out a design type examination of each type of gas cartridges (including materials to be used and variations of that type, e.g. volumes, pressures, drawings and closing and release devices) according to 1.8.8.2;
- b) Operate an approved quality system for design, manufacture, inspection and testing according to 1.8.8.3;
- c) Operate an approved testing regime according to 1.8.8.4 for the tests required in 6.2.6;
- d) Apply for the approval of his quality system for supervision of manufacture and for testing to one Xa body of his choice of the SMGS Contracting State; if the applicant is not established in an SMGS Contracting State he shall apply to one Xa body of an SMGS Contracting State prior to first transport into an SMGS Contracting State;
- e) If the gas cartridge is finally assembled from parts manufactured by the applicant by one or more other enterprise(s), provide written instructions how to assemble and fill the gas cartridges to meet the provisions of his type examination certificate.

1.8.8.1.4 Where the applicant and enterprises assembling or filling gas cartridges according to the instructions of the applicant, can demonstrate to the satisfaction of the Xa body conformity with the provisions of 1.8.7.7 excluding 1.8.7.7.1 (b) (ii) and 1.8.7.7.2 (b), they may establish an in-house inspection service which may perform part or all of the inspections and tests specified in 6.2.6.

1.8.8.2 Design type examination

1.8.8.2.1 The applicant shall establish technical documentation for each type of gas cartridges including the technical standard(s) applied. If he chooses to apply a standard not referenced in 6.2.6, he shall add the standard applied to the documentation.

1.8.8.2.2 The applicant shall retain the technical documentation together with samples of that type at the disposal of the Xa body during production and afterwards for a period of minimum five years starting from the last date of production of gas cartridges according to that type examination certificate.

- 1.8.8.2.3** The applicant shall after careful examination issue a design type certificate which shall be valid for a maximum period of ten years; he shall add this certificate to the documentation. This certificate authorises him to produce gas cartridges of that type for that period.
- 1.8.8.2.4** If within that period the relevant technical requirements of Annex 2 to SMGS (including referenced standards) have changed so that the design type is no longer in conformity with them, the applicant shall withdraw his type examination certificate and inform the Xa body.
- 1.8.8.2.5** The applicant may after careful and complete review reissue the certificate for another period of maximum ten years.
- 1.8.8.3** **Supervision of manufacture**
- 1.8.8.3.1** he procedure of design type examination as well as the manufacturing process shall be subject to a survey by the Xa body to ensure the type certified by the applicant and the product as produced are in conformity with the provisions of the design type certificate and the applicable provisions of Annex 2 to SMGS. If 1.8.8.1.3 (e) applies, the assembling and filling enterprises shall be included in that procedure.
- 1.8.8.3.2** The applicant shall take all the necessary measures to ensure that the manufacturing process complies with the applicable provisions of Annex 2 to SMGS and of his design type certificate and its annexes. If 1.8.8.1.3 (e) applies, the assembling and filling enterprises shall be included in that procedure.
- 1.8.8.8** The Xa body shall:
- a) Verify the conformity of the design type examination of the applicant and conformity of the type of gas cartridges with the technical documentation specified in 1.8.8.2;
 - b) Verify that the manufacturing process produces products in conformity with the requirements and the documentation which apply to it; if the gas cartridge is finally assembled from parts manufactured by the applicant by one or more enterprise(s), the Xa body shall also verify that the gas cartridges are in full conformity with all applicable provisions after final assembly and filling and that the instructions of the applicant are correctly applied;
 - c) Verify that the personnel undertaking the permanent joining of parts (for example, welding) and the tests are qualified or approved;
 - d) Record the results of its surveys.
- 1.8.8.3.4** If the findings of the Xa body show non-conformity of the design type certificate of the applicant or the manufacturing process, he shall require appropriate corrective measures or withdrawal of the certificate from the applicant.
- 1.8.8.4** **Leakproofness test**
- 1.8.8.4.1** The applicant and enterprises finally assembling and filling gas cartridges according to the instructions of the applicant shall:
- a) Carry out the tests required in 6.2.6;
 - b) Record the test results;
 - c) Issue a certificate of conformity only for gas cartridges, which are in full compliance with the provisions of his design type examination and the applicable provisions of Annex 2 to SMGS and have successfully passed the tests as required in 6.2.6;
 - d) Retain the documentation as specified in 1.8.8.7 during production and afterwards for a period of minimum five years from the last date of production of gas cartridges belonging to one type approval for inspection by the Xa body;
 - e) Affix a durable and legible mark identifying the type of gas cartridge, the applicant and the date of production or batch number; where due to limited available space the mark cannot be fully applied to the body of the gas cartridge, he shall affix a durable tag with this information to the gas cartridge or place it together with a gas cartridge in an inner packaging.

1.8.8.4.2 The Xa body shall:

- a) Perform the necessary examinations and tests at random intervals, but at least shortly after starting of manufacture of a type of gas cartridges and thereafter at least once every three years, in order to verify that the procedure for design type examination of the applicant as well as that the manufacture and testing of the product are carried out in accordance with the design type certificate and the relevant provisions;
- b) Check the certificates supplied by the applicant;
- c) Carry out the tests as required in 6.2.6 or approve the program of testing and the in-house inspection service to carry out the tests.

1.8.8.4.3 The certificate shall contain as a minimum:

- a) The name and address of the applicant and, when the final assembly is not carried out by the applicant but by an enterprise or enterprises in accordance with the written instructions of the applicant, the name(s) and address(es) of these enterprises;
- b) A reference to the version of Annex 2 to SMGS and the standard(s) used for manufacture and tests;
- c) The result of inspections and tests;
- d) The data for marking as required in 1.8.8.4.1 (e).

1.8.8.5 (reserved)

1.8.8.6 **Surveillance of the in-house inspection service**

When the applicant or enterprise assembling or filling gas cartridges has established an in-house inspection service, the provisions of 1.8.7.7 excluding 1.8.7.7.1 (b) (ii) and 1.8.7.7.2 (b) shall be applied. The enterprise assembling or filling gas cartridges shall comply with the provisions relevant to the applicant.

1.8.8.7 **Documents**

The provisions of 1.8.7.8.1, 1.8.7.8.2, 1.8.7.8.3, 1.8.7.8.4 and 1.8.7.8.6 shall be applied.

CHAPTER 1.9

RESTRICTIONS ON CARRIAGE IMPOSED BY THE COMPETENT AUTHORITIES

1.9.1 An SMGS Contracting State may apply to the international carriage of dangerous goods by rail on its territory certain additional provisions not included in Annex 2 to SMGS, provided that these additional provisions

- are in accordance with 1.9.2,
- do not conflict with the provisions of 1.1.2.1 (a),
- are contained in the SMGS Contracting State's domestic legislation applying equally to the domestic carriage of dangerous goods by rail on the territory of that SMGS Contracting State,
- do not result in the prohibition of carriage by rail of the dangerous goods covered by these provisions in the whole territory of the SMGS Contracting State.

1.9.2 The additional provisions referred to in 1.9.1 are:

- a) safety requirements or restrictions on carriage,
 - using certain structures such as bridges or tunnels,
 - using combined transport installations such as transshipment installations, or
 - where the transport operation begins or ends in ports, railway stations or other transport terminals
- b) provisions according to which the carriage of certain dangerous goods on sections with special and local risks is prohibited, such as sections in residential areas, environmentally sensitive areas, economic centres or industrial zones containing hazardous installations, or to which special conditions, e.g. operational measures (reduced speed, specified journey times, prohibition on trains meeting each other, etc.) apply.

1.9.3 (reserved)

1.9.4 (reserved)

1.9.5 Notwithstanding with preceding paragraphs, SMGS Contracting States may lay down specific safety requirements for the international carriage of dangerous goods by rail, in so far as SMGS does not cover that area, in particular as regards:

- the running of trains;
- operating rules for operations ancillary to transport such as marshalling and stabling;
- management of information concerning the dangerous goods transported.

These specific requirements shall not concern the areas covered by Annex 2 to SMGS, in particular those listed in 1.1.2.1 a) and 1.1.2.1 b)

CHAPTER 1.10 SECURITY PROVISIONS ⁶

***Note:** For the purposes of this Chapter the term “security” means measures to be taken against danger to human life and health as well as against danger to the environment resulting from willful misconduct or acts of terror.*

1.10.1 GENERAL PROVISIONS

- 1.10.1.1 All persons engaged in the carriage of dangerous goods shall consider the security requirements set out in this Chapter commensurate with their responsibilities.
- 1.10.1.2 Dangerous goods shall only be offered for carriage to carriers that have been appropriately identified.
- 1.10.1.3 Areas within temporary storage terminals, temporary storage sites, vehicle depots, berthing areas and marshalling yards used for temporary storage during carriage of dangerous goods shall be properly secured, well lit and, where possible and appropriate, not accessible to the general public.
- 1.10.1.4 Each crew member of a train carrying dangerous goods shall carry with them means of identification, which includes their photograph, during carriage.
- 1.10.1.5 Safety inspections in accordance with 1.8.1 shall cover appropriate implementation of security measures.
- 1.10.1.6 (reserved)

1.10.2 SECURITY TRAINING

- 1.10.2.1 The training and the refresher training specified in Chapter 1.3 shall also include elements of security awareness. The security refresher training need not be linked to regulatory changes only.
- 1.10.2.2 Security awareness training shall address the nature of security risks, recognising security risks, methods to address and reduce such risks and actions to be taken in the event of a security breach. It shall include awareness of security plans (if appropriate) commensurate with the responsibilities and duties of individuals and their part in implementing security plans.
- 1.10.2.3 Such training shall be provided or verified upon employment in a position involving dangerous goods transport and shall be periodically supplemented with refresher training.
- 1.10.2.4 Records of all security training received shall be kept by the employer and made available to the employee or competent authority, upon request. Records shall be kept by the employer for a period of time established by the competent authority.

1.10.3 PROVISIONS FOR HIGH CONSEQUENCE DANGEROUS GOODS

***Note:** In addition to the security provisions of Annex 2 to SMGS, competent authorities may implement further security provisions for reasons other than safety during carriage. In order not to impede international and multimodal carriage by different explosives security marks, it is recommended that such marks be formatted*

⁶ Provisions of Chapter 1.10 shall be applied so far as it is authorized by national law.

consistent with an internationally harmonized standard (See also the document No 6 of the List).

1.10.3.1 Definition of high consequence dangerous goods

1.10.3.1.1 High consequence dangerous goods are those which have the potential for misuse in a terrorist event and which may, as a result, produce serious consequences such as mass casualties, mass destruction or, particularly for Class 7, mass socio-economic disruption..

1.10.3.1.2 High consequence dangerous goods in classes other than Class 7 are those listed in Table 1.10.3.1.2 below and carried in quantities greater than those indicated therein.

Table 1.10.3.1.2: List of high consequence dangerous goods

Class	Subclass	Substance or article	Quantity		
			Tank ^{a)} (l)	Bulk ^{b)} (kg)	Packages (kg)
1	1.1	Explosive substances and material	Shall not be transported	Shall not be transported	0
	1.2	Explosive substances and material	Shall not be transported	Shall not be transported	0
	1.3	Explosive substances and material , Compatibility group C	Shall not be transported	Shall not be transported	0
	1.4	Explosive substances and material UN Nos.0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456, 0500, 0512 and 0513.	Shall not be transported	Shall not be transported	0
	1.5	Explosive substances	0	Shall not be transported	0
	1.6	Explosive substances and articles	Shall not be transported	Shall not be transported	0
2		Flammable, non-toxic gases (classification codes including only letters F or FC)	3 000	Shall not be transported	Shall not be limited
		Toxic gases (classification codes including letters T, TF, TC, TO, TFC or TOC) excluding aerosols	0	Shall not be transported	0
3		Flammable liquids of packing groups I and II	3 000	Shall not be transported	Shall not be limited
		Desensitized explosive substances	0	Shall not be transported	0
4.1		Desensitized explosive substances	Shall not be transported	Shall not be transported	0
4.2		Packing group I substances	3 000	Shall not be transported	Shall not be limited
4.3		Packing group I substances	3 000	Shall not be transported	Shall not be limited
5.1		Oxidizing liquids of packing group I	3 000	Shall not be transported	Shall not be limited

		Perchlorates, ammonium nitrate, ammonium nitrate fertilisers and ammonium nitrate emulsions or suspensions or gels	3 000	3 000	Shall not be limited
6.1		Toxic substances of packing group I	0	Shall not be transported	0
6.2		Infectious substances of Category A (UN Nos. 2814 and 2900, except for animal material) and medical waste of Category A (UN No. 3549)	Shall not be transported	0	0
8		Corrosive substances of packing group I	3 000	Shall not be transported	Shall not be limited

«0» - The requirements of 1.10.3 shall be met, despite the quantity of the goods to be transported;

«3000» - the requirements of 1.10.3 shall be met if 3000 or more are transported;

«Shall not be transported» – this method of carriage is not allowed;

«Shall not be limited» - the requirements of 1.10.3 do not apply if such a method of transport is implemented;

«a)» A value indicated in this column is applicable only if carriage in tanks is authorized, in accordance with Chapter 3.2, Table A, column (10) or (12). For substances that are not authorized for carriage in tanks, the instruction in this column is not relevant (Carriage of these goods is prohibited).

«b)» A value indicated in this column is applicable only if carriage in bulk is authorized, in accordance with Chapter 3.2, Table A, column (10) or (17). For substances that are not authorized for carriage in bulk, the instruction in this column is not relevant.

1.10.3.1.3 For dangerous goods of Class 7, high consequence radioactive material is that with an activity equal to or greater than a transport security threshold of 3 000 A2 per single package (see also 2.2.7.2.2.1) except for the following radionuclides where the transport security threshold is given in Table 1.10.3.1.3 below.

Table 1.10.3.1.3
Transport security thresholds for specific radionuclides

Element	Radionuclide	Transport security thresholds (TBq)
Americium	Am-241	0,6
Gold	Au-198	2
Cadmium	Cd-109	200
Californium	Cf-252	0,2
Curium	Cm-244	0,5
Cobalt	Co-57	7

Cobalt	Co-60	0,3
Caesium	Cs-137	1
Iron	Fe-55	8000
Germanium	Ge-68	7
Gadolinium	Gd-153	10
Iridium	Ir-192	0,8
Nickel	Ni-63	600
Palladium	Pd-103	900
Promethium	Pm-147	400
Polonium	Po-210	0,6
Plutonium	Pu-238	0,6
Plutonium	Pu-239	0,6
Radium	Ra-226	0,4
Ruthenium	Ru-106	3
Selenium	Se-75	2
Strontium	Sr-90	10
Thallium	Tl-204	200
Thulium	Tm-170	200
Ytterbium	Yb-169	3

1.10.3.1.4 For mixtures of radionuclides, determination of whether or not the transport security threshold has been met or exceeded can be calculated by summing the ratios of activity present for each radionuclide divided by the transport security threshold for that radionuclide. If the sum of the fractions is less than 1, then the radioactivity threshold for the mixture has not been met or exceeded.

This calculation can be made with the formula:

$$\sum_i \frac{A_i}{T_i} < 1,$$

where

A_i = activity of radionuclide i that is present in a package (TBq)

T_i = transport security threshold for radionuclide i (TBq).

- 1.10.3.1.5** When radioactive material possesses subsidiary hazards of other classes, the criteria of table 1.10.3.1.2 shall also be taken into account (see also 1.7.5).

1.10.3.2 Security plans

- 1.10.3.2.1** Carriers, consignors and other participants specified in 1.4.2 and 1.4.3 engaged in the carriage of high consequence dangerous goods (see Table 1.10.3.1.2) or high consequence radioactive material (see 1.10.3.1.3) shall adopt, implement and comply with a security plan that addresses at least the elements specified in 1.10.3.2.2.

- 1.10.3.2.2** The security plan shall comprise at least the following elements:

- (a) specific allocation of responsibilities for security to competent and qualified persons with appropriate authority to carry out their responsibilities;
- (b) records of dangerous goods or types of dangerous goods concerned;
- (c) review of current operations and assessment of security risks, including any stops necessary to the transport operation, the keeping of dangerous goods in the wagon, tank or container before, during and after the journey and the intermediate temporary storage of dangerous goods during the course of intermodal transfer or transshipment between units, as appropriate;
- (d) clear statement of measures that are to be taken to reduce security risks, commensurate with the responsibilities and duties of the participant, including:
 - training;
 - security policies (e.g. response to higher threat conditions, new employee/employment verification, etc.);
 - operating practices (e.g. choice/use of routes where known, access to dangerous goods in intermediate temporary storage (as defined in (c)), proximity to vulnerable infrastructure etc.);
 - equipment and resources that are to be used to reduce security risks;
- (e) effective and up to date procedures for reporting and dealing with security threats, breaches of security or security incidents;
- (f) procedures for the evaluation and testing of security plans and procedures for periodic review and update of the plans;
- (g) measures to ensure the physical security of transport information contained in the security plan; and
- (h) measures to ensure that the distribution of information relating to the transport operation contained in the security plan is limited to those who need to have it. Such measures shall not preclude the provision of information required elsewhere in Annex 2 to SMGS.

Note: Carriers, consignors and consignees should co-operate with each other and with competent authorities to exchange threat information, apply appropriate security measures and respond to security incidents.

- 1.10.3.3** Devices, equipment or arrangements to prevent the theft of the train or wagon carrying high consequence dangerous goods (see Table 1.10.3.1.2) or high consequence radioactive material (see 1.10.3.1.3) and its cargo, shall be applied and measures taken to ensure that these are operational and effective at all times. The application of these protective measures shall not jeopardize emergency response.

Note: When appropriate and already fitted, the use of transport telemetry or other tracking methods or devices should be used to monitor the movement of high consequence dangerous goods (see Table 1.10.3.1.2) or high consequence radioactive material (see 1.10.3.1.3).

- 1.10.4** The provisions of 1.10.1, 1.10.2 and 1.10.3 do not apply when the quantities carried in packages in a wagon or large container do not exceed those referred to in 1.1.3.6.3, except for high consequence dangerous goods of Class 1 (in accordance with 1.10.3.1) and except for UN numbers 2910 and 2911 if the activity level exceeds the A2 value. In addition, the provisions of 1.10.1, 1.10.2 and 1.10.3 do not apply when the quantities carried in tanks or in bulk in a wagon or container do not exceed those referred to in 1.1.3.6.3. In addition the provisions of this Chapter do not apply to the carriage of UN No. 2912 RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I) and UN No. 2913 RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I).
- 1.10.5** For radioactive material, the provisions of this Chapter are deemed to be complied with when the provisions of the Convention on Physical Protection of Nuclear Material (INFCIRC/274/Rev.1, IAEA, Vienna (1980)) and the IAEA circular on "Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities" (INFCIRC/225/Rev.5, IAEA, Vienna (2011)) are applied.

CHAPTER 1.11

INTERNAL EMERGENCY PLANS FOR MARSHALLING YARDS

Internal emergency plans shall be drawn up for the carriage of dangerous goods in marshalling yards.

The aim of emergency plans shall be that in the event of an accident or incident in marshalling yards, all those involved shall co-operate in a co-ordinated way and the consequences of the accident or incident for human life or for the environment shall be minimised to the greatest possible extent.

PART 2 CLASSIFICATION

CHAPTER 2.1 GENERAL PROVISIONS

2.1.1 INTRODUCTION

2.1.1.1 The classes of dangerous goods according to Annex 2 to SMGS are the following:

Class 1 Explosive substances and articles

Class 2 Gases

Class 3 Flammable liquids

Class 4.1 Flammable solids, self-reactive substances, polymerizing substances and solid desensitized explosives

Class 4.2 Substances liable to spontaneous combustion

Class 4.3 Substances which, in contact with water, emit flammable gases

Class 5.1 Oxidizing substances

Class 5.2 Organic peroxides

Class 6.1 Toxic¹ (poisonous) substances

Class 6.2 Infectious substances

Class 7 Radioactive material

Class 8 Corrosive¹ (caustic) substances

Class 9 Miscellaneous dangerous substances and articles

2.1.1.2 Each entry in the different classes has been assigned a UN number. The following types of entries are used:

A. Single entries for well defined substances or articles including entries for substances covering several isomers, e.g.:

UN No. 1090 ACETONE

UN No. 1104 AMYL ACETATES

UN No. 1194 ETHYL NITRITE SOLUTION

B. Generic entries for a well defined group of substances or articles, which are not n.o.s. entries, e.g.:

UN No. 1133 ADHESIVES

UN No. 1266 PERFUMERY PRODUCTS

UN No. 2757 CARBAMATE PESTICIDE, SOLID, TOXIC

UN No. 3101 ORGANIC PEROXIDE TYPE B, LIQUID

C. Specific n.o.s. entries covering a group of substances or articles of a particular chemical or technical nature, not otherwise specified, e.g.:

UN No. 1477 NITRATES, INORGANIC, N.O.S.

UN No. 1987 ALCOHOLS, N.O.S.

D. General n.o.s. entries covering a group of substances or articles having one or more dangerous properties, not otherwise specified. e.g.:

¹ In the text of the rules, along with the terms "poisonous" and "caustic", the terms "toxic" and "corrosive" are used, respectively.

UN No. 1325 FLAMMABLE SOLID, ORGANIC, N.O.S.

UN No. 1993 FLAMMABLE LIQUID, N.O.S.

The entries defined under B., C. and D. are defined as collective entries.

2.1.1.3 For packing purposes, substances other than those of Classes 1, 2, 5.2, 6.2 and 7, and other than self- reactive substances of Class 4.1 are assigned to packing groups in accordance with the degree of danger they present:

- Packing group I: Substances presenting high danger;
- Packing group II: Substances presenting medium danger;
- Packing group III: Substances presenting low danger.

The packing group(s) to which a substance is assigned is (are) indicated in Table A of Chapter 3.2.

Articles are not assigned to packing groups. For packing purposes any requirement for a specific packaging performance level is set out in the applicable packing instruction.

2.1.2 PRINCIPLES OF CLASSIFICATION

2.1.2.1 The dangerous goods covered by the heading of a class are defined on the basis of their properties according to sub-section 2.2.x.1 of the relevant class. Assignment of dangerous goods to a class and a packing group is made according to the criteria mentioned in the same sub-section 2.2.x.1. Assignment of one or several subsidiary risk(s) to a dangerous substance or article is made according to the criteria of the class or classes corresponding to those risks, as mentioned in the appropriate sub-section(s) 2.2.x.1.

2.1.2.2 All dangerous goods entries are listed in Table A of Chapter 3.2 in the numerical order of their UN Number. This table contains relevant information on the goods listed, such as name, class, packing group(s), label(s) to be affixed, packing and carriage provisions². The substances listed by name in column (2) of Table A of Chapter 3.2 shall be carried according to their classification in Table A or under the conditions specified in 2.1.2.8.

2.1.2.3 A substance may contain technical impurities (for example those deriving from the production process) or additives for stability or other purposes that do not affect their classification. However, a substance mentioned by name, i.e. listed as a single entry in Table A of Chapter 3.2, containing technical impurities or additives for stability or other purposes affecting its classification shall be considered a solution or mixture (see 2.1.3.3).

2.1.2.4 Dangerous goods which are listed or defined in sub-section 2.2.x.2 of each class are not to be accepted for carriage.

2.1.2.5 Goods not mentioned by name, i.e. goods not listed as single entries in Table A of Chapter 3.2 and not listed or defined in one of the above-mentioned sub-sections 2.2.x.2 shall be assigned to the relevant class in accordance with the procedure of section 2.1.3. In addition, the subsidiary risk (if any) and the packing group (if any) shall be determined. Once the class, subsidiary risk (if any) and packing group (if any) have been established the relevant UN number shall be determined. The decision trees in sub-sections 2.2.x.3 (list of collective entries) at the end of each class indicate the relevant parameters for selecting the relevant collective entry (UN number). In all cases the most specific collective entry covering the properties of the substance or article shall be selected, according to the hierarchy indicated in 2.1.1.2 by the letters B, C and D respectively. If the substance or article cannot be classified under entries of type B or C according to 2.1.1.2, then, and only then shall it be classified under an entry of type D.

2.1.2.6 On the basis of the test procedures of Chapter 2.3 and the criteria set out in sub-sections 2.2.x.1 of classes when it is so specified, it may be determined that a substance, solution or mixture of a certain class, mentioned by name in Table A of Chapter 3.2, does not

² An alphabetical list of these entries is given in table B of Chapter 3.2.

meet the criteria of that class. In such a case, the substance, solution or mixture is deemed not to belong to that class.

2.1.2.7 For the purposes of classification, substances with a melting point or initial melting point of 20 °C or lower at a pressure of 101.3 kPa shall be considered to be liquids. A viscous substance for which a specific melting point cannot be determined shall be subjected to the ASTM D 4359-90 test or to the test for determining fluidity (penetrometer test) prescribed in 2.3.4.

2.1.2.8 A consignor who has identified, on the basis of test data, that a substance listed by name in column (2) of Table A of Chapter 3.2 meets classification criteria for a class that is not identified in column (3a) or (5) of Table A of Chapter 3.2, may, with the approval of the competent authority, consign the substance:

- Under the most appropriate collective entry listed in sub-sections 2.2.x.3 reflecting all hazards; or
- Under the same UN number and name but with additional hazard communication information as appropriate to reflect the additional subsidiary hazard(s) (documentation, label, placard) provided that the class remains unchanged and that any other carriage conditions (e.g. limited quantity, packaging and tank provisions) that would normally apply to substances possessing such a combination of hazards are the same as those applicable to the substance listed.

Note 1: *The competent authority granting the approval may be the competent authority of any SMGS Contracting State who may also recognize an approval granted by the competent authority of a country which is not an SMGS Contracting State provided that this approval has been granted in accordance with the procedures applicable according to Annex 2 to SMGS, RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions.*

Note 2: *When a competent authority grants such approvals, it should inform the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods accordingly and submit a relevant proposal of amendment to the Dangerous Goods List of the UN Model Regulations. Should the proposed amendment be rejected, the competent authority should withdraw its approval.*

Note 3: *For carriage in accordance with 2.1.2.8, see also 5.4.1.1.20.*

2.1.3 CLASSIFICATION OF SUBSTANCES, INCLUDING SOLUTIONS AND MIXTURES (SUCH AS PREPARATION AND WASTES), NOT MENTIONED BY NAME IN TABLE A OF CHAPTER 3.2

2.1.3.1 Substances including solutions and mixtures not mentioned by name in Table A shall be classified according to their degree of danger on the basis of the criteria mentioned in sub-section 2.2.x.1 of the various classes. The danger(s) presented by a substance shall be determined on the basis of its physical and chemical characteristics and physiological properties. Such characteristics and properties shall also be taken into account when such experience leads to a more stringent assignment.

2.1.3.2 A substance not mentioned by name in Table A of Chapter 3.2 presenting a single hazard shall be classified in the relevant class under a collective entry listed in sub-section 2.2.x.3 of that class.

2.1.3.3 A solution or mixture meeting the classification criteria of Annex 2 to SMGS composed of a single predominant substance mentioned by name in Table A of Chapter 3.2 and one or more substances not subject to Annex 2 to SMGS or traces of one or more substances mentioned by name in Table A of Chapter 3.2, shall be assigned the UN number and proper shipping name of the predominant substance mentioned by name in Table A of Chapter 3.2 unless:

- a) The solution or mixture is mentioned by name in Table A of Chapter 3.2;
- b) The name and description of the substance mentioned by name in Table A of Chapter 3.2 specifically indicate that they apply only to the pure substance;

- c) The class, classification code, packing group, or physical state of the solution or mixture is different from that of the substance mentioned by name in Table A of Chapter 3.2; or
- d) The hazard characteristics and properties of the solution or mixture necessitate emergency response measures that are different from those required for the substance mentioned by name in Table A of Chapter 3.2.

In those other cases, except the one described in (a), the solution or mixture shall be classified as a sub-stance not mentioned by name in the relevant class under a collective entry listed in sub-section 2.2.x.3 of that class taking account of the subsidiary hazards presented by that solution or mixture, if any, unless the solution or mixture does not meet the criteria of any class, in which case it is not subject to Annex 2 to SMGS

2.1.3.4 Solutions and mixtures containing a substance belonging to one of the entries mentioned in 2.1.3.4.1 or 2.1.3.4.2 shall be classified in accordance with the provisions of these paragraphs.

2.1.3.4.1 Solutions and mixtures containing one of the following substances mentioned by name shall always be classified under the same entry as the substance they contain, provided they do not have the hazard characteristics as indicated in 2.1.3.5.3:

- Class 3

UN 1921 PROPYLENEIMINE, STABILIZED

UN 3064 NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 5% nitroglycerin

- Class 6.1

UN 1051 HYDROGEN CYANIDE, STABILIZED, containing less than 3% water

UN 1185 ETHYLENEIMINE, STABILIZED

UN 1259 NICKEL CARBONYL

UN 1613 HYDROCYANIC ACID, AQUEOUS SOLUTION (HYDROGEN CYANIDE, AQUEOUS SOLUTION), with not more than 20% hydrogen cyanide

UN 1614 HYDROGEN CYANIDE, STABILIZED, containing not more than 3% water and absorbed in a porous inert material

UN 1994 IRON PENTACARBONYL

UN 2480 METHYL ISOCYANATE

UN 2481 ETHYL ISOCYANATE

UN 3294 HYDROGEN CYANIDE, SOLUTION IN ALCOHOL, with not more than 45% hydrogen cyanide

- Class 8

UN 1052 HYDROGEN FLUORIDE, ANHYDROUS

UN 1744 BROMINE or UN 1744 BROMINE SOLUTION

UN 1790 HYDROFLUORIC ACID with more than 85% hydrogen fluoride

UN 2576 PHOSPHORUS OXYBROMIDE, MOLTEN

2.1.3.4.2 Solutions and mixtures containing a substance belonging to one of the following entries of Class 9:

UN 2315 POLYCHLORINATED BIPHENYLS, LIQUID;

UN 3151 POLYHALOGENATED BIPHENYLS, LIQUID or

UN 3151 HALOGENATED MONOMETHYLDIPHENYLMETHANES, LIQUID or

UN 3151 POLYHALOGENATED TERPHENYLS, LIQUID;

UN 3152 POLYHALOGENATED BIPHENYLS, SOLID or

UN 3152 HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or
UN 3152 POLYHALOGENATED TERPHENYLS, SOLID

shall always be classified under the same entry of Class 9, provided that:

- they do not contain any additional dangerous component other than components of packing group III of classes 3, 4.1, 4.2, 4.3, 5.1, 6.1 or 8; and
- they do not have the hazard characteristics as indicated in 2.1.3.5.3.

2.1.3.4.3 Used articles, e.g. transformers and condensers, containing a solution or mixture mentioned in 2.1.3.4.2 shall always be classified under the same entry of Class 9, provided:

- a) they do not contain any additional dangerous components, other than polyhalogenated dibenzodioxins and dibenzofurans of Class 6.1 or components of packing group III of Class 3, 4.1, 4.2, 4.3, 5.1, 6.1 or 8; and
- b) they do not have the hazard characteristics as indicated in 2.1.3.5.3 (a) to (g) and (i).

2.1.3.5 Substances not mentioned by name in Table A of Chapter 3.2, having more than one hazard characteristic and solutions or mixtures meeting the classification criteria of Annex 2 to SMGS and containing several dangerous substances shall be classified under a collective entry (see 2.1.2.5) and packing group of the appropriate class in accordance with their hazard characteristics. Such classification according to the hazard characteristics shall be carried out as follows (See 2.1.3.5.1 – 2.1.3.5.5):

2.1.3.5.1 The physical and chemical characteristics and physiological properties shall be determined by measurement or calculation and the substance, solution or mixture shall be classified according to the criteria mentioned in sub-section 2.2.x.1 of the various classes.

2.1.3.5.2 If this determination is not possible without disproportionate cost or effort (as for some kinds of wastes), the substance, solution or mixture shall be classified in the class of the component presenting the major hazard

2.1.3.5.3 If the hazard characteristics of the substance, solution or mixture fall within more than one class or group of substances listed below then the substance, solution or mixture shall be classified in the class or group of substances corresponding to the major hazard on the basis of the following order of precedence:

- a) Material of Class 7 (apart from radioactive material in excepted packages for which, except for UN 3507 URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, special provision 290 of Chapter 3.3 applies, where the other hazardous properties take precedence);
- b) Substances of Class 1;
- c) Substances of Class 2;
- d) Liquid desensitized explosives of Class 3;
- e) Self-reactive substances and solid desensitized explosives of Class 4.1;
- f) Pyrophoric substances of Class 4.2;
- g) Substances of Class 5.2;
- h) Substances of Class 6.1 meeting the inhalation toxicity criteria of packing group I

Note: *Substances meeting the classification criteria of Class 8 and having an inhalation toxicity of dust and mist (LC50) in the range of packing group I and a toxicity through oral ingestion or dermal contact only in the range of packing group III or less, shall be allocated to Class 8*

- i) Infectious substances of Class 6.2.

2.1.3.5.4 If the hazard characteristics of the substance fall within more than one class or group of substances not listed in 2.1.3.5.3 above, the substance shall be classified in accordance with the same procedure but the relevant class shall be selected according to the precedence of hazards table in 2.1.3.10.

2.1.3.5.5 If the substance to be carried is a waste, with a composition that is not precisely known, its assignment to a UN number and packing group in accordance with 2.1.3.5.2 may be based on the consignor's knowledge of the waste, including all available technical and safety data as requested by safety and environmental legislation in force³.

In case of doubt, the highest danger level shall be taken.

If however, on the basis of the knowledge of the composition of the waste and the physical and chemical properties of the identified components, it is possible to demonstrate that the properties of the waste do not correspond to the properties of the packing group I level, the waste may be classified by default in the most appropriate n.o.s. entry of packing group II. However, if it is known that the waste possesses only environmentally hazardous properties, it may be assigned to packing group III under UN Nos. 3077 or 3082.

This procedure may not be used for wastes containing substances mentioned in 2.1.3.5.3, substances of Class 4.3, substances of the case mentioned in 2.1.3.7 or substances which are not accepted for carriage in accordance with 2.2.x.2.

2.1.3.6 The most specific applicable collective entry (see 2.1.2.5) shall always be used, i.e. a general n.o.s. entry shall only be used if a generic entry or a specific n.o.s. entry cannot be used.

2.1.3.7 Solutions and mixtures of oxidizing substances or substances with an oxidizing subsidiary risk may have explosive properties. In such a case they are not to be accepted for carriage unless they meet the requirements for Class 1. For solid ammonium nitrate based fertilizers, see also 2.2.51.2.2, thirteenth and fourteenth indent and Manual of Tests and Criteria, Part III, Section 39.

2.1.3.8 Substances of classes 1 to 6.2, 8 and 9, other than those assigned to UN Nos. 3077 and 3082, meeting the criteria of 2.2.9.1.10 are additionally to their hazards of classes 1 to 6.2, 8 and 9 considered to be environmentally hazardous substances. Other substances meeting the criteria of no other class or of no other substance of Class 9, but those of 2.2.9.1.10 are to be assigned to UN Nos. 3077 and 3082 as appropriate.

2.1.3.9 Wastes which do not meet the criteria for classification in classes 1 to 9 but are covered by the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal may be carried under UN Nos. 3077 or 3082.

³ Such legislation is for instance the Regulation listed in the documents Nos. 7 and 8 of the List.

2.1.3.10 Table of precedence of hazards

Class and packing group	4.1 (II)	4.1 (III)	4.2 (II)	4.2 (III)	4.3 (I)	4.3 (II)	4.3 (III)	5.1 (I)	5.1 (II)	5.1 (III)	6.1 (I) DERMAL	6.1 (I) ORAL	6.1 (II)	6.1 (III)	8 (I)	8 (II)	8 (III)	9
3 (I)	SOL LIQ 4.1 3(I)	SOL LIQ 4.1 3(I)	SOL LIQ 4.2 3(I)	SOL LIQ 4.2 3(I)	4.3 (I)	4.3 (I)	4.3 (I)	SOL LIQ 5.1(I) 3(I)	SOL LIQ 5.1(I) 3(I)	SOL LIQ 5.1(I) 3(I)	3 (I)	3 (I)	3 (I)	3 (I)	3 (I)	3 (I)	3 (I)	3 (I)
3 (II)	SOL LIQ 4.1 3(II)	SOL LIQ 4.1 3(II)	SOL LIQ 4.2 3(II)	SOL LIQ 4.2 3(II)	4.3 (I)	4.3 (II)	4.3 (II)	SOL LIQ 5.1(I) 3(I)	SOL LIQ 5.1(II) 3(II)	SOL LIQ 5.1(II) 3(II)	3 (I)	3 (I)	3 (II)	3 (II)	8 (I)	3 (II)	3 (II)	3 (II)
3 (III)	SOL LIQ 4.1 3(II)	SOL LIQ 4.1 3(III)	SOL LIQ 4.2 3(II)	SOL LIQ 4.2 3(III)	4.3 (I)	4.3 (II)	4.3 (III)	SOL LIQ 5.1(I) 3(I)	SOL LIQ 5.1(II) 3(II)	SOL LIQ 5.1(III) 3(III)	6.1 (I)	6.1 (I)	6.1 (II)	3 (III) */	8 (I)	8 (II)	3 (III)	3 (III)
4.1 (II)			4.2 (II)	4.2 (II)	4.3 (I)	4.3 (II)	4.3 (II)	5.1 (I)	4.1 (II)	4.1 (II)	6.1 (I)	6.1 (I)	SOL LIQ 4.1(II) 6.1(II)	SOL LIQ 4.1(II) 6.1(II)	8 (I)	SOL LIQ 4.1(II) 8(II)	SOL LIQ 4.1(II) 8(II)	4.1 (II)
4.1 (III)			4.2 (II)	4.2 (III)	4.3 (I)	4.3 (II)	4.3 (III)	5.1 (I)	4.1 (II)	4.1 (III)	6.1 (I)	6.1 (I)	6.1 (II)	SOL LIQ 4.1(III) 6.1(III)	8 (I)	8 (II)	SOL LIQ 4.1(III) 8(III)	4.1 (III)
4.2 (II)					4.3 (I)	4.3 (II)	4.3 (II)	5.1 (I)	4.2 (II)	4.2 (II)	6.1 (I)	6.1 (I)	4.2 (II)	4.2 (II)	8 (I)	4.2 (II)	4.2 (II)	4.2 (II)
4.2 (III)					4.3 (I)	4.3 (II)	4.3 (III)	5.1 (I)	5.1 (II)	4.2 (III)	6.1 (I)	6.1 (I)	6.1 (II)	4.2 (III)	8 (I)	8 (II)	4.2 (III)	4.2 (III)
4.3 (I)								5.1 (I)	4.3 (I)	4.3 (I)	6.1 (I)	4.3 (I)	4.3 (I)	4.3 (I)	4.3 (I)	4.3 (I)	4.3 (I)	4.3 (I)
4.3 (II)								5.1 (I)	4.3 (II)	4.3 (II)	6.1 (I)	4.3 (I)	4.3 (II)	4.3 (II)	8 (I)	4.3 (II)	4.3 (II)	4.3 (II)
4.3 (III)								5.1 (I)	5.1 (II)	4.3 (III)	6.1 (I)	6.1 (I)	6.1 (II)	4.3 (III)	8 (I)	8 (II)	4.3 (III)	4.3 (III)
5.1 (I)											5.1 (I)	5.1 (I)	5.1 (I)	5.1 (I)	5.1 (I)	5.1 (I)	5.1 (I)	5.1 (I)
5.1 (II)											6.1 (I)	5.1 (I)	5.1 (II)	5.1 (II)	8 (I)	5.1 (II)	5.1 (II)	5.1 (II)
5.1 (III)											6.1 (I)	6.1 (I)	6.1 (II)	5.1 (III)	8 (I)	8 (II)	5.1 (III)	5.1 (III)
6.1 (I) DERMAL															SOL LIQ 6.1(I) 8(I)	6.1 (I)	6.1 (I)	6.1 (I)
6.1 (I) ORAL															SOL LIQ 6.1(I) 8(I)	6.1 (I)	6.1 (I)	6.1 (I)
6.1 (II) INHAL															SOL LIQ 6.1(I) 8(I)	6.1 (II)	6.1 (II)	6.1 (II)
6.1 (II) DERMAL															SOL LIQ 6.1(I) 8(I)	SOL LIQ 6.1(II) 8(II)	6.1 (II)	6.1 (II)
6.1 (II) ORAL															8 (I)	SOL LIQ 6.1(II) 8(II)	6.1 (II)	6.1 (II)
6.1 (III)															8 (I)	8 (II)	8 (III)	6.1 (III)
8 (I)																		8 (I)
8 (II)																		8 (II)
8 (III)																		8 (III)

SOL - Solid substances and mixtures;
LIQ - Liquid substances, mixtures and solutions;
DERMAL - Dermal toxicity – toxic effect (by absorption through the undamaged skin);
ORAL - Oral toxicity – toxic effect (by ingesting);
INHAL - Inhalation toxicity – toxic effect by breathing;
*/ - Class 6.1 for pesticides

Note 1: *Examples to explain the use of the table*

Classification of a single substance

Description of the substance to be classified:

An amine not mentioned by name meeting the criteria for Class 3, packing group II as well as those for Class 8, packing group I.

Procedure:

The intersection of line 3 II with column 8 I gives 8 I. This amine has therefore to be classified in Class 8 under UN No. 2734 AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or UN No. 2734 POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S., packing group I.

Classification of mixture

Description of the mixture to be classified:

Mixture consisting of a flammable liquid classified in Class 3, packing group III, a toxic substance in Class 6.1, packing group II and a corrosive substance in Class 8, packing group I.

Procedure:

The intersection of line 3 III with column 6.1 II gives 6.1 II.

The intersection of line 6.1 II with column 8 I gives 8 I LIQ.

This mixture not further defined has therefore to be classified in Class 8 under UN No. 2922 CORROSIVE LIQUID, TOXIC, N.O.S., packing group I.

Note 2: *Examples for the classification of mixtures and solutions under a class and a packing group:*

A phenol solution of Class 6.1, (II), in benzene of Class 3, (II) is to be classified in Class 3, (II); this solution is to be classified under UN No. 1992 FLAMMABLE LIQUID, TOXIC, N.O.S., Class 3, (II), by virtue of the toxicity of the phenol.

A solid mixture of sodium arsenate of Class 6.1, (II) and sodium hydroxide of Class 8, (II) is to be classified under UN No. 3290 TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S., in Class 6.1 (II).

A solution of crude or refined naphthalene of Class 4.1, (III) in petrol of Class 3, (II), is to be classified under UN No. 3295 HYDROCARBONS, LIQUID, N.O.S. in Class 3, (II).

A mixture of hydrocarbons of Class 3, (III), and of polychlorinated biphenyls (PCB) of Class 9, (II), is to be classified under UN No. 2315 POLYCHLORINATED BIPHENYLS, LIQUID or UN No. 3432 POLYCHLORINATED BIPHENYLS, SOLID in Class 9, (II).

A mixture of propyleneimine of Class 3, and polychlorinated biphenyls (PCB) of Class 9, (II), is to be classified under UN No. 1921 PROPYLENEIMINE, INHIBITED in Class 3.

2.1.4 CLASSIFICATION OF SAMPLES

2.1.4.1 When the class of a substance is uncertain and it is being carried for further testing, a tentative class, proper shipping name and UN number shall be assigned on the basis of the consignor's knowledge of the substance and application of:

- a) the classification criteria of Chapter 2.2; and
- b) the requirements of this Chapter.

The most severe packing group possible for the proper shipping name chosen shall be used.

Where this provision is used the proper shipping name shall be supplemented with the word "SAMPLE" (e.g., "FLAMMABLE LIQUID, N.O.S., SAMPLE"). In certain instances, where a specific proper shipping name is provided for a sample of a substance considered to meet certain classification criteria (e.g., GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, UN No. 3167) that proper shipping name shall be used. When an N.O.S. entry is used to carry the sample, the proper shipping name need not be supplemented with the technical name as required by special provision 274 of Chapter 3.3.

2.1.4.2 Samples of the substance shall be carried in accordance with the requirements applicable to the tentative assigned proper shipping name provided:

- a) The substance is not considered to be a substance not accepted for carriage by sub-sections 2.2.x.2 of Chapter 2.2 or by Chapter 3.2;
- b) The substance is not considered to meet the criteria for Class 1 or considered to be an infectious substance or a radioactive material;
- c) The substance is in compliance with 2.2.41.1.15 or 2.2.52.1.9 if it is a self-reactive substance or an organic peroxide, respectively;
- d) The sample is carried in a combination packaging with a net mass per package not exceeding 2.5 kg; and
- e) The sample is not packed together with other goods.

2.1.4.3 **Samples of energetic materials for testing purposes**

2.1.4.3.1 Samples of organic substances carrying functional groups listed in Tables A6.1 and/or A6.3 in Appendix 6 (Screening Procedures) of the Manual of Tests and Criteria may be carried under UN No. 3224 (self-reactive solid type C) or UN No. 3223 (self-reactive liquid type C), as applicable, of Class 4.1 provided that:

- a) The samples do not contain any:
 - 1) Known explosives;
 - 2) Substances showing explosive effects in testing;
 - 3) Compounds designed with the view of producing a practical explosive or pyrotechnic effect; or
 - 4) Components consisting of synthetic precursors of intentional explosives;
- b) For mixtures, complexes or salts of inorganic oxidizing substances of Class 5.1 with organic material(s), the concentration of the inorganic oxidizing substance is:
 - 1) Less than 15%, by mass, if assigned to packing group I (high hazard) or II (medium hazard); or
 - 2) Less than 30%, by mass, if assigned to packing group III (low hazard);
- c) Available data do not allow a more precise classification;
- d) The sample is not packed together with other goods; and
- e) The sample is packed in accordance with packing instruction P 520 and special packing provisions PP 94 or PP 95 of 4.1.4.1, as applicable.

2.1.5 **Classification of articles as articles containing dangerous goods, n.o.s.**

Note: For articles which do not have a proper shipping name and which contain only dangerous goods within the permitted limited quantity amounts specified in Column (7a) of Table A of Chapter 3.2, UN No. 3363 and special provisions 301 and 672 of Chapter 3.3 may be applied.

2.1.5.1 Articles containing dangerous goods may be classified as otherwise provided by Annex 2 to SMGS under the proper shipping name for the dangerous goods they contain or in accordance with this section.

For the purposes of this section "article" means machinery, apparatus or other devices containing one or more dangerous goods (or residues thereof) that are an integral element of the article, necessary for its functioning and that cannot be removed for the purpose of carriage.

An inner packaging shall not be an article.

- 2.1.5.2** Such articles may in addition contain cells or batteries. Lithium metal, lithium ion and sodium ion cells and batteries that are integral to the article shall be of a type proven to meet the testing requirements of the Manual of Tests and Criteria, Part III, sub-section 38.3. For articles containing pre-production prototype lithium metal, lithium ion or sodium ion cells or batteries carried for testing, or for articles containing lithium metal, lithium ion or sodium ion cells or batteries manufactured in production runs of not more than 100 cells or batteries, the requirements of special provision 310 of Chapter 3.3 shall apply.
- 2.1.5.3** This section does not apply to articles for which a more specific proper shipping name already exists in Table A of Chapter 3.2.
- 2.1.5.4** This section does not apply to dangerous goods of Class 1, Class 6.2, Class 7 or radioactive material contained in articles. However, this section applies to articles containing explosives which are excluded from Class 1 in accordance with 2.2.1.1.8.2.
- 2.1.5.5** Articles containing dangerous goods shall be assigned to the appropriate Class determined by the hazards present using, where applicable, the Table of precedence of hazard in 2.1.3.10 for each of the dangerous goods contained in the article. If dangerous goods classified as Class 9 are contained within the article, all other dangerous goods present in the article shall be considered to present a higher hazard.
- 2.1.5.6** Subsidiary hazards shall be representative of the primary hazards posed by the other dangerous goods contained within the article. When only one item of dangerous goods is present in the article, the subsidiary hazard(s), if any, shall be the subsidiary hazard(s) identified by the subsidiary hazard label(s) in column (5) of Table A of Chapter 3.2. If the article contains more than one item of dangerous goods and these could react dangerously with one another during carriage, each of the dangerous goods shall be enclosed separately (see 4.1.1.6).
- 2.1.6 Classification of packagings, discarded, empty, uncleaned**

Empty uncleaned packagings, large packagings or IBCs, or parts thereof, carried for disposal, recycling or recovery of their material, other than reconditioning, repair, routine maintenance, remanufacturing or reuse, may be assigned to UN 3509 if they meet the requirements for this entry.

CHAPTER 2.2

CLASS SPECIAL PROVISIONS

2.2.1 CLASS 1 EXPLOSIVE SUBSTANCES AND ARTICLES

2.2.1.1 Criteria

2.2.1.1.1 The heading of Class 1 covers:

- a) Explosive substances: solid or liquid substances (or mixtures of substances) capable by chemical reaction of producing gases at such a temperature and pressure and at such a speed as to cause damage to the surroundings.

Pyrotechnic substances: substances or mixtures of substances designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonating self-sustaining exothermic chemical reactions..

Note 1: *Substances which are not themselves explosive but which may form an explosive mixture of gas, vapour or dust are not substances of Class 1.*

Note 2: *Also excluded from Class 1 are:*

- *water- or alcohol-wetted explosives of which the water or alcohol content exceeds the limits specified,*
- *those explosive containing plasticizers, assigned to Class 3 or Class 4.1,*
- *as well as those explosives which, on the basis of their predominant hazard, are assigned to Class 5.2.*

- b) Explosive articles: articles containing one or more explosive or pyrotechnic substances.

Note: *Devices containing explosive or pyrotechnic substances in such small quantity or of such a character that their inadvertent or accidental ignition or initiation during carriage would not cause any manifestation external to the device by projection, fire, smoke, heat or loud noise are not subject to the requirements of Class 1.*

- c) Substances and articles not mentioned above which are manufactured with a view to producing a practical explosive or pyrotechnic effect.

For the purposes of Class 1, the following definitions applies:

Phlegmatized means that a substance (or "phlegmatizer") has been added to an explosive to enhance its safety in handling and carriage. The phlegmatizer renders the explosive insensitive, or less sensitive, to the following actions: heat, shock, impact, percussion or friction. Typical phlegmatizing agents include, but are not limited to: wax, paper, water, polymers (such as chlorofluoropolymers), alcohol and oils (such as petroleum jelly and paraffin).

Explosive or pyrotechnic effect means, in the context of (c), an effect produced by self-sustaining exothermic chemical reactions including shock, blast, fragmentation, projection, heat, light, sound, gas and smoke.

2.2.1.1.2 Any substance or article having or suspected of having explosive properties shall be considered for assignment to Class 1 in accordance with the tests, procedures and criteria prescribed in Part I, Manual of Tests and Criteria.

A substance or article assigned to Class 1 can only be accepted for carriage when it has been assigned to a name or n.o.s. entry listed in Table A of Chapter 3.2 and meets the criteria of the Manual of Tests and Criteria.

2.2.1.1.3 The substances and articles of Class 1 shall be assigned to a UN Number and a name or n.o.s. entry listed in Table A of Chapter 3.2. Interpretation of the names of substances and articles in Table A of Chapter 3.2 shall be based upon the glossary in 2.2.1.4

Samples of new or existing explosive substances or articles carried for purposes including: testing, classification, research and development quality control, or as a commercial sample, other than initiating explosive, may be assigned to UN No. 0190 SAMPLES, EXPLOSIVE.

The assignment of explosive substances and articles not mentioned by name as such in Table A of Chapter 3.2 to an n.o.s entry of Class 1 or UN No. 0190 SAMPLES, EXPLOSIVE as well as the assignment of certain substances the carriage of which is subject to a specific authorization by the competent authority according to the special provisions referred to in Column (6) of Table A of Chapter 3.2 shall be made by the competent authority of the country of origin. This competent authority shall also approve in writing the conditions of carriage of these substances and articles. If the country of origin is not an SMGS Contracting State, the classification and the conditions of carriage shall be recognized by the competent authority of the first SMGS Contracting State reached by the consignment.

2.2.1.1.4 Substances and articles of Class 1 shall have been assigned to a division in accordance with 2.2.1.1.5 and to a compatibility group in accordance with 2.2.1.1.6. The division shall be based on the results of the tests described in 2.3.0 and 2.3.1 applying the definitions in 2.2.1.1.5. The compatibility group shall be determined in accordance with the definitions in 2.2.1.1.6. The classification code shall consist of the division number and the compatibility group letter.

2.2.1.1.5 Definition of divisions

Division 1.1 Substances and articles which have a mass explosion hazard (a mass explosion is an explosion which affects almost the entire load virtually instantaneously).

Division 1.2 Substances and articles which have a projection hazard but not a mass explosion hazard.

Division 1.3 Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard:

- a) combustion of which gives rise to considerable radiant heat; or
- b) which burn one after another, producing minor blast or projection effects or both.

Division 1.4 Substances and articles which present only a slight hazard of explosion in the event of ignition or initiation during carriage. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5 Very insensitive substances having a mass explosion hazard which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of carriage. As a minimum requirement they must not explode in the external fire test.

Division 1.6 Extremely insensitive articles which do not have a mass explosion hazard. The articles pre-dominantly contain extremely insensitive substances and demonstrate a negligible probability of accidental initiation or propagation

Note: *The hazard from articles of Division 1.6 is limited to the explosion of a single article.*

2.2.1.1.6 Definition of compatibility groups of substances and articles:

A – Primary explosive substance.

B – Article containing a primary explosive substance and not having two or more effective protective features. Some articles, such as detonators for blasting, detonator assemblies for blasting and primers, cap-type, are included, even though they do not contain primary explosives.

C – Propellant explosive substance or other deflagrating explosive substance or article containing such explosive substance..

D – Secondary detonating explosive substance or black powder or article containing a secondary detonating explosive substance, in each case without means of initiation and without a propelling charge, or article containing a primary explosive substance and having two or more effective protective features.

E – Article containing a secondary detonating explosive substance, without means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids).

F – Article containing a secondary detonating explosive substance with its own means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids) or without a propelling charge.

G – Pyrotechnic substance, or article containing a pyrotechnic substance, or article containing both an explosive substance and an illuminating, incendiary, tear- or smoke-producing substance (other than a water-activated article or one which contains white phosphorus, phosphides, a pyrophoric substance, a flammable liquid or gel or hypergolic liquids).

H – Article containing both an explosive substance and white phosphorus.

J – Article containing both an explosive substance and a flammable liquid or gel.

K – Article containing both an explosive substance and a toxic chemical.

L – Explosive substance or article containing an explosive substance and presenting a special hazard (e.g. due to water activation or the presence of hypergolic liquids, phosphides or a pyrophoric substance) necessitating isolation of each type.

N – Articles predominantly containing extremely insensitive substances.

S – Substance or article so packed or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder or prevent fire-fighting or other emergency response efforts in the immediate vicinity of the package.

Note 1: *Each substance or article, packed in a specified packaging, may be assigned to one compatibility group only. Since the criterion of compatibility group S is empirical, assignment to this group is necessarily linked to the tests for assignment of a classification code.*

Note 2: *Articles of compatibility groups D and E may be fitted or packed together with their own means of initiation, provided that such means have at least two effective protective features designed to prevent an explosion in the event of accidental functioning of the means of initiation. Such articles and packages shall be assigned to compatibility groups D or E.*

Note 3: *Articles of compatibility groups D and E may be packed together with their own means of initiation, which do not have two effective protective features (i.e. means of initiation assigned to compatibility group B), provided that they comply with mixed packing provision MP 21 of Section 4.1.10. Such packages shall be assigned to compatibility groups D or E.*

Note 4: *Articles may be fitted or packed together with their own means of ignition, provided that the means of ignition cannot function during normal conditions of carriage.*

Note 5: *Articles of compatibility groups C, D and E may be packed together. Such packages shall be assigned to compatibility group E.*

2.2.1.1.7 Assignment of fireworks to divisions

2.2.1.1.7.1 Fireworks shall normally be assigned to divisions 1.1, 1.2, 1.3 and 1.4 on the basis of test data derived from Test Series 6 of the Manual of Tests and Criteria. However:

- a) waterfalls containing flash composition (see Note 2 of 2.2.1.1.7.5) shall be classified as 1.1G regardless of the results of Test Series 6;
- b) since the range of such articles is very extensive and the availability of test facilities may be limited, assignment to divisions may also be made in accordance with the procedure in 2.2.1.1.7.2.

2.2.1.1.7.2 Assignment of fireworks to UN No. 0333, 0334, 0335 or 0336, and assignment of articles to UN No. 0431 for those used for theatrical effects meeting the definition for article type and the 1.4G specification in the default fireworks classification table in 2.2.1.1.7.5, may be made on the basis of analogy, without the need for Test Series 6 testing, in accordance with the default fireworks classification table in 2.2.1.1.7.5. Such assignment shall be made with the agreement of the competent authority. Items not specified in the table shall be classified on the basis of test data derived from Test Series 6.

Note 1: *The addition of other types of fireworks to column 1 of the table in 2.2.1.1.7.5 shall only be made on the basis of full test data submitted to the UN Sub-Committee of Experts on the Transport of Dangerous Goods for consideration.*

Note 2: *Test data derived by competent authorities which validates, or contradicts the assignment of fireworks specified in column 4 of the table in 2.2.1.1.7.5 to divisions in column 5 should be submitted to the UN Sub-Committee of Experts on the Transport of Dangerous Goods for information.*

2.2.1.1.7.3 Where fireworks of more than one division are packed in the same package they shall be classified on the basis of the most dangerous division unless test data derived from Test Series 6 indicate otherwise.

2.2.1.1.7.4 The classification shown in the Table in 2.2.1.1.7.5 applies only for articles packed in fibreboard boxes (4G).

2.2.1.1.7.5 Default fireworks classification table (in accordance with principle of equivalence)⁴

Note 1: *References to percentages in the Table, unless otherwise stated, are to the mass of all pyrotechnic substances (e.g. rocket motors, lifting charge, bursting charge and effect charge).*

Note 2: *"Flash composition" in this Table refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the fireworks that are used in waterfalls, or to produce an aural effect or used as a bursting charge, or propellant charge unless:*

- a) *The time taken for the pressure rise in the HSL Flash Composition Test in Appendix 7 of the Manual of Tests and Criteria is demonstrated to be more than 6 ms for 0.5 g of pyrotechnic substance; or*
- b) *The pyrotechnic substance gives a negative "-" result in the US Flash Composition Test in Appendix 7 of the Manual of Tests and Criteria.*

Note 3: *Dimensions in mm refer to:*

- a) *for spherical and peanut shells the diameter of the sphere of the shell;*
- b) *for cylinder shells the length of the shell;*
- c) *for a shell in mortar, Roman candle, shot tube firework or mine⁵ the inside diameter of the tube comprising or containing the firework;*
- d) *for a bag mine or cylinder mine, the inside diameter of the mortar intended to contain the mine.*

⁴ This Table contains a list of firework classifications which may be used in the absence of Test Series 6 data (see 2.2.1.1.7.2).

⁵ Mine is a thick paper, plastic or metal case, closed from below by a sabot on which there is an ejection charge. On the separating membrane, a filling of pyrotechnic elements, closed with cardboard covers, is laid. After the ejection charge is ignited, the mine filling is ejected.

Type	Includes: / Synonym:	Definition	Technical specifications	Classification code
Shell, spherical or cylindrical	Spherical display shell: aerial shell, colour shell, dye shell, multi-break shell, multi-effect shell, nautical shell, parachute shell, smoke shell, star shell; report shell: maroon ⁶ , salute, sound shell, thunder- clap, aerial shell kit	Device with or without propellant charge, with delay fuse and bursting charge, pyrotechnic unit(s) or loose pyrotechnic sub- stance and designed to be projected from a mortar	All report shells	1.1G
			Colour shell: ≥ 180 mm	1.1G
			Colour shell: < 180 mm with $> 25\%$ flash composition, as loose powder and/ or report effects	1.1G
			Colour shell: < 180 mm with $\leq 25\%$ flash composition, as loose powder and/ or report effects	1.3G
			Colour shell: ≤ 50 mm, or ≤ 60 g pyrotechnic substance, with $\leq 2\%$ flash composition as loose powder and/ or report effects	1.4G
	Peanut shell	Device with two or more spherical aerial shells in a common wrapper propelled by the same propellant charge with separate external delay fuses	The most hazardous spherical aerial shell determines the classification	
	Preloaded mortar, shell in mortar	Assembly comprising a spherical or cylindrical shell inside a mortar from which the shell is designed to be projected	All report shells	1.1G
			Colour shell: ≥ 180 mm	1.1G
			Colour shell: $> 25\%$ flash composition as loose powder and/or report effects	1.1G
			Colour shell: > 50 mm and < 180 mm	1.2G
			Colour shell: ≤ 50 mm, or ≤ 60 g pyrotechnic substance, with $\leq 25\%$ flash composition as loose powder and/ or report effects	1.3G
Shell, spherical or cylindrical	Shell of shells (spherical) (Reference to percentages for	Device without propellant charge, with delay fuse and bursting charge, containing report shells and inert materials and	> 120 mm	1.1G

⁶ A pyrotechnic article producing a very loud pop (bang)

	shell of shells are to the gross mass of the fireworks article)	designed to be projected from a mortar		
		Device without propellant charge, with delay fuse and bursting charge, containing report shells $\leq 25\text{g}$ flash composition per report unit, with $\leq 33\%$ flash composition and $\geq 60\%$ inert materials and designed to be projected from a mortar	$\leq 120\text{ mm}$	1.3G
		Device without propellant charge, with delay fuse and bursting charge, containing colour shells and/or pyrotechnic units and designed to be projected from a mortar	$> 300\text{ mm}$	1.1G
		Device without propellant charge, with delay fuse and bursting charge, containing colour shells $\leq 70\text{mm}$ and/or pyrotechnic units, with $\leq 25\%$ flash composition and $\leq 60\%$ pyrotechnic substance and designed to be projected from a mortar	$> 200\text{mm}$ and $\leq 300\text{ mm}$	1.3G
		Device with propellant charge, with delay fuse and bursting charge, containing colour shells $\leq 70\text{ mm}$ and/or pyrotechnic units, with $\leq 25\%$ flash composition and $\leq 60\%$ pyrotechnic substance and designed to be projected from a mortar	$\leq 200\text{ mm}$	1.3G
Battery/ combination	Barrage, bombardos, cakes, finale box, flowerbed, hybrid, multiple tubes, shell cakes, banger batteries, flash banger batteries	Assembly including several elements either containing the same type or several types each corresponding to one of the types of fire- works listed in this table, with one or two points of ignition	The most hazardous firework type determines the classification	
Roman candle	Exhibition candle, candle, bombettes	Tube containing a series of pyrotechnic units consisting of alternate pyrotechnic substance, propellant charge, and transmitting fuse	$\geq 50\text{ mm}$ inner diameter, containing flash composition, or $< 50\text{ mm}$ with $>25\%$ flash composition	1.1G
			$\geq 50\text{ mm}$ inner diameter, containing no flash composition	1.2G
			$< 50\text{ mm}$ inner diameter and $\leq 25\%$	1.3G

			flash composition	
			≤ 30 mm inner diameter, each pyrotechnic unit ≤ 25 g and ≤ 5% flash composition	1.4G
Shot tube	Single shot Roman candle, small preloaded mortar	Tube containing a pyrotechnic unit consisting of pyrotechnic substance, propellant charge with or without transmitting fuse	≤ 30 mm inner diameter and pyrotechnic unit > 25 g, or > 5% and ≤ 25% flash composition	1.3G
			≤ 30 mm inner diameter, pyrotechnic unit ≤ 25 g and ≤ 5% flash composition	1.4G
Rocket	Avalanche rocket, signal rocket, whistling rocket, bottle rocket, sky rocket, missile type rocket, table rocket	Tube containing pyrotechnic substance and/or pyrotechnic units, equipped with stick(s) or other means for stabilization of flight, and designed to be propelled into the air	Flash composition effects only	1.1G
			Flash composition > 25% of the pyrotechnic substance	1.1G
			> 20 g pyrotechnic substance and flash composition ≤ 25%	1.3G
			≤ 20 g pyrotechnic substance, black powder bursting charge and ≤ 0.13 g flash composition per report and ≤ 1 g in total	1.4G
Mine	Pot-a-feu, ground mine, bag mine, cylinder mine	Tube containing propellant charge and pyrotechnic units and designed to be placed on the ground or to be fixed in the ground. The principal effect is ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual and/or aural effect in the air or: Tube containing propellant charge and pyrotechnic units and designed to be placed on the ground or to be fixed in the ground. The principal effect is ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual and/or aural effect in the air or:	> 25% flash composition, as loose powder and/ or report effects	1.1G
			≥ 180 mm and ≤ 25% flash composition, as loose powder and/ or report effects	1.1G
			< 180 mm and ≤ 25% flash composition, as loose powder and/ or report effects	1.3G

		Cloth or paper bag or cloth or paper cylinder containing propellant charge and pyrotechnic units, designed to be placed in a mortar and to function as a mine	≤ 150 g pyrotechnic substance, containing ≤ 5% flash composition as loose powder and/ or report effects. Each pyrotechnic unit ≤ 25 g, each report effect < 2 g, each whistle, if any, ≤ 3 g	1.4G
Fountain	Volcanos, gerbs, showers, lances, Bengal fire, flitter sparkle, cylindrical fountains, cone fountains, illuminating torch	Non-metallic case containing pressed or consolidated pyrotechnic substance producing sparks and flame Note: Fountains intended to produce a vertical cascade or curtain of sparks are considered to be waterfalls (see row below).	≥ 1 kg pyrotechnic substance	1.3G
			< 1 kg pyrotechnic substance	1.4G
Waterfall	cascades, showers	pyrotechnic fountain intended to produce a vertical cascade or curtain of sparks	containing flash composition regardless of the results of Test Series 6 (see 2.2.1.1.7.1 (a))	1.1G
			not containing flash composition	1.3G
Sparkler	Handheld sparklers, non-handheld sparklers, wire sparklers	Rigid wire partially coated (along one end) with slow burning pyrotechnic substance with or without an ignition tip	Perchlorate based sparklers: > 5 g per item or > 10 items per pack	1.3G
			Perchlorate based sparklers: ≤ 5 g per item and ≤ 10 items per pack; Nitrate based sparklers: ≤ 30 g per item	1.4G
Bengal stick	Dipped stick	Non-metallic stick partially coated (along one end) with slow-burning pyrotechnic substance and designed to be held in the hand	Perchlorate based items: > 5 g per item or > 10 items per pack	1.3G
			Perchlorate based items: ≤ 5 g per item and ≤ 10 items per pack; Nitrate based items:	1.4G

			≤ 30 g per item	
Low hazard fire-works and novelties	Table bombs, throw-downs, crackling granules, smokes, fog, snakes, glow worm, serpents, snaps, party poppers	Device designed to produce very limited visible and/ or audible effect which contains small amounts of pyrotechnic substance and/or explosive composition.	Throwdowns and snaps may contain up to 1.6 mg of silver fulminate; snaps and party poppers may contain up to 16 mg of potassium chlorate/ red phosphorous mixture; other articles may contain up to 5 g of pyrotechnic substance, but no flash composition	1.4G
Spinner	Aerial spinner, helicopter, chaser, ground spinner	Non-metallic tube or tubes containing gas- or spark- producing pyrotechnic substance, with or without noise producing composition, with or without aerofoils attached	Pyrotechnic substance per item > 20 g, containing ≤ 3% flash composition as report effects, or whistle composition ≤ 5 g	1.3G
			Pyrotechnic substance per item ≤ 20 g, containing ≤ 3% flash composition as report effects, or whistle composition ≤ 5 g	1.4G
Wheels	Catherine wheels, Saxon	Assembly including drivers containing pyrotechnic substance and provided with a means of attaching it to a support so that it can rotate	≥ 1 kg total pyrotechnic substance, no report effect, each whistle (if any) ≤ 25 g and ≤ 50 g whistle composition per wheel	1.3G
			< 1 kg total pyrotechnic substance, no report effect, each whistle (if any) ≤ 5 g and ≤ 10 g whistle composition per wheel	1.4G
Aerial wheel	Flying Saxon, UFO's, rising crown	Tubes containing propellant charges and sparks- flame- and/ or noise producing pyrotechnic substances, the tubes being fixed to a supporting ring	> 200 g total pyrotechnic substance or > 60 g pyrotechnic substance per driver, ≤ 3% flash composition as report effects, each whistle (if any) ≤ 25 g and ≤ 50 g whistle composition per wheel	1.3G

			≤ 200 g total pyrotechnic substance and ≤ 60 g pyrotechnic substance per driver, $\leq 3\%$ flash composition as report effects, each whistle (if any) ≤ 5 g and ≤ 10 g whistle composition per wheel	1.4G
Selection pack	Display selection box, display selection pack, garden selection box, indoor selection box; assortment	A pack of more than one type each corresponding to one of the types of fire-works listed in this table	The most hazardous firework type determines the classification	
Firecracker	Celebration cracker, celebration roll, string cracker	Assembly of tubes (paper or cardboard) linked by a pyrotechnic fuse, each tube intended to produce an aural effect	Each tube ≤ 140 mg of flash composition or ≤ 1 g black powder	1.4G
Banger	Salute, flash banger, lady cracker	Non-metallic tube containing report composition intended to produce an aural effect	> 2 g flash composition per item	1.1G
			≤ 2 g flash composition per item and ≤ 10 g per inner packaging	1.3G
			≤ 1 g flash composition per item and ≤ 10 g per inner packaging or ≤ 10 g black powder per item	1.4G

2.2.1.1.8 Exclusion from Class 1

2.2.1.1.8.1 An article or a substance may be excluded from Class 1 by virtue of test results and the Class 1 definition with the approval of the competent authority of any SMGS Contracting State who may also recognize an approval granted by the competent authority of a country which is not an SMGS Contracting State provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions.

2.2.1.1.8.2 With the approval of the competent authority in accordance with 2.2.1.1.8.1, an article may be excluded from Class 1 when three unpackaged articles, each individually activated by its own means of initiation or ignition or external means to function in the designed mode, meet the following test criteria:

- a) No external surface shall have a temperature of more than 65 °C. A momentary spike in temperature up to 200 °C is acceptable;
- b) No rupture or fragmentation of the external casing or movement of the article or detached parts thereof of more than one metre in any direction;

Note: *Where the integrity of the article may be affected in the event of an external fire these criteria shall be examined by a fire test. One such method is described in ISO 14451-2 using a heating rate of 80 K/min. (c) No audible report exceeding 135 dB(C) peak at a distance of one metre;*

- d) No flash or flame capable of igniting a material such as a sheet of 80 ± 10 g/m² paper in contact with the article; and
- e) No production of smoke, fumes or dust in such quantities that the visibility in a one cubic metre chamber equipped with appropriately sized blow out panels is reduced more than 50% as measured by a calibrated light (lux) meter or radiometer located one metre from a constant light source located at the midpoint on opposite walls. The general guidance on Optical Density Testing in ISO 5659-1 and the general guidance on the Photometric System described in Section 7.5 in ISO 5659-2 may be used or similar optical density measurement methods designed to accomplish the same purpose may also be employed. A suitable hood cover surrounding the back and sides of the light meter shall be used to minimize effects of scattered or leaking light not emitted directly from the source.

Note 1: *If during the tests addressing criteria (a), (b), (c) and (d) no or very little smoke is observed the test described in (e) may be waived.*

Note 2: *The competent authority referred to in 2.2.1.1.8.1 may require testing in packaged form if it is determined that, as packaged for carriage, the article may pose a greater risk.*

2.2.1.1.9 Classification documentation

2.2.1.1.9.1 A competent authority assigning an article or substance to Class 1 shall confirm that classification with the applicant in writing.

2.2.1.1.9.2 A competent authority classification document may be in any form and may consist of more than one page, provided pages are numbered consecutively. The document shall have a unique reference.

2.2.1.1.9.3 The information provided shall be easy to identify, legible and durable.

2.2.1.1.9.4 Examples of the information that may be provided in the classification documents are as follows:

- a) The name of the competent authority and the provisions in national legislation under which it is granted its authority;
- b) The modal or national regulations for which the classification document is applicable;

- c) Confirmation that the classification has been approved, made or agreed in accordance with the UN Model Regulations or the relevant modal regulations;
- d) The name and address of the person in law to which the classification has been assigned and any company registration which uniquely identifies a company or other body corporate under national legislation;
- e) The name under which the explosives will be placed onto the market or otherwise supplied for carriage;
- f) The proper shipping name, UN number, class, division and corresponding compatibility group of the explosives;
- g) Where appropriate, the maximum net explosive mass of the package or article;
- h) The name, signature, stamp, seal or other identification of the person authorised by the competent authority to issue the classification document is clearly visible;
- i) Where safety in carriage or the division is assessed as being dependent upon the packaging, the packaging mark or a description of the permitted inner packagings, intermediate packagings, outer packagings;
- j) The classification document states the part number, stock number or other identifying reference under which the explosives will be placed onto the market or otherwise supplied for carriage;
- k) The name and address of the person in law who manufactured the explosives and any company registration which uniquely identifies a company or other body corporate under national legislation;
- l) Any additional information regarding the applicable packing instruction and special packing provisions where appropriate;
- m) The basis for assigning the classification, i.e. whether on the basis of test results, default for fireworks, analogy with classified explosive, by definition from Table A of Chapter 3.2 etc.;
- n) Any special conditions or limitations that the competent authority has identified as relevant to the safety for carriage of the explosives, the communication of the hazard and international carriage;
- o) The expiry date of the classification document is given where the competent authority considers one to be appropriate.

2.2.1.2 Substances and articles not accepted for carriage

2.2.1.2.1 Explosive substances which are unduly sensitive according to the criteria of the Manual of Tests and Criteria, Part I, or are liable to spontaneous reaction, as well as explosive substances and articles which cannot be assigned to a name or n.o.s. entry listed in Table A of Chapter 3.2, shall not be accepted for carriage.

2.2.1.2.2 Substances of compatibility group A shall not be accepted for carriage by rail (1.1 A, UN Nos. 0074, 0113, 0114, 0129, 0130, 0135, 0224 and 0473).

Articles of compatibility group K shall not be accepted for carriage (1.2 K, UN No. 0020 and 1.3 K, UN No. 0021).

2.2.1.3 List of collective entries

Classification code (see 2.2.1.1.4)	UN NO	Name of the substance or article
1.1A	0473	SUBSTANCES, EXPLOSIVE, N.O.S. (not accepted for carriage by rail, see 2.2.1.2.2)
1.1B	0461	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.1C	0474	SUBSTANCES, EXPLOSIVE, N.O.S

Classification code (see 2.2.1.1.4)	UN NO	Name of the substance or article
	0497	PROPELLANT, LIQUID
	0498	PROPELLANT, SOLID
	0462	ARTICLES, EXPLOSIVE, N.O.S
1.1D	0475	SUBSTANCES, EXPLOSIVE, N.O.S.
	0463	ARTICLES, EXPLOSIVE, N.O.S
1.1E	0464	ARTICLES, EXPLOSIVE, N.O.S.
1.1F	0465	ARTICLES, EXPLOSIVE, N.O.S.
1.1G	0476	SUBSTANCES, EXPLOSIVE, N.O.S.
1.1L	0357	SUBSTANCES, EXPLOSIVE, N.O.S.
	0354	ARTICLES, EXPLOSIVE, N.O.S.
1.2B	0382	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.2C	0466	ARTICLES, EXPLOSIVE, N.O.S.
1.2D	0467	ARTICLES, EXPLOSIVE, N.O.S
1.2E	0468	ARTICLES, EXPLOSIVE, N.O.S
1.2F	0469	ARTICLES, EXPLOSIVE, N.O.S
1.2L	0358	SUBSTANCES, EXPLOSIVE, N.O.S.
	0248	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge
	0355	ARTICLES, EXPLOSIVE, N.O.S.
1.3C	0132	DEFLAGRATING METAL SALTS OF AROMATIC NITRO-DERIVATIVES, N.O.S.
	0447	SUBSTANCES, EXPLOSIVE, N.O.S.
	0495	PROPELLANT, LIQUID
	0499	PROPELLANT, SOLID
	0470	ARTICLES, EXPLOSIVE, N.O.S.
1.3G	0478	SUBSTANCES, EXPLOSIVE, N.O.S.
1.3L	0359	SUBSTANCES, EXPLOSIVE, N.O.S.
	0249	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge
	0356	ARTICLES, EXPLOSIVE, N.O.S.
1.4B	0350	ARTICLES, EXPLOSIVE, N.O.S.
	0383	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.4C	0479	SUBSTANCES, EXPLOSIVE, N.O.S
	0501	PROPELLANT, SOLID
	0351	ARTICLES, EXPLOSIVE, N.O.S
1.4D	0480	SUBSTANCES, EXPLOSIVE, N.O.S.
	0352	ARTICLES, EXPLOSIVE, N.O.S
1.4E	0471	ARTICLES, EXPLOSIVE, N.O.S..
1.4F	0472	ARTICLES, EXPLOSIVE, N.O.S.
1.4G	0485	SUBSTANCES, EXPLOSIVE, N.O.S.
	0353	ARTICLES, EXPLOSIVE, N.O.S.
1.4S	0481	SUBSTANCES, EXPLOSIVE, N.O.S.
	0349	ARTICLES, EXPLOSIVE, N.O.S.
	0384	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.
1.5D	0482	SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI) N.O.S.

Classification code (see 2.2.1.1.4)	UN NO	Name of the substance or article
1.6N	0486	ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI)
	0190	SAMPLES, EXPLOSIVE other than initiating explosive <i>Note: Division and compatibility group shall be defined as directed by the competent authority and according to the principles in 2.2.1.1.4.</i>

2.2.1.4 Glossary of names

Note 1: The descriptions in the glossary are not intended to replace the test procedures, nor to determine the hazard classification of a substance or article of Class 1. Assignment to the correct division and a decision on whether compatibility group S is appropriate shall be based on testing of the product in accordance with the Manual of Tests and Criteria, Part I or by analogy with similar products which have already been tested and assigned in accordance with the procedures of the Manual of Tests and Criteria.

Note 2: The figures given after the names refer to the relevant UN numbers (Column 1 of Table A of Chapter 3.2). For the classification code, see 2.2.1.1.4.

AMMUNITION, ILLUMINATING, with or without burster, expelling charge or propelling charge: UN Nos. 0171, 0254, 0297

Ammunition designed to produce a single source of intense light for lighting up an area. The term includes illuminating cartridges, grenades and projectiles; and illuminating and target identification bombs.

Note: The following articles: CARTRIDGES, SIGNAL; SIGNAL DEVICES HAND; SIGNALS, DISTRESS;

FLARES, AERIAL; FLARES, SURFACE are not included in this definition. They are listed separately.

AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge: UN No. 0247

Ammunition containing liquid or gelatinous incendiary substance. Except when the incendiary substance is an explosive per se, it also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge: UN Nos. 0243, 0244

Ammunition containing white phosphorus as incendiary substance. It also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge: UN Nos. 0009, 0010, 0300

Ammunition containing incendiary composition. Except when the composition is an explosive per se, it also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

AMMUNITION, PRACTICE: UN Nos. 0362, 0488

Ammunition without a main bursting charge, containing a burster or expelling charge. Normally it also contains a fuze and a propelling charge.

Note: GRENADES, PRACTICE are not included in this definition. They are listed separately.

AMMUNITION, PROOF: UN No. 0363

Ammunition containing pyrotechnic substances, used to test the performance or strength of new ammunition, weapon components or assemblies

AMMUNITION, SMOKE, WHITE PHOSPHORUS, with burster, expelling charge or propelling charge: UN Nos. 0245, 0246

Ammunition containing white phosphorus as a smoke-producing substance. It also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge. The term includes grenades, smoke.

AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge: UN Nos. 0015, 0016, 0303

Ammunition containing a smoke-producing substance such as chlorosulphonic acid mixture or titanium tetrachloride; or a smoke-producing pyrotechnic composition based on hexachloroethane or red phosphorus. Except when the substance is an explosive per se, the ammunition also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge. The term includes grenades, smoke.

Note: *SIGNALS, SMOKE are not included in this definition. They are listed separately.*

AMMUNITION, TEAR-PRODUCING, with burster, expelling charge or propelling charge: UN Nos. 0018, 0019, 0301

Ammunition containing a tear-producing substance. It also contains one or more of the following: a pyro-technic substance; a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES EEI): UN No. 0486

Articles that predominantly contain extremely insensitive substances which demonstrate a negligible probability of accidental initiation or propagation under normal conditions of transport, and which have passed Test Series 7.

ARTICLES, PYROPHORIC: UN No. 0380

Articles which contain a pyrophoric substance (capable of spontaneous ignition when exposed to air) and an explosive substance or component. The term excludes articles containing white phosphorus.

ARTICLES, PYROTECHNIC, for technical purposes: UN Nos. 0428, 0429, 0430, 0431, 0432

Articles which contain pyrotechnic substances and are used for technical purposes such as heat generation, gas generation, theatrical effects, etc.

Note: *The following articles: all ammunition; CARTRIDGES, SIGNAL; CUTTERS, CABLE, EXPLOSIVE; FIREWORKS; FLARES, AERIAL; FLARES, SURFACE; RELEASE DEVICES, EXPLOSIVE; RIVETS, EXPLOSIVE; SIGNAL DEVICES, HAND; SIGNALS, DISTRESS; SIGNALS, RAILWAY*

TRACK, EXPLOSIVES; SIGNALS, SMOKE are not included in this definition. They are listed separately.

BLACK POWDER (GUNPOWDER), COMPRESSED or BLACK POWDER (GUNPOWDER), IN PELLETS: UN No. 0028

Substance consisting of a pelletized form of black powder.

BLACK POWDER (GUNPOWDER), GRANULAR OR AS MEAL: UN NO. 0027

SUBSTANCE CONSISTING OF AN INTIMATE MIXTURE OF CHARCOAL OR OTHER CARBON AND EITHER POTASSIUM NITRATE OR SODIUM NITRATE, WITH OR WITHOUT SULPHUR.

BOMBS, WITH FLAMMABLE LIQUID, with bursting charge: UN Nos. 0399, 0400

Articles which are dropped from aircraft, consisting of a tank filled with inflammable liquid and bursting charge.

BOMBS, PHOTO-FLASH: UN NO. 0038

Explosive articles which are dropped from aircraft to provide brief, intense illumination for photography. They contain a charge of detonating explosive without means of initiation or with means of initiation containing two or more effective protective features.

BOMBS, PHOTO-FLASH: UN NO. 0037

Explosive articles which are dropped from aircraft to provide brief, intense illumination for photography. They contain a charge of detonating explosive with means of initiation not containing two or more effective protective features.

BOMBS, PHOTO-FLASH: UN NOS. 0039, 0299

Explosive articles which are dropped from aircraft to provide brief, intense illumination for photography. They contain a photo-flash composition.

BOMBS WITH BURSTING CHARGE: UN NOS. 0034; 0035

Explosive articles which are dropped from aircraft, without means of initiation or with means of initiation containing two or more effective protective features.

BOMBS WITH BURSTING CHARGE: UN NOS. 0033, 0291

Explosive articles which are dropped from aircraft, with means of initiation not containing two or more effective protective features.

BOOSTERS WITH DETONATOR: UN NOS. 0225, 0268

Articles consisting of a charge of detonating explosive with means of initiation. They are used to increase the initiating power of detonators or detonating cord.

BOOSTERS WITHOUT DETONATOR: UN NOS. 0042, 0283

Articles consisting of a charge of detonating explosive without means of initiation. They are used to increase the initiating power of detonators or detonating cord.

BURSTERS, EXPLOSIVE: UN NO. 0043

Articles consisting of a small charge of explosive used to open projectiles or other ammunition in order to disperse their contents.

CARTRIDGES, FLASH: UN Nos. 0049, 0050

Articles consisting of a casing, a primer and flash powder, all assembled in one piece ready for firing.

CARTRIDGES FOR TOOLS, BLANK: UN No. 0014

Article, used in tools, consisting of a closed cartridge case with a centre or rim fire primer with or without a charge of smokeless or black powder but with no projectile.

CARTRIDGES FOR WEAPONS, BLANK: UN Nos. 0326, 0413, 0327, 0338, 0014

Ammunition consisting of a closed cartridge case with a centre or rim fire primer and a charge of smokeless or black powder but no projectile. It produces a loud noise and is used for training, saluting, propelling charge, starter pistols, etc. The term includes ammunition, blank.

CARTRIDGES FOR WEAPONS, INERT PROJECTILE: UN Nos. 0328, 0417, 0339, 0012

Ammunition consisting of a projectile without bursting charge but with a propelling charge with or without a primer. The articles may include a tracer, provided that the predominant hazard is that of the propelling charge.

CARTRIDGES FOR WEAPONS with bursting charge: UN Nos. 0006, 0321, 0412

Ammunition consisting of a projectile with a bursting charge without means of initiation or with means of initiation containing two or more effective protective features; and a propelling charge with or without a primer. The term includes fixed (assembled) ammunition, semi-fixed (partially assembled) ammunition and separate loading ammunition when the components are packed together.

CARTRIDGES FOR WEAPONS with bursting charge: UN Nos. 0005, 0007, 0348

Ammunition consisting of a projectile with a bursting charge with means of initiation not containing two or more effective protective features; and a propelling charge with or without a primer. The term includes fixed (assembled) ammunition, semi-fixed (partially assembled) ammunition and separate loading ammunition when the components are packed together.

CARTRIDGES, OIL WELL: UN Nos. 0277, 0278

Articles consisting of a thin casing of fibreboard, metal or other material containing only propellant powder which projects a hardened projectile to perforate an oil well casing.

Note:: CHARGES, SHAPED are not included in this definition. They are listed separately.

CARTRIDGES, POWER DEVICE: UN Nos. 0275, 0276, 0323, 0381

Articles designed to accomplish mechanical actions. They consist of a casing with a charge of deflagrating explosive and a means of ignition. The gaseous products of the deflagration produce inflation, linear or rotary motion or activate diaphragms, valves or switches or project fastening devices or extinguishing agents.

CARTRIDGES, SIGNAL: UN Nos. 0054, 0312, 0405

Articles designed to fire coloured flares or other signals from signal pistols, etc.

CARTRIDGES, SMALL ARMS: UN Nos. 0417, 0339, 0012

Ammunition consisting of a cartridge case fitted with a centre or rim fire primer and containing both a propelling charge and solid projectile. They are designed to be fired in weapons of calibre not larger than 19.1 mm. Shot-gun cartridges of any calibre are included in this description.

Note:: CARTRIDGES, SMALL ARMS, BLANK, are not included in this definition. They are listed separately. Some military small arms cartridges are not included in this definition. They are listed under CARTRIDGES FOR WEAPONS, INERT PROJECTILE.

CARTRIDGES, SMALL ARMS, BLANK: UN Nos. 0014, 0327, 0338

Ammunition consisting of a closed cartridge case with a centre or rim fire primer and a charge of smokeless or black powder. The cartridge cases contain no projectiles. The cartridges are designed to be fired from weapons with a calibre of at most 19.1 mm and serve to produce a loud noise and are used for training, saluting, propelling charge, starter pistols, etc.

CASES, CARTRIDGE, EMPTY, WITH PRIMER: UN Nos. 0379; 0055

Articles consisting of a cartridge case made from metal, plastics or other non-inflammable material, in which the only explosive component is the primer

CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER: UN Nos. 0447, 0446

Articles consisting of a cartridge case made partly or entirely from nitrocellulose.

CHARGES, BURSTING, PLASTICS BONDED: UN Nos. 0457, 0458, 0459, 0460

Articles consisting of a charge of detonating explosive, plastics bonded, manufactured in a specific form without a casing and without means of initiation. They are designed as components of ammunition such as warheads.

CHARGES, DEMOLITION: UN No. 0048

Articles containing a charge of a detonating explosive in a casing of fibreboard, plastics, metal or other material. The articles are without means of initiation or with means of initiation containing two or more effective protective features.

Note: The following articles: *BOMBS; MINES; PROJECTILES* are not included in this definition. They are listed separately.

CHARGES, DEPTH: UN No. 0056

Articles consisting of a charge of detonating explosive contained in a drum or projectile without means of initiation or with means of initiation containing two or more effective protective features. They are designed to detonate under water.

CHARGES, EXPLOSIVE, COMMERCIAL without detonator: UN Nos. 0442, 0443, 0444, 0445

Articles consisting of a charge of detonating explosive without means of initiation, used for explosive welding, jointing, forming and other metallurgical processes.

CHARGES, PROPELLING, FOR CANNON: UN NOS. 0242, 0279, 0414

Charges of propellant in any physical form for separate-loading ammunition for cannon.

CHARGES, PROPELLING: UN Nos. 0271, 0272, 0415, 0491

Articles consisting of a charge of a propellant charge in any physical form, with or without a casing, as a component of rocket motors or for reducing the drag of projectiles.

CHARGES, SHAPED, without detonator: UN Nos. 0059, 0439, 0440, 0441

Articles consisting of a casing containing a charge of detonating explosive with a cavity lined with rigid material, without means of initiation. They are designed to produce a powerful, penetrating jet effect.

CHARGES, SHAPED, FLEXIBLE, LINEAR: UN Nos. 0237, 0288

Articles consisting of a V-shaped core of a detonating explosive clad by a flexible sheath.

CHARGES, SUPPLEMENTARY, EXPLOSIVE: UN No. 0060

Articles consisting of a small removable booster placed in the cavity of a projectile between the fuze and the bursting charge.

COMPONENTS, EXPLOSIVE TRAIN, N.O.S.: UN Nos. 0382, 0383, 0384, 0461

Articles containing an explosive designed to transmit detonation or deflagration within an explosive train.

CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge: UN Nos. 0248, 0249

Articles whose functioning depends upon physico-chemical reaction of their contents with water.

CORD, DETONATING, flexible: UN Nos. 0065, 0289

Article consisting of a core of detonating explosive enclosed in spun fabric and a plastics or other covering. The covering is not necessary if the spun fabric is sift-proof.

CORD (FUZE) DETONATING, metal clad: UN Nos. 0102, 0290

Article consisting of a core of detonating explosive clad by a soft metal tube with or without protective covering.

CORD (FUSE) DETONATING, MILD EFFECT, metal clad: UN No. 0104

Article consisting of a core of detonating explosive clad by a soft metal tube with or without a protective covering. The quantity of explosive substance is so small that only a mild effect is manifested outside the cord.

CORD, IGNITER: UN No. 0066

Article consisting of textile yarns covered with black powder or another fast burning pyrotechnic composition and of a flexible protective covering; or it consists of a core of black powder surrounded by a flexible woven fabric. It burns progressively along its length with an external flame and is used to transmit ignition from a device to a charge or primer.

CUTTERS, CABLE, EXPLOSIVE: UN No. 0070

Articles consisting of a knife-edged device which is driven by a small charge of deflagrating explosive into an anvil.

DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting: UN Nos. 0360, 0361, 0500

Non-electric detonators assembled with and activated by such means as safety fuse, shock tube, flash tube or detonating cord. They may be of instantaneous design or incorporate delay elements. Detonating relays incorporating detonating cord are included.

DETONATORS, ELECTRIC for blasting: UN Nos. 0030, 0255, 0456

Articles specially designed for the initiation of blasting explosives. These detonators may be constructed to detonate instantaneously or may contain a delay element. Electric detonators are activated by an electric current.

DETONATORS, ELECTRONIC programmable for blasting: UN Nos. 0511, 0512, 0513
Detonators with enhanced safety and security features, utilizing electronic components to transmit a firing signal with validated commands and secure communications. Detonators of this type cannot be initiated by other means.

DETONATORS FOR AMMUNITION: UN Nos. 0073, 0364, 0365, 0366

Articles consisting of a small metal or plastics tube containing explosives such as lead azide, PETN or combinations of explosives. They are designed to start a detonation train.

DETONATORS, NON-ELECTRIC for blasting: UN Nos. 0029, 0267, 0455

Articles specially designed for the initiation of blasting explosives. These detonators may be constructed to detonate instantaneously or may contain a delay element. Non-electric detonators are activated by such means as shock tube, flash tube, safety fuse, other igniferous device or flexible detonating cord. Detonating relays without detonating cord are included.

EXPLOSIVE, BLASTING, TYPE A: UN No. 0081

Substances consisting of liquid organic nitrates such as nitroglycerine or a mixture of such ingredients with one or more of the following: nitrocellulose; ammonium nitrate or other inorganic nitrates; aromatic nitro-derivatives, or combustible materials, such as wood-meal and aluminium powder. They may contain inert components such as kieselguhr, and additives such as colouring agents and stabilizers. Such explosives shall be in powdery, gelatinous or elastic form. The term includes dynamite; gelatine, blasting and gelatine dynamites.

EXPLOSIVE, BLASTING, TYPE B: UN Nos. 0082, 0331

Substances consisting of

(a) a mixture of ammonium nitrate or other inorganic nitrates with an explosive such as trinitrotoluene, with or without other substances such as wood-meal and aluminium powder; or

(b) a mixture of ammonium nitrate or other inorganic nitrates with other combustible substances which are not explosive ingredients. In both cases they may contain inert components such as kieselguhr, and additives such as colouring agents and stabilizers. Such explosives must not contain nitroglycerine, similar liquid organic nitrates or chlorates.

EXPLOSIVE, BLASTING, TYPE C: UN No. 0083

Substances consisting of a mixture of either potassium or sodium chlorate or potassium, sodium or ammonium perchlorate with organic nitro-derivatives or combustible materials such as wood-meal or aluminium powder or a hydrocarbon. They may contain inert components such as kieselguhr and additives such as colouring agents and stabilizers. Such explosives must not contain nitroglycerine or similar liquid organic nitrates.

EXPLOSIVE, BLASTING, TYPE D: UN No. 0084

Substances consisting of a mixture of organic nitrated compounds and combustible materials such as hydrocarbons and aluminium powder. They may contain inert components such as kieselguhr and additives such as colouring agents and stabilizers. Such explosives must not contain nitroglycerine, similar liquid organic nitrates, chlorates and ammonium nitrate. The term generally includes plastic explosives.

EXPLOSIVES, BLASTING, TYPE E: UN Nos. 0241, 0332

Substances consisting of water as an essential ingredient and high proportions of ammonium nitrate or other oxidizers, some or all of which are in solution. The other constituents may include nitro-derivatives such as trinitrotoluene, hydrocarbons or aluminium powder. They may contain inert components such as kieselguhr and additives such as colouring agents and stabilizers. The term includes explosives, emulsion, explosives, slurry and explosives, watergel.

FIRE SUPPRESSANT DISPERSING DEVICES: UN No. 0514

Articles which contain a pyrotechnic substance, which are intended to disperse a fire extinguishing agent (or aerosol) when activated, and which do not contain any other dangerous goods.

FIREWORKS: UN Nos. 0333, 0334, 0335, 0336, 0337

Pyrotechnic articles designed for entertainment.

FLARES, AERIAL: UN Nos. 0093, 0403, 0404, 0420, 0421;

Articles containing pyrotechnic substances which are designed to be dropped from an aircraft to illuminate, identify, signal or warn.

FLARES, SURFACE: UN Nos. 0092, 0418, 0419

Articles containing pyrotechnic substances which are designed for use on the surface to illuminate, identify, signal or warn.

FLASH POWDER: UN Nos. 0094, 0305

Pyrotechnic substance which, when ignited, produces an intense light.

FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells: UN No. 0099

Articles consisting of a charge of detonating explosive contained in a casing without means of initiation. They are used to fracture the rock around a drill shaft to assist the flow of crude oil from the rock.

FUSE, IGNITER, tubular, metal clad: UN No. 0103

Article consisting of a metal tube with a core of deflagrating explosive.

FUSE, NON-DETONATING: UN No. 0101

Article consisting of cotton yarns impregnated with fine black powder (quickmatch). It burns with an external flame and is used in ignition trains for fireworks, etc.

FUSE, SAFETY: UN No. 0105

Article consisting of a core of fine grained black powder surrounded by a flexible woven fabric with one or more protective outer coverings. When ignited, it burns at a predetermined rate without any external explosive effect.

FUZES, DETONATING: UN Nos. 0106, 0107, 0257, 0367

Articles with explosive components designed to produce a detonation in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components to initiate the detonation. They generally incorporate protective features.

FUZES, DETONATING with protective features: UN Nos. 0408, 0409, 0410

Articles with explosive components designed to produce a detonation in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components to initiate the detonation. The detonating fuze must incorporate two or more effective protective features.

FUZES, IGNITING: UN Nos. 0316, 0317, 0368

Articles with primary explosive components designed to produce a deflagration in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components to start the deflagration. They generally incorporate protective features.

GRENADES, hand or rifle, with bursting charge: UN Nos. 0284, 0285

Articles which are designed to be thrown by hand or to be projected by a rifle. They are without means of initiation or with means of initiation containing two or more effective protective features.

GRENADES, hand or rifle, with bursting charge: UN Nos. 0292, 0293

Articles which are designed to be thrown by hand or to be projected by a rifle. They are with means of initiation not containing two or more effective protective features.

GRENADES, PRACTICE, hand or rifle: UN Nos. 0110, 0372, 0318, 0452

Articles without a main bursting charge which are designed to be thrown by hand or to be projected by a rifle. They contain the priming device and may contain a spotting charge.

HEXOTONAL: UN No. 0393

Substance consisting of an intimate mixture of cyclotrimethylene-trinitramine (RDX), trinitrotoluene (TNT) and aluminium.

HEXOLITE (HEXOTOL), dry or wetted with less than 15% water, by mass: UN No. 0118

Substance consisting of an intimate mixture of cyclotrimethylene-trinitramine (RDX) and trinitrotoluene (TNT). The term includes "Composition B".

IGNITERS: UN Nos. 0121, 0314, 0315, 0325, 0454

Articles containing one or more explosive substances designed to produce a deflagration in an explosive train. They may be actuated chemically, electrically or mechanically.

Note: The following articles: CORD, IGNITER; FUSE, IGNITER; FUSE, NON-DETONATING; FUZES, IGNITING; LIGHTERS, FUSE; PRIMERS, CAP TYPE; PRIMERS, TUBULAR are not included in this definition. They are listed separately.

JET PERFORATING GUNS, CHARGED, oil well, without detonator: UN Nos. 0124, 0494

Articles consisting of a steel tube or metallic strip, into which are inserted shaped charges connected by detonating cord, without means of initiation.

LIGHTERS, FUSE: UN No. 0131

Articles of various design actuated by friction, percussion or electricity and used to ignite safety fuse.

MINES with bursting charge: UN Nos. 0137, 0138

Articles consisting normally of metal or composition receptacles filled with a detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be operated by the passage of ships, vehicles or personnel. The term includes "Bangalore torpedoes". MINES with bursting charge: UN Nos. 0136, 0294

Articles consisting normally of metal or composition receptacles filled with a detonating explosive, with means of initiation not containing two or more effective protective features. They are designed to be operated by the passage of ships, vehicles or personnel. The term includes "Bangalore torpedoes".

OCTOLITE (OCTOL), dry or wetted with less than 15% water, by mass: UN No. 0266

Substance consisting of an intimate mixture of cyclotetramethylene-tetranitramine (HMX) and trinitrotoluene (TNT).

OCTONAL: UN No. 0496

Substance consisting of an intimate mixture of cyclotetramethylenetetranitramine (HMX), trinitrotoluene (TNT) and aluminium.

PENTOLITE, dry or wetted with less than 15% water, by mass: UN No. 0151

Substance consisting of an intimate mixture of pentaerythrite tetranitrate (PETN) and trinitrotoluene (TNT).

POWDER CAKE (POWDER PASTE), WETTED with not less than 17% alcohol, by mass; **POWDER CAKE (POWDER PASTE), WETTED** with not less than 25% water, by mass: UN Nos. 0433, 0159

Substance consisting of nitrocellulose impregnated with not more than 60% of nitroglycerine or other liquid organic nitrates or a mixture of these.

POWDER, SMOKELESS: UN Nos. 0160, 0161, 0509

Substance based on nitrocellulose used as propellant. The term includes propellants with a single base (nitrocellulose (NC) alone), those with a double base (such as NC and nitroglycerine/(NG)) and those with a triple base (such as NC/NG/nitroguanidine).

Note: *Cast, pressed or bag-charges of smokeless powder are listed under CHARGES, PROPELLING or CHARGES, PROPELLING, FOR CANON.*

PRIMERS, CAP TYPE: UN Nos. 0044, 0377, 0378

Articles consisting of a metal or plastics cap containing a small amount of primary explosive mixture that is readily ignited by impact. They serve as igniting elements in small arms cartridges and in percussion primers for propelling charges.

PRIMERS, TUBULAR: UN Nos. 0319, 0320, 0376

Articles consisting of a primer for ignition and an auxiliary charge of deflagrating explosive such as black powder used to ignite the propelling charge in a cartridge case for cannon, etc.

PROJECTILES, inert with tracer: UN Nos. 0345, 0424, 0425

Articles such as a shell or bullet, which are projected from a cannon or other gun, rifle or other small arm.

PROJECTILES with burster or expelling charge: UN Nos. 0346, 0347

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are without means of initiation or with means of initiation containing two or more effective protective features. They are used to scatter dyes for spotting or other inert materials.

PROJECTILES with burster or expelling charge: UN Nos. 0426, 0427

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are with means of initiation not containing two or more effective protective features. They are used to scatter dyes for spotting or other inert materials.

PROJECTILES with burster or expelling charge: UN Nos. 0434, 0435

Articles such as a shell or bullet, which are projected from a cannon or other gun, rifle or other small arm. They are used to scatter dyes for spotting or other inert materials.

PROJECTILES with bursting charge: UN Nos. 0168, 0169, 0344

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are without means of initiation or with means of initiation containing two or more effective protective features.

PROJECTILES with bursting charge: UN Nos. 0167, 0324

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are with means of initiation not containing two or more effective protective features.

PROPELLANT, LIQUID: UN Nos. 0495, 0497

Substance consisting of a deflagrating liquid explosive, used for propulsion.

PROPELLANT, SOLID: UN Nos. 0498, 0499, 0501

Substance consisting of a deflagrating solid explosive, used for propulsion.

RELEASE DEVICES, EXPLOSIVE: UN No. 0173

Articles consisting of a small charge of explosive with means of initiation and rods or links. They sever the rods or links to release equipment quickly.

RIVETS, EXPLOSIVE: UN No. 0174

Articles consisting of a small charge of explosive inside a metallic rivet.

ROCKET MOTORS: UN Nos. 0186, 0280, 0281, 0510

Articles consisting of a charge of explosive, generally a solid propellant, contained in a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile.

ROCKET MOTORS, LIQUID FUELLED: UN Nos. 0395, 0396

Articles consisting of a liquid fuel within a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile.

ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge: UN Nos. 0322, 0250

Articles consisting of a hypergolic fuel contained in a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile.

ROCKETS, LINE THROWING: UN Nos. 0238, 0240, 0453

Articles consisting of a rocket motor which is designed to extend a line.

ROCKETS, LIQUID FUELLED with bursting charge: UN Nos. 0397, 0398

Articles consisting of a liquid fuel within a cylinder fitted with one or more nozzles and fitted with a warhead. The term includes guided missiles.

ROCKETS with bursting charge: UN Nos. 0181, 0182

Articles consisting of a rocket motor and a warhead without means of initiation or with means of initiation containing two or more effective protective features. The term includes guided missiles.

ROCKETS with bursting charge: UN Nos. 0180, 0295

Articles consisting of a rocket motor and a warhead with means of initiation not containing two or more effective protective features. The term includes guided missiles.

ROCKETS with expelling charge: UN Nos. 0436, 0437, 0438

Articles consisting of a rocket motor and a charge to expel the payload from a rocket head. The term includes guided missiles.

ROCKETS with inert head: UN Nos. 0183, 0502

Articles consisting of a rocket motor and an inert head. The term includes guided missiles.

SAFETY DEVICES, PYROTECHNIC: UN No. 0503

Articles which contain pyrotechnic substances or dangerous goods of other classes and are used in vehicles, vessels or aircraft to enhance safety to persons. Examples are: air bag inflators, air bag modules, seat-belt pretensioners and pyromechanical devices. These pyromechanical devices are assembled components for tasks such as but not limited to separation, locking, or occupant restraint.

SAMPLES, EXPLOSIVE, other than initiating explosive UN No. 0190

New or existing explosive substances or articles, not yet assigned to a name in Table A of Chapter 3.2 and carried in conformity with the instructions of the competent authority and generally in small quantities, inter alia, for the purposes of testing, classification, research and development, or quality control, or as commercial samples.

Note: *Explosive substances or articles already assigned to another name in Table A of Chapter 3.2 are not included in this definition.*

SIGNAL DEVICES, HAND: UN Nos. 0191, 0373

Portable articles containing pyrotechnic substances which produce visual signals or warnings. The term includes small surface flares such as highway or railway flares and small distress flares.

SIGNALS, DISTRESS, ship: UN Nos. 0194, 0195, 0505, 0506

Articles containing pyrotechnic substances designed to produce signals by means of sound, flame or smoke or any combination thereof.

SIGNALS, RAILWAY TRACK, EXPLOSIVE: UN Nos. 0192, 0193, 0492, 0493

Articles containing a pyrotechnic substance which explodes with a loud report when the article is crushed. They are designed to be placed on a rail.

SIGNALS, SMOKE: UN Nos. 0196, 0197, 0313, 0487, 0507

Articles containing pyrotechnic substances which emit smoke. In addition they may contain devices for emitting audible signals.

SOUNDING DEVICES, EXPLOSIVE: UN Nos. 0374, 0375

Articles consisting of a charge of detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are dropped from ships and function when they reach a predetermined depth or the sea bed.

SOUNDING DEVICES, EXPLOSIVE: UN Nos. 0204, 0296

Articles consisting of a charge of detonating explosive with means of initiation not containing two or more effective protective features. They are dropped from ships and function when they reach a predetermined depth or the sea bed.

SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI), N.O.S.: UN No. 0482

Substances presenting a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport, and which have passed Test Series 5.

TORPEDOES, LIQUID FUELLED with inert head: UN No. 0450

Articles consisting of a liquid explosive system to propel the torpedo through the water, with an inert head.

TORPEDOES, LIQUID FUELLED with or without bursting charge: UN No. 0449

Articles consisting of either a liquid explosive system to propel the torpedo through the water, with or without a warhead; or a liquid non-explosive system to propel the torpedo through the water, with a warhead.

TORPEDOES with bursting charge: UN No. 0451

Articles consisting of a non-explosive system to propel the torpedo through the water, and a warhead without means of initiation or with means of initiation containing two or more effective protective features.

TORPEDOES with bursting charge: UN No. 0329

Articles consisting of an explosive system to propel the torpedo through the water, and a warhead without means of initiation or with means of initiation containing two or more effective protective features.

TORPEDOES with bursting charge: UN No. 0330

Articles consisting of an explosive or non-explosive system to propel the torpedo through the water, and a warhead with means of initiation not containing two or more effective protective features.

TRACERS FOR AMMUNITION: UN Nos. 0212, 0306

Sealed articles containing pyrotechnic substances, designed to reveal the trajectory of a projectile.

TRITONAL: UN No. 0390

Substance consisting of trinitrotoluene (TNT) mixed with aluminium.

WARHEADS, ROCKET with burster or expelling charge: UN No. 0370

Articles consisting of an inert payload and a small charge of detonating or deflagrating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be fitted to a rocket motor to scatter inert material. The term includes warheads for guided missiles.

WARHEADS, ROCKET with burster or expelling charge: UN No. 0371

Articles consisting of an inert payload and a small charge of detonating or deflagrating explosive, with means of initiation not containing two or more effective protective features. They are designed to be fitted to a rocket motor to scatter inert material. The term includes warheads for guided missiles.

WARHEADS, ROCKET with bursting charge: UN Nos. 0286, 0287

Articles consisting of a detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be fitted to a rocket. The term includes warheads for guided missiles.

WARHEADS, ROCKET with bursting charge: UN No. 0369

Articles consisting of a detonating explosive, with means of initiation not containing two or more effective protective features. They are designed to be fitted to a rocket. The term includes warheads for guided missiles.

WARHEADS, TORPEDO with bursting charge: UN No. 0221

Articles consisting of a detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be fitted to a torpedo.

2.2.2 CLASS 2 Gases

2.2.2.1 Criteria

2.2.2.1.1 The heading of Class 2 covers pure gases, mixtures of gases, mixtures of one or more gases with one or more other substances and articles containing such substances.

A gas is a substance which:

- a) at 50 °C has a vapour pressure greater than 300 kPa (3 bar); or
- b) is completely gaseous at 20 °C at the standard pressure of 101.3 kPa.

Note 1. *UN No. 1052 HYDROGEN FLUORIDE is nevertheless classified in Class 8.*

Note 2. *A pure gas may contain other components deriving from its production process or added to preserve the stability of the product, provided that the level of these components does not change its classification or its conditions of carriage, such as filling ratio, filling pressure, test pressure.*

Note 3. *N.O.S. entries in 2.2.2.3 may cover pure gases as well as mixtures.*

2.2.2.1.2 The substances and articles of Class 2 are subdivided as follows:

1. Compressed gas – this category includes all gases with a critical temperature less than or equal to -50 °C.
2. Liquefied gas - this category includes all gases with a critical temperature above -50 °C. A distinction is made between:
 - High pressure liquefied gas: a gas with a critical temperature above -50 °C and equal to or below +65 °C; and;
 - Low pressure liquefied gas: *a gas with a critical temperature above +65 °C*;
3. Refrigerated liquefied gas – a gas which is liquid because of its low temperature.
4. Dissolved gas – a gas which is dissolved in a liquid phase solvent.
5. Aerosol dispensers and receptacles, small, containing gas (gas cartridges).
6. Other articles containing gas under pressure.
7. Non-pressurized gases subject to special requirements.
8. Chemicals under pressure: liquids, pastes or powders, pressurized with a propellant that meets the definition of a compressed or liquefied gas and mixtures thereof.
9. Adsorbed gas: a gas which when packaged for carriage is adsorbed onto a solid porous material resulting in an internal receptacle pressure of less than 101.3 kPa at 20 °C and less than 300 kPa at 50 °C

2.2.2.1.3 Substances and articles (except aerosols and chemicals under pressure) of Class 2 are assigned to one of the following groups according to their hazardous properties, as follows:

A – asphyxiant

O – oxidizing

F – flammable

T - toxic

TF – toxic, flammable

TC – toxic, corrosive

TO – toxic, oxidizing

TFC – toxic, flammable, corrosive

TOC – toxic, oxidizing, corrosive

For gases and gas mixtures presenting hazardous properties associated with more than one group according to the criteria, the groups designated by letter T take precedence over all other groups. The groups designated by letter F take precedence over the groups designated by letters A or O.

Note 1. *In the UN Model Regulations, the IMDG Code and the ICAO Technical Instructions, gases are assigned to one of the following three divisions, based on the primary hazard:*

Division 2.1: flammable gases (corresponding to the groups designated by the capital letter F);

Division 2.2: non-flammable, non-toxic gases (corresponding to the groups designated by the capital letters A or O);

Division 2.3: toxic gases (corresponding to the groups designated by the capital letter T (i.e. T, TF, TC, TO, TFC and TOC).

Note 2. *Receptacles, small containing gas (UN No. 2037) shall be assigned to the groups A to TOC according to the hazard of the contents. For aerosols (UN No. 1950), see 2.2.2.1.6. For chemicals under pressure (UN Nos. 3500 to 3505), see 2.2.2.1.7.*

Note 3. *Corrosive gases are considered to be toxic, and are therefore assigned to the group TC, TFC or TOC.*

2.2.2.1.4 If a mixture of Class 2 mentioned by name in Table A of Chapter 3.2 meets different criteria as mentioned in 2.2.2.1.2 and 2.2.2.1.5, this mixture shall be classified according to the criteria and assigned to an appropriate N.O.S. entry.

2.2.2.1.5 Substances and articles (except aerosols and chemicals under pressure) of Class 2 which are not mentioned by name in Table A of Chapter 3.2 shall be classified under a collective entry listed in 2.2.2.3 in accordance with 2.2.2.1.2 and 2.2.2.1.3. The following criteria shall apply:

Asphyxiant gases

Gases which are non-oxidizing, non-flammable and non-toxic and which dilute or replace oxygen normally in the atmosphere.

Flammable gases

Gases which at 20 °C and a standard pressure of 101.3 kPa:

- a) are ignitable when in a mixture of 13% or less by volume with air; or
- b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Flammability shall be determined by tests or by calculation, in accordance with methods adopted by ISO (see ISO 10156:2017).

Where insufficient data are available to use these methods, tests by a comparable method recognized by the competent authority of the country of origin may be used. If the country of origin is not an SMGS Contracting State these methods shall be recognized by the competent authority of the first SMGS Contracting State reached by the consignment.

Oxidizing gases

Gases, which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. These are pure gases or gas mixtures with an oxidizing power greater than 23.5% as determined by a method specified in ISO 10156:2017.

Toxic gases

Note: *Gases meeting the criteria for toxicity in part or completely owing to their corrosivity are to be classified as toxic. See also the criteria under the heading "Corrosive gases" for a possible subsidiary corrosivity hazard.*

Gases which:

- a) are known to be so toxic or corrosive to humans as to pose a hazard to health; or
- b) are presumed to be toxic or corrosive to humans because they have a LC50 value for acute toxicity equal to or less than 5 000 ml/m³ (ppm) when tested in accordance with 2.2.61.1.

In the case of gas mixtures (including vapours of substances from other classes) the following formula may be used:

$$LC_{50} \text{ Toxic (mixture)} = \frac{1}{\sum_{i=1}^n \frac{f_i}{T_i}}$$

where

f_i – mole fraction of the i th component substance of the mixture;

T_i – toxicity index of the i th component substance of the mixture. The T_i equals the LC50 value as found in packing instruction P200 of 4.1.4.1. When no LC50 value is listed in packing instruction P200 of 4.1.4.1, a LC50 value available in scientific literature shall be used. When the LC50 value is unknown, the toxicity index is determined by using the lowest LC50 value of substances of similar physiological and chemical effects, or through testing if this is the only practical possibility.

Corrosive gases

Gases or gas mixtures meeting the criteria for toxicity completely owing to their corrosivity are to be classified as toxic with a subsidiary corrosivity hazard.

A gas mixture that is considered to be toxic due to the combined effects of corrosivity and toxicity has a subsidiary hazard of corrosivity when the mixture is known by human experience to be destructive to the skin, eyes or mucous membranes or when the LC50 value of the corrosive components of the mixture is equal to or less than 5 000 ml/m³ (ppm) when the LC50 is calculated by the formula:

$$LC_{50} \text{ Corrosive (mixture)} = \frac{1}{\sum_{i=1}^n \frac{fc_i}{Tc_i}}$$

where

fc_i – mole fraction of the i th corrosive component substance of the mixture;

Tc_i – toxicity index of the i th corrosive component substance of the mixture. The Tc_i equals the LC50 value as found in packing instruction P200 of 4.1.4.1. When no LC50 value is listed in packing instruction P200 of 4.1.4.1, a LC50 value available in scientific literature shall be used. When the LC50 value is unknown the toxicity index is determined by using the lowest LC50 value of substances of similar physiological and chemical effects, or through testing if this is the only practical possibility.

2.2.2.1.6 Aerosols (aerosol dispensers)

Aerosols (UN No. 1950) are assigned to one of the following groups according to their hazardous properties, as follows:

- A: - asphyxiant;
- O: - oxidizing;
- F: - flammable;
- T: - toxic;
- C: - corrosive;
- CO: - corrosive, oxidizing;
- FC: - flammable, corrosive;

TF: - flammable, corrosive;
 TC: - toxic, corrosive;
 TO: - toxic, oxidizing;
 TFC: - toxic, flammable, corrosive;
 TOC: - toxic, oxidizing, corrosive.

Note: Gases, which meet the definition of toxic gases according to 2.2.2.1.5 and gases identified as "Considered as pyrophoric" by table note c of Table 2 of packing instruction P 200 in 4.1.4.1, shall not be used as a propellant in an aerosol dispenser. Aerosols with contents meeting the criteria for packing group I for toxicity or corrosivity shall not be accepted for carriage (see also 2.2.2.2.2).

The following criteria shall apply:

- a) Assignment to group A shall apply when the contents do not meet the criteria for any other group according to sub-paragraphs (b) to (f) below;
- b) Assignment to group O shall apply when the aerosol contains an oxidizing gas according to 2.2.2.1.5;
- c) Assignment to group F shall apply if the contents include 85% by mass or more flammable components and the chemical heat of combustion is 30 kJ/g or more.

It shall not apply if the contents contain 1% by mass or less flammable components and the heat of combustion is less than 20 kJ/g.

Otherwise the aerosol shall be tested for flammability in accordance with the tests described in the Manual of Tests and Criteria, Part III, section 31. Extremely flammable and flammable aerosols shall be assigned to group F.

Note: Flammable components are flammable liquids, flammable solids or flammable gases and gas mixtures as defined in Notes 1 to 3 of sub-section 31.1.3 of Part III of the Manual of Tests and Criteria. This designation does not cover pyrophoric, self-heating or water-reactive substances. The chemical heat of combustion shall be determined by one of the following methods: ASTM D 240, ISO/FDIS 13943:1999 (E/F) 86.1 to 86.3 or NFPA 30B.,

- d) Assignment to group T shall apply when the contents, other than the propellant of aerosol dispensers to be ejected, are classified as Class 6.1, packing groups II or III;
- e) Assignment to group C shall apply when the contents, other than the propellant of aerosol dispensers to be ejected, meet the criteria for Class 8, packing groups II or III;
- f) When the criteria for more than one group amongst groups O, F, T, and C are met, assignment to groups CO, FC, TF, TC TO, TFC or TOC shall apply, as relevant.

2.2.2.1.7 Chemicals under pressure

Chemicals under pressure (UN Nos. 3500 to 3505) are assigned to one of the following groups according to their hazardous properties, as follows:

A - asphyxiant;
 F - flammable;
 T - toxic;
 C - corrosive;
 FC - flammable, corrosive;
 TF - toxic, flammable.

The classification depends on the hazard characteristics of the components in the different states:

The propellant;
 The liquid; or
 The solid.

Note 1: Gases, which meet the definition of toxic gases or of oxidizing gases according to 2.2.2.1.5 or gases identified as "Considered as pyrophoric" by table note c of Table 2 of packing instruction P 200 in 4.1.4.1, shall not be used as a propellant in chemicals under pressure.

Note 2: Chemicals under pressure with contents meeting the criteria for packing group I for toxicity or corrosivity or with contents meeting both the criteria for packing group II or III for toxicity and for packing group II or III for corrosivity shall not be accepted for carriage under these UN numbers.

Note 3: Chemicals under pressure with components meeting the properties of Class 1; liquid desensitized explosives of Class 3; self-reactive substances and solid desensitized explosives of Class 4.1; Class 4.2; Class 4.3; Class 5.1; Class 5.2; Class 6.2; or Class 7, shall not be used for carriage under these UN numbers.

Note 4: A chemical under pressure in an aerosol dispenser shall be carried under UN No. 1950.

The following criteria shall apply:

- a) Assignment to group A shall apply when the contents do not meet the criteria for any other group according to sub-paragraphs (b) to (e) below
- (b) Assignment to group F shall apply if one of the components, which can be a pure substance or a mixture, needs to be classified as flammable. Flammable components are flammable liquids and liquid mixtures, flammable solids and solid mixtures or flammable gases and gas mixtures meeting the following criteria:
 - I) A flammable liquid is a liquid having a flashpoint of not more than 93 °C;
 - II) A flammable solid is a solid which meets the criteria in 2.2.41.1;
 - III) A flammable gas is a gas which meets the criteria in 2.2.2.1.;
- c) Assignment to group T shall apply when the contents, other than the propellant, are classified as dangerous goods of Class 6.1, packing groups II or III;
- d) Assignment to group C shall apply when the contents, other than the propellant, are classified as dangerous goods of Class 8, packing groups II or III;
- e) When the criteria for two groups amongst groups F, T, and C are met, assignment to groups FC or TF shall apply, as relevant.

2.2.2.2 Gases not accepted for carriage

2.2.2.2.1 Chemically unstable gases of Class 2 shall not be accepted for carriage

- unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage or
- unless carried in accordance with special packing provision (r) of packing instruction P 200 (10) of 4.1.4.1, as applicable.

For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions. If temperature control is required to prevent polymerization of a substance the substance shall not be accepted for carriage:

- in a packaging or IBC with an SAPT of 50 °C or less,
- or in a tank with an SAPT of 45 °C or less.

2.2.2.2.2 The following substances and mixtures shall not be accepted for carriage:

- UN No. 2186 HYDROGEN CHLORIDE, REFRIGERATED LIQUID;

- UN No. 2421 NITROGEN TRIOXIDE;
- UN No. 2455 METHYL NITRITE;
- Refrigerated liquefied gases which cannot be assigned to classification codes 3A, 3O or 3F;
- Dissolved gases which cannot be classified under UN Nos. 1001, 1043, 2073 or 3318. For UN No. 1043, see special provision 642;
- Aerosols where gases which are toxic according to 2.2.2.1.5 or pyrophoric according to packing instruction P200 in 4.1.4.1 are used as propellants;
- Aerosols with contents meeting the criteria for packing group I for toxicity or corrosivity (see 2.2.61 and 2.2.8);
- Receptacles, small, containing gases which are very toxic (LC50 lower than 200 ppm) or pyrophoric according to packing instruction P200 in 4.1.4.1.

2.2.2.3 List of collective entries

Classification code	UN No.	Name of the substance or article
Compressed gases		
1A	1956	COMPRESSED GAS, N.O.S.
1O	3156	COMPRESSED GAS, OXIDIZING, N.O.S.
1F	1964 1954	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S. COMPRESSED GAS, FLAMMABLE, N.O.S..
1T	1955	COMPRESSED GAS, TOXIC, N.O.S
1TF	1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S
1TC	3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S
1TO	3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S..
1TFC	3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
1TOC	3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.
Liquefied gases		
2A	1058 1078 1968 3163	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air REFRIGERANT GAS, N.O.S. such as mixtures of gases, Indicated by the letter R..., which as: Mixture F1, have a vapour pressure at 70 °C not exceeding 1.3 MPa (13 bar) and a density at 50 °C not lower than that of dichlorofluoromethane (1.30 kg/l); Mixture F2, have a vapour pressure at 70 °C not exceeding 1.9 MPa (19 bar) and a density at 50 °C not lower than that of dichlorodifluoromethane (1.21 kg/l); Mixture F3, have a vapour pressure at 70 °C not exceeding 3 MPa (30 bar) and a density at 50 °C not lower than that of chlorodifluoromethane (1.09 kg/l). Note: Trichlorofluoromethane (Refrigerant R 11), 1,1,2-trichloro-1,2,2-trifluoroethane (Refrigerant R 113), 1,1,1-trichloro-2,2,2-trifluoroethane (Refrigerant R 113a), 1-chloro-1,2,2-trifluoroethane (Refrigerant R 133) and 1-chloro-1,1,2-trifluoroethane (Refrigerant R 133b) are not substances of Class 2. They may, however, enter into the composition of mixtures F1 to F3. INSECTICIDE GAS, N.O.S. LIQUEFIED GAS, N.O.S. INSECTICIDE GAS, N.O.S. LIQUEFIED GAS, N.O.S.
2O	3157	LIQUEFIED GAS, OXIDIZING, N.O.S.
2F	1010 1060	BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 20% butadienes. METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED such as mixtures of methylacetylene and propadiene with hydrocarbons, which as:

	1965	Mixture P1, contain not more than 63% methylacetylene and propadiene by volume and not more than 24% propane and propylene by volume, the percentage of C4- saturated hydrocarbons being not less than 14% by volume; and as Mixture P2, contain not more than 48% methylacetylene and propadiene by volume and not more than 50% propane and propylene by volume, the percentage of C4- saturated hydrocarbons being not less than 5% by volume, as well as mixtures of propadiene with 1 to 4% methylacetylene. HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S such as mixtures, which as: Mixture A, have a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l; Mixture A01, have a vapour pressure at 70 °C not exceeding 1.6 MPa (16 bar) and a relative density at 50 °C not lower than 0.516 kg/l; Mixture A02, have a vapour pressure at 70 °C not exceeding 1.6 MPa (16 bar) and a relative density at 50 °C not lower than 0.505 kg/l; Mixture A0, have a vapour pressure at 70 °C not exceeding 1.6 MPa (16 bar) and a density at 50 °C not lower than 0.495 kg/l; Mixture A1, have a vapour pressure at 70 °C not exceeding 2.1 MPa (21 bar) and a density at 50 °C not lower than 0.485 kg/l; Mixture B1 have a vapour pressure at 70 °C not exceeding 2.6 MPa (26 bar) and a relative density at 50 °C not lower than 0.474 kg/l; Mixture B2 have a vapour pressure at 70 °C not exceeding 2.6 MPa (26 bar) and a relative density at 50 °C not lower than 0.463 kg/l; Mixture B, have a vapour pressure at 70 °C not exceeding 2.6 MPa (26 bar) and a density at 50 °C not lower than 0.450 kg/l; Mixture C, have a vapour pressure at 70 °C not exceeding 3.1 MPa (31 bar) and a relative density at 50 °C not lower than 0.440 kg/l; Note 1: In the case of the foregoing mixtures, the use of the following names customary in the trade is permitted for describing these sub- stances: for mixtures A, A01, A02 and A0: BUTANE; for mixture C: PROPANE. 2: UN No. 1075 PETROLEUM GASES, LIQUEFIED may be used as an alternative entry for UN No. 1965 HYDROCARBON GAS MIX- TURE LIQUEFIED, N.O.S. for carriage prior to or following maritime or air carriage.
	3354	INSECTICIDE GAS, FLAMMABLE, N.O.S.
	3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.
2T	1967	INSECTICIDE GAS, TOXIC, N.O.S
	3162	LIQUEFIED GAS, TOXIC, N.O.S.
2TF	3355	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.
	3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.
2TC	3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S..
2TO	3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.
2TFC	3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
2TOC	3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S
Refrigerated liquefied gases		
3A	3158	GAS, REFRIGERATED LIQUID, N.O.S..
3O	3311	GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.
3F	3312	GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.
Dissolved gases		
4		Only substances listed in Table A of Chapter 3.2 are to be accepted for carriage.

Aerosols and receptacles, small, containing gas		
5	1950	AEROSOLS (aerosol dispensers)
	2037	RECEPTACLES, SMALL CONTAINING GAS (GAS CARTRIDGES) without arelease device, non-refillable
Other articles containing gas under pressure		
6A	2857	REFRIGERATING MACHINES containing non-flammable, non-toxic gases or ammonia solutions (UN 2672)
	3164	ARTICLES, PRESSURIZED, PNEUMATIC (containing non-flammable gas) or
	3164	ARTICLES, PRESSURIZED, HYDRAULIC (containing non-flammable gas)
	3558	ARTICLES CONTAINING NON-FLAMMABLE, NON TOXIC GAS, N.O.S.
6F	3150	DEVICES, SMALL, HYDROCARBON GAS POWERED or
	3150	HYDROCARBON GAS REFILLS FOR SMALL DEVICES, with release device
	3358	REFRIGERATING MACHINES containing flammable, non-toxic, liquefied gas
	3478	FUEL CELL CARTRIDGES, containing liquefied flammable gas or
	3478	FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing liquefied flammable gas or
	3478	FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas
	3479	FUEL CELL CARTRIDGES, containing hydrogen in metal hydride or
	3479	FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing hydrogen in metal hydride or
	3479	FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride
	3529	ENGINE, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or
	3529	ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or
	3529	MACHINERY, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or
	3529	MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED
6T	3539	ARTICLES CONTAINING TOXIC GAS, N.O.S.
Gas samples		
7F	3167	GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid
7T	3169	GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S., not refrigerated liquid
7TF	3168	GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid
Chemicals under pressure		
8A	3500	CHEMICAL UNDER PRESSURE, N.O.S.
8F	3501	CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.
8T	3502	CHEMICAL UNDER PRESSURE, TOXIC, N.O.S
8C	3503	CHEMICAL UNDER PRESSURE, CORROSIVE, N.O.S.
8TF	3504	CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.
8FC	3505	CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.
Adsorbed gases		
9A	3511	ADSORBED GAS, N.O.S.
9O	3513	ADSORBED GAS, OXIDIZING, N.O.S
9F	3510	ADSORBED GAS, FLAMMABLE, N.O.S.

9T	3512	ADSORBED GAS, TOXIC, N.O.S
9TF	3514	ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.
9TC	3516	ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.
9TO	3515	ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.
9TFC	3517	ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S
9TOC	3518	ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S

2.2.3 CLASS 3 FLAMMABLE LIQUIDS

2.2.3.1 Criteria

2.2.3.1.1 The heading of Class 3 covers substances and articles containing substances of this Class which:

- are liquids according to subparagraph (a) of the definition for "liquid" in 1.2.1;
- have at 50 °C a vapour pressure of not more than 300 kPa (3 bar) and are not completely gaseous at 20 °C and at standard pressure of 101.3 kPa; and;
- have a flash-point of not more than 60 °C (see 2.3.3.1 for the relevant test).

The heading of Class 3 also covers liquid substances and molten solid substances with a flash-point of more than 60 °C and which are carried or handed over for carriage whilst heated at temperatures equal to or higher than their flash-point. These substances are assigned to UN No. 3256

The heading of Class 3 also covers liquid desensitized explosives. Liquid desensitized explosives are explosive substances which are dissolved or suspended in water or other liquid substances, to form an homogeneous liquid mixture to suppress their explosive properties. Such entries in Table A of Chapter 3.2 are UN Nos. 1204, 2059, 3064, 3343, 3357, 3379 and 3555.

Note 1: *Substances having a flash-point above 35 °C which do not sustain combustion according to the criteria of sub-section 32.2.5 of Part III of the Manual of Tests and Criteria, are not substances of Class 3; if, however, these substances are handed over for carriage and carried whilst heated at temperatures equal to or higher than their flash-point, they are substances of Class 3.*

Note 2: *By derogation from paragraph 2.2.3.1.1 above, diesel fuel, gasoil, heating oil (light) including synthetically manufactured products having a flash-point above 60 °C and not more than 100 °C shall be deemed substances of Class 3, UN No. 1202.*

Note 3: *Flammable liquids which are highly toxic by inhalation, as defined in 2.2.61.1.4 to 2.2.61.1.9, and toxic substances having a flash-point of 23 °C or above are substances of Class 6.1 (see 2.2.61.1). Liquids which are highly toxic by inhalation are indicated as "toxic by inhalation" in their proper shipping name in Column (2) or by special provision 354 in Column (6) of Table A of Chapter 3.2.*

Note 4: *Flammable liquid substances and preparations used as pesticides, which are highly toxic, toxic or slightly toxic and have a flash-point of 23 °C or above are substances of Class 6.1 (see 2.2.61.1).*

2.2.3.1.2 The substances and articles of Class 3 are subdivided as follows:

- F** Flammable liquids, without subsidiary risk and articles containing such substances:
 - F1** Flammable liquids having a flash-point of or below 60 °C;
 - F2** Flammable liquids having a flash-point above 60 °C which are carried or handed over for carriage at or above their flash-point (elevated temperature substances);
 - F3** Articles containing flammable liquids
- FT** Flammable liquids, toxic:
 - FT1** Flammable liquids, toxic;
 - FT2** Pesticides;
 - FC** Flammable liquids, corrosive
 - FTC** Flammable liquids, toxic, corrosive;
 - D** Liquid desensitized explosives.

2.2.3.1.3 Substances and articles classified in Class 3 are listed in Table A of Chapter 3.2. Substances not mentioned by name in Table A of Chapter 3.2 shall be assigned to the

relevant entry of 2.2.3.3 and the relevant packing group in accordance with the provisions of this section. Flammable liquids shall be assigned to one of the following packing groups according to the degree of danger they present for carriage:

Packing group	Flash-point (closed cup), °C	Initial boiling point
I	--	≤35
II ^a	<23	>35
III ^a	≥23 and ≤60	>35

^a See also 2.2.3.1.4.

For a liquid with (a) subsidiary risk(s), the packing group determined in accordance with the table above and the packing group based on the severity of the subsidiary risk(s) shall be considered; the classification and packing group shall then be determined in accordance with the table of precedence of hazards in 2.1.3.10.

2.2.3.1.4 Viscous flammable liquids such as paints, enamels, lacquers, varnishes, adhesives and polishes having a flash-point of less than 23 °C may be assigned to packing group III in conformity with the procedures pre- scribed in the Manual of Tests and Criteria, Part III, sub-section 32.3, provided that:

a) The viscosity⁷ and flash-point are in accordance with the following Table:

Kinematic viscosity (extrapolated) ν (at near-zero shear rate) mm ² /s at 23°C	Flow-time t in seconds	Jet diameter (mm)	Flash-point, closed-cup (°C)
20 < ν ≤ 80	20 < t ≤ 60	4	above 17
80 < ν ≤ 135	60 < t ≤ 100	4	above 10
135 < ν ≤ 220	20 < t ≤ 32	6	above 5
220 < ν ≤ 300	32 < t ≤ 44	6	above - 1
300 < ν ≤ 700	44 < t ≤ 100	6	above - 5
ν > 700	t < 100	6	No limit

- b) Less than 3% of the clear solvent layer separates in the solvent separation test;
- c) The mixture or any separated solvent does not meet the criteria for Class 6.1 or Class 8;
- d) The substances are packed in receptacles of not more than 450 litre capacity

Note: These provisions also apply to mixtures containing no more than 20% nitrocellulose with a nitrogen content not exceeding 12.6% by dry mass. Mixtures containing more than 20% but not more than 55% nitrocellulose with a nitrogen content not exceeding 12.6% by dry mass are substances assigned to UN No. 2059.

Mixtures having a flash-point below 23 °C and containing:

⁷ Viscosity determination: Where the substance concerned is non-Newtonian, or where a flow cup method of viscosity determination is otherwise unsuitable, a variable shear-rate viscometer shall be used to determine the dynamic viscosity coefficient of the substance, at 23 °C, at a number of shear rates. The values obtained are plotted against shear rate and then extrapolated to zero shear rate. The dynamic viscosity thus obtained, divided by the density, gives the apparent kinematic viscosity at near- zero shear rate.

- more than 55% nitrocellulose, whatever their nitrogen content; or
- not more than 55% nitrocellulose with a nitrogen content above 12.6% by dry mass) are substances of Class 1 (UN Nos. 0340 or 0342) or of Class 4.1 (UN Nos. 2555, 2556 or 2557).

2.2.3.1.5 Viscous liquids

2.2.3.1.5.1 Except as provided for in 2.2.3.1.5.2, viscous liquids which:

- have a flash-point of 23 °C or above and less than or equal to 60 °C;
 - are not toxic, corrosive or environmentally hazardous;
 - contain not more than 20% nitrocellulose provided the nitrocellulose contains not more than 12.6% nitrogen by dry mass; and
 - are packed in receptacles of not more than 450 litre capacity
- are not subject to Annex 2 to SMGS, if:
- a) in the solvent separation test (see Manual of Tests and Criteria, Part III, sub-section 32.5.1), the height of the separated layer of solvent is less than 3% of the total height; and
 - b) the flowtime in the viscosity test (see Manual of Tests and Criteria, Part III, sub-section 32.4.3), with a jet diameter of 6 mm is equal to or greater than:
 - 60 seconds, or
 - 40 seconds, if the viscous liquid contains not more than 60% of Class 3 substances.

2.2.3.1.5.2 Viscous liquids which are also environmentally hazardous, but meet all other criteria in 2.2.3.1.5.1, are not subject to any other provisions of Annex 2 to SMGS when they are carried in single or combination packagings containing a net quantity per single or inner packaging of 5 litres or less, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

2.2.3.1.6 If substances of Class 3, as a result of admixtures, come into categories of risk different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

Note: For the classification of solutions and mixtures (such as preparations and wastes) see also 2.1.3.

2.2.3.1.7 On the basis of the test procedures in accordance with 2.3.3.1 and 2.3.4, and the criteria set out in 2.2.3.1.1, it may also be determined whether the nature of a solution or a mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the provisions for this Class (see also 2.1.3).

2.2.3.2 Substances not accepted for carriage

2.2.3.2.1 Substances of Class 3 which are liable to form peroxides easily (as happens with ethers or with certain heterocyclic oxygenated substances) shall not be accepted for carriage if their peroxide content, calculated as hydrogen peroxide (H₂O₂), exceeds 0.3%. The peroxide content shall be determined as indicated in 2.3.3.3.

2.2.3.2.2 Chemically unstable substances of Class 3 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions. If temperature control is required to prevent polymerization of a substance the substance shall not be accepted for carriage:

- in a packaging or IBC with an SAPT of 50 °C or less,
- or in a tank with an SAPT of 45 °C or less.

2.2.3.2.3 Liquid desensitized explosives other than those listed in Table A of Chapter 3.2 shall not be accepted for carriage as substances of Class 3.

2.2.3.3 List of collective entries

Subsidiary risk	Classification code	UN No.	Name of the substance or article
Flammable liquids and articles containing such substances			
without subsidiary risk F	F1	1133	ADHESIVES containing flammable liquid
		1136	COAL TAR DISTILLATES, FLAMMABLE
		1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining)
		1197	EXTRACTS, LIQUID, for flavour or aroma
		1210	PRINTING INK, flammable or
		1210	PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable
		1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or
		1263	PAINT RELATED MATERIAL (including paint thinning or reducing compound)
		1266	PERFUMERY PRODUCTS with flammable solvents
		1293	TINCTURES, MEDICINAL
		1306	WOOD PRESERVATIVES, LIQUID
		1866	RESIN SOLUTION, flammable
		1999	TARS, LIQUID, including road oils, and cutback bitumens
		3065	ALCOHOLIC BEVERAGES
		3269	POLYESTER RESIN KIT, liquid base material
		3269	POLYESTER RESIN KIT, liquid base material
		1224	KETONES, LIQUID, N.O.S.
		1268	PETROLEUM DISTILLATES, N.O.S. or
		1268	PETROLEUM PRODUCTS, N.O.S.
		1987	ALCOHOLS, N.O.S..
		1989	ALDEHYDES, N.O.S.
		2319	TERPENE HYDROCARBONS, N.O.S
		3271	ETHERS, N.O.S.
		3272	ESTERS, N.O.S.
		3295	HYDROCARBONS, LIQUID, N.O.S..
		3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or
		3336	MERCAPTANS MIXTURE, LIQUID, FLAMMABLE, N.O.S.
		1993	FLAMMABLE LIQUID, N.O.S.
	F2 Elevated temperature	3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S., with flash-point above 60 °C, at or above its flash-point
	Articles F3	3473	FUEL CELL CARTRIDGES or
		3473	FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or
		3473	FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT
		3528	ENGINE, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or
		3528	ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or
		3528	MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or
		3528	MACHINERY, FUEL CELL, FLAMMABLE LIQUID POWERED
		3540	ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.

			1228 MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S. or 1228 MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S. 1986 ALCOHOLS, FLAMMABLE, TOXIC, N.O.S. 1988 ALDEHYDES, FLAMMABLE, TOXIC, N.O.S. 2478 ISOCYANATES, FLAMMABLE, TOXIC, N.O.S. or 2478 ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S. 3248 MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S. 3273 NITRILES, FLAMMABLE, TOXIC, N.O.S. 1992 FLAMMABLE LIQUID, TOXIC, N.O.S.
Toxic FT	FT1		
	pesticide (flash point below 23 °C) FT2		2758 CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2760 ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2762 ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2764 TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2772 THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2776 COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2778 MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2780 SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2782 BIPYRIDILUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2784 ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2787 ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC 3024 COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 3346 PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 3350 PYRETHROID PESTICIDE, LIQUID, FLAMMABLE TOXIC 3021 PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S. <i>Note: The classification of a pesticide under an entry shall be effected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary risks it may exhibit.</i>
Corrosive	FC		3469 PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or 3469 PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning and reducing compound)
			2733 AMINES, FLAMMABLE, CORROSIVE, N.O.S. or 2733 POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S. 2985 CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S. 3274 ALCOHOLATES SOLUTION, N.O.S., in alcohol 2924 FLAMMABLE LIQUID, CORROSIVE, N.O.S.
Toxic, corrosive	FTC		3286 FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.
Liquid desensitized explosive	D		3343 NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMA BLE, N.O.S. with not more than 30% nitroglycerin by mass 3357 NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin by mass 3379 DESENSITIZED EXPLOSIVE, LIQUID, N.O.S.

2.2.41 CLASS 4.1 FLAMMABLE SOLIDS, SELF-REACTIVE SUBSTANCES, POLYMERIZING SUBSTANCES AND SOLID DESENSITIZED EXPLOSIVES

2.2.41.1 Criteria

2.2.41.1.1 The heading of Class 4.1 covers flammable substances and articles, desensitized explosives which are solids according to subparagraph (a) of the definition "solid" in 1.2.1 and self-reactive liquids or solids and polymerizing substances.

The following are assigned to Class 4.1:

- readily flammable solid substances and articles (see paragraphs 2.2.41.1.3 to 2.2.41.1.8);
- self-reactive solids or liquids (see paragraphs 2.2.41.1.9 to 2.2.41.1.16);
- solid desensitized explosives (see 2.2.41.1.18);
- substances related to self-reactive substances (see 2.2.41.1.19);
- polymerizing substances (see 2.2.41.1.20).

2.2.41.1.2 The substances and articles of Class 4.1 are subdivided as follows:

F Flammable solids, without subsidiary risk, and articles containing such substances:

F1 Organic;

F2 Organic, molten;

F3 Inorganic;

F4 Articles;

FO Flammable solids, oxidizing;

FT Flammable solids, toxic:

FT1 Organic, toxic;

FT2 Inorganic, toxic;

FC Flammable solids, corrosive:

FC1 Organic, corrosive;

FC2 Inorganic, corrosive;

D Solid desensitized explosives without subsidiary risk;

DT Solid desensitized explosives, toxic;

SR Self-reactive substances:

SR1 Not requiring temperature control;

SR2 Requiring temperature control.

PM Polymerizing substances:

PM1 Not requiring temperature control;

PM2 Requiring temperature control (not accepted for carriage by rail).

Flammable solids

Definition and properties

2.2.41.1.3 *Flammable solids* are readily combustible solids and solids which may cause fire through friction.

Readily combustible solids are powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly. The danger may come not only from the fire but also from toxic combustion products. Metal powders are especially dangerous

because of the difficulty of extinguishing a fire since normal extinguishing agents such as carbon dioxide or water can increase the hazard.

Metal powders are powders of metals or metal alloys.

Classification

2.2.41.1.4 Substances and articles classified as flammable solids of Class 4.1 are listed in Table A of Chapter 3.2. The assignment of organic substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of 2.2.41.3 in accordance with the provisions of Chapter 2.1 can be based on experience or on the results of the test procedures in accordance with Part III, sub-section 33.2. of the Manual of Tests and Criteria. The assignment of inorganic substances not mentioned by name shall be based on the results of the test procedures in accordance with Part III, sub-section 33.2. of the Manual of Tests and Criteria; experience shall also be taken into account when it leads to a more stringent assignment.

2.2.41.1.5 When substances not mentioned by name are assigned to one of the entries listed in 2.2.41.3 on the basis of the test procedures in accordance with the Manual of Tests and Criteria, Part III, sub-section 33.2., the following criteria apply:

- a) With the exception of metal powders, powdery, granular or pasty substances shall be classified as readily flammable substances of Class 4.1 if they can be easily ignited by brief contact with an ignition source (e.g. a burning match), or if, in the event of ignition, the flame spreads rapidly, the burning time is less than 45 seconds for a measured distance of 100 mm or the rate of burning is greater than 2.2 mm/s.
- b) Metal powders shall be assigned to Class 4.1 if they can be ignited by a flame and the reaction spreads over the whole length of the sample in 10 minutes or less.

Solids which may cause fire through friction shall be classified in Class 4.1 by analogy with existing entries (e.g. matches) or in accordance with any appropriate special provision.

2.2.41.1.6 On the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, Section 33.2.1 and the criteria set out in 2.2.41.1.4 and 2.2.41.1.5, it may also be determined whether the nature of a substance mentioned by name is such that the substance is not subject to the provisions for Class 4.1.

2.2.41.1.7 If substances of Class 4.1, as a result of admixtures, come into different categories of risk from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

Note: For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.

Assignment of packaging groups

2.2.41.1.8 Flammable solids classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, sub-section 33.2, in accordance with the following criteria:

- a) Readily flammable solids which, when tested, have a burning time of less than 45 seconds over a measured distance of 100 mm shall be assigned to:
 - Packing group II: if the flame passes the wetted zone;
 - Packing group III: if the wetted zone stops the flame for at least four minutes;
- b) Metal powders shall be assigned to:
 - Packing group II: if, when tested, the reaction spreads over the whole length of the sample in five minutes or less;

Packing group III: if, when tested, the reaction spreads over the whole length of the sample in more than five minutes.

For solids which may cause fire through friction, the packing group shall be assigned by analogy with existing entries or in accordance with any special provision.

Self-reactive substances

Definitions

2.2.41.1.9 For the purposes of Annex 2 to SMGS, self-reactive substances are thermally unstable substances liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). Substances are not considered to be self-reactive substances of Class 4.1, if:

- a) they are explosives according to the criteria of Class 1;
- b) they are oxidizing substances according to the classification procedure for Class 5.1 (see 2.2.51.1) except that mixtures of oxidizing substances which contain 5% or more of combustible organic substances shall be subjected to the classification procedure defined in Note 2;
- c) they are organic peroxides according to the criteria of Class 5.2 (see 2.2.52.1);
- d) their heat of decomposition is less than 300 J/g;
- e) their self-accelerating decomposition temperature (SADT) (see Note 3 below) is greater than 75 °C for a 50 kg package.

Note 1: *The heat of decomposition can be determined using any internationally recognised method e.g. differential scanning calorimetry and adiabatic calorimetry.*

Note 2: *Mixtures of oxidizing substances meeting the criteria of Class 5.1 which contain 5% or more of combustible organic substances, which do not meet the criteria mentioned in (a), (c), (d) or (e) above, shall be subjected to the self-reactive substance classification procedure.*

A mixture showing the properties of a self-reactive substance, type B to F, shall be classified as a self-reactive substance of Class 4.1.

A mixture showing the properties of a self-reactive substance, type G, according to the principle given in section 20.4.3 (g) of Part II of the Manual of Tests and Criteria shall be considered for classification as a substance of Class 5.1 (see 2.2.51.1).

Note 3: *The self-accelerating decomposition temperature (SADT) is the lowest temperature at which self-accelerating decomposition may occur with a substance in the packaging as used during carriage. Requirements for the determination of the SADT are given in the Manual of Tests and Criteria, Part II, Chapter 20 and section 28.4.*

Note 4: *Any substance which shows the properties of a self-reactive substance shall be classified as such, even if this substance gives a positive test result according to 2.2.42.1.5 for inclusion in Class 4.2.*

Properties

2.2.41.1.10 The decomposition of self-reactive substances can be initiated by heat, contact with catalytic impurities (e.g. acids, heavy-metal compounds, bases), friction or impact. The rate of decomposition increases with temperature and varies with the substance. Decomposition, particularly if no ignition occurs, may result in the evolution of toxic gases or vapours. For certain self-reactive substances, the temperature shall be controlled.

Some self-reactive substances may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Certain self-reactive substances burn vigorously. Self-reactive substances are, for example, some compounds of the types listed below:

- aliphatic azo compounds ($-C-N=N-C-$);
- organic azides ($-C-N_3$);
- diazonium salts ($-CN_2^+Z^-$);
- N-nitroso compounds ($-N-N=O$);
- aromatic sulphonylhydrazides ($-SO_2-NH-NH_2$).

This list is not exhaustive and substances with other reactive groups and some mixtures of substances may have similar properties.

Classification

2.2.41.1.11 Self-reactive substances are classified into seven types according to the degree of danger they present. The types of self-reactive substances range from type A, which is not accepted for carriage in the packaging in which it is tested, to type G, which is not subject to the provisions for self-reactive substances of Class 4.1. The classification of types B to F is directly related to the maximum quantity allowed in one packaging. The principles to be applied for classification as well as the applicable classification procedures, test methods and criteria and an example of a suitable test report are given in Part II of the Manual of Tests and Criteria.

2.2.41.1.12 Self-reactive substances which have already been classified and are already permitted for carriage in packagings are listed in 2.2.41.4, those already permitted for carriage in IBCs are listed in 4.1.4.2, packing instruction IBC520 and those already permitted for carriage in tanks according to Chapter 4.2 are listed in 4.2.5.2, portable tank instruction T23. Each permitted substance listed is assigned to a generic entry of Table A of Chapter 3.2 (UN Nos. 3221 to 3240) and appropriate subsidiary risks and remarks providing relevant transport information are given.

The collective entries specify:

- self-reactive substances types B, C, D, E, F see 2.2.41.1.11;
- physical state (liquid/solid).

The classification of the self-reactive substances listed in 2.2.41.4 is based on the technically pure substance (except where a concentration of less than 100% is specified).

2.2.41.1.13 Classification of self-reactive substances not listed in 2.2.41.4, 4.1.4.2, packing instruction IBC520 or 4.2.5.2, portable tank instruction T23 and assignment to a collective entry shall be made by the competent authority of the country of origin on the basis of a test report. The statement of approval shall contain the classification and the relevant conditions of carriage. If the country of origin is not an SMGS Contracting State, the classification and the conditions of carriage shall be recognized by the competent authority of the first SMGS Contracting State reached by the consignment.

2.2.41.1.14 Activators, such as zinc compounds, may be added to some self-reactive substances to change their reactivity. Depending on both the type and the concentration of the activator, this may result in a decrease in thermal stability and a change in explosive properties. If either of these properties is altered, the new formulation shall be assessed in accordance with the classification procedure.

2.2.41.1.15 Samples of self-reactive substances or formulations of self-reactive substances not listed in 2.2.41.4, for which a complete set of test results is not available and which are to be carried for further testing or evaluation, shall be assigned to one of the appropriate entries for self-reactive substances type C provided the following conditions are met:

- the available data indicate that the sample would be no more dangerous than self-reactive substances type B;

- the sample is packaged in accordance with packing method OP2 and the quantity per wagon is limited to 10 kg;

Samples requiring temperature control shall not be accepted for carriage by rail.

Desensitization

2.2.41.1.16 In order to ensure safety during carriage, self-reactive substances are in many cases desensitized by use of a diluent. Where a percentage of a substance is stipulated, this refers to the percentage by mass, rounded to the nearest whole number. If a diluent is used, the self-reactive substance shall be tested with the diluent present in the concentration and form used in carriage. Diluents which may allow a self-reactive substance to concentrate to a dangerous extent in the event of leakage from a packaging shall not be used. Any diluent shall be compatible with the self-reactive substance. In this regard, compatible diluents are those solids or liquids which have no detrimental influence on the thermal stability and hazard type of the self-reactive substance.

2.2.41.1.17 (Reserved)

Solid desensitized explosives

2.2.41.1.18 Solid desensitized explosives are substances which are wetted with water or alcohols or are diluted with other substances to suppress their explosive properties. Such entries in Table A of Chapter 3.2 are: UN Nos. 1310, 1320, 1321, 1322, 1336, 1337, 1344, 1347, 1348, 1349, 1354, 1355, 1356, 1357, 1517, 1571, 2555, 2556, 2557, 2852, 2907, 3317, 3319, 3344, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3376, 3380 and 3474.

Substances related to self-reactive substances

2.2.41.1.19 Substances that:

- a) have been provisionally accepted into Class 1 according to Test Series 1 and 2 but exempted from Class 1 by Test Series 6;
 - b) are not self-reactive substances of Class 4.1;
 - c) are not substances of Classes 5.1 or 5.2,
- are also assigned to Class 4.1. UN Nos. 2956, 3241, 3242 and 3251 are such entries.

Polymerizing substances

Polymerizing substances

2.2.41.1.20 Polymerizing substances are substances which, without stabilization, are liable to undergo a strongly exothermic reaction resulting in the formation of larger molecules or resulting in the formation of polymers under conditions normally encountered in carriage. Such substances are considered to be polymerizing substances of Class 4.1 when:

- a) Their self-accelerating polymerization temperature (SAPT) is 75 °C or less under the conditions (with or without chemical stabilization as offered for carriage) and in the packaging, IBC or tank in which the substance or mixture is to be carried;
- b) They exhibit a heat of reaction of more than 300 J/g; and
- c) They do not meet any other criteria for inclusion in classes 1 to 8.

A mixture meeting the criteria of a polymerizing substance shall be classified as a polymerizing substance of Class 4.1.

Temperature control requirements

2.2.41.1.21 (reserved)

2.2.41.2 Substances not accepted for carriage

2.2.41.2.1 The chemically unstable substances of Class 4.1 shall not be accepted for carriage unless the necessary steps have been taken to prevent their dangerous decomposition or polymerization during carriage. To this end, it shall in particular be ensured that receptacles and tanks do not contain any substance liable to promote these reactions.

2.2.41.2.2 Flammable solids, oxidizing, assigned to UN No. 3097 shall not be accepted for carriage unless they meet the requirements for Class 1 (see also 2.1.3.7).

2.2.41.2.3 The following substances shall not be accepted for carriage:

- Self-reactive substances of type A (see Manual of Tests and Criteria, Part II, paragraph 20.4.2 (a));
- Phosphorus sulphides which are not free from yellow and white phosphorus;

Solid densitized explosives other than those listed in Table A of Chapter 3.2;

- Inorganic flammable substances in the molten form other than UN No. 2448 SULPHUR, MOLTEN.

The following self-reactive substances shall not be accepted for carriage by rail:

- Barium azide with a water content less than 50% (mass);
- Self-reactive substances with an SADT ≤ 55 °C, therefore requiring temperature control:

UN 3231 SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED;

UN 3232 SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED;

UN 3233 SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED;

UN 3234 SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED;

UN 3235 SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED;

UN 3236 SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED;

UN 3237 SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED;

UN 3238 SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED;

UN 3239 SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED;

UN 3240 SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED;

UN 3238 SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED;

- Polymerizing substances in packagings or IBCs with an SAPT ≤ 50 °C and polymerizing substances in tanks with an SAPT ≤ 45 °C, therefore requiring temperature control:

UN 3533 POLYMERIZING SUBSTANCE, SOLID, TEMPERATURE CONTROLLED, N.O.S;

UN 3534 POLYMERIZING SUBSTANCE, LIQUID, TEMPERATURE CONTROLLED, N.O.S.

2.2.41.3 List of collective entries

Subsidiary risk	Classification code	UN No.	Name of substance or article
Flammable Solids F	without subsidiary risk	organic F1	3527 POLYESTER RESIN KIT, solid base material 3175 SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S. 1353 FIBRES IMPREGNATED WITH WEAKLY NI-TRATED NITROCELLULOSE, N.O.S. or 1353 FABRICS IMPREGNATED WITH WEAKLY NI-TRATED NITROCELLULOSE, N.O.S. 1325 FLAMMABLE SOLID, ORGANIC, N.O.S.
		organic molten F2	3176 FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.
		inorganic F3	3089 METAL POWDER, FLAMMABLE, N.O.S.(a),(b) 3181 METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S. 3182 METAL HYDRIDES, FLAMMABLE, N.O.S.(c) 3178 FLAMMABLE SOLID, INORGANIC, N.O.S.
		articles F4	3527 POLYESTER RESIN KIT, solid base material 3541 ARTICLES CONTAINING FLAMMABLE SOLID, N.O.S.
	oxidizing	F0	3097 FLAMMABLE SOLID, OXIDIZING, N.O.S. (not accepted for carriage, see 2.2.41.2.2)
	organic	FT1	2926 FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.
	inorganic	FT2	3179 FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S..
	toxic FT	FC1	2925 FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.
	corrosive FC	FC2	3180 FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.
	without subsidiary risk	D	3319 NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin by mass 3344 PENTAERYTHRITATE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE, PETN) MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN by mass 3380 DESENSITIZED EXPLOSIVE, SOLID, N.O.S.
Solid desensitized explosives	toxic	DT	Only substances listed in Table A of Chapter 3.2 are to be accepted for carriage as substances of Class 4.1
Self-reactive substances SR	not requiring temperature control	SR1	SELF-REACTIVE LIQUID TYPE A (not accepted for carriage, see 2.2.41.2.3) SELF-REACTIVE SOLID TYPE A (not accepted for carriage, see 2.2.41.2.3) 3221 SELF-REACTIVE LIQUID TYPE B 3222 SELF-REACTIVE SOLID TYPE B 3223 SELF-REACTIVE LIQUID TYPE C 3224 SELF-REACTIVE SOLID TYPE C 3225 SELF-REACTIVE SOLID TYPE C 3226 SELF-REACTIVE SOLID TYPE D 3227 SELF-REACTIVE LIQUID TYPE E 3228 SELF-REACTIVE SOLID TYPE E 3229 SELF-REACTIVE LIQUID TYPE F 3230 SELF-REACTIVE SOLID TYPE F SELF-REACTIVE LIQUID TYPE G (not subject to the provisions applicable to Class 4.1, see 2.2.41.1.11) SELF-REACTIVE SOLID TYPE G (not subject to the provisions applicable to Class 4.1, see 2.2.41.1.11)

	requiring temperature control	SR2	3231	SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
			3232	SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
			3233	SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
			3234	SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
			3235	SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
			3236	SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
			3237	SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
			3238	SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
			3239	SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
			3240	SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.41.2.3)
Polymerizing substances PM	not requiring temperature control	PM1	3531 3531 POLYMERIZING SUBSTANCE, SOLID, STABILIZED, N.O.S; 3532 3532 POLYMERIZING SUBSTANCE, LIQUID, STABILIZED, N.O.S;	
	requiring temperature control	PM2	3533 3533 POLYMERIZING SUBSTANCE, SOLID, TEMPERATURE CONTROLLED, N.O.S. (not accepted for carriage by rail, see 2.2.41.2.3) 3534 3534 POLYMERIZING SUBSTANCE, LIQUID, TEMPERATURE CONTROLLED, N.O.S. (not accepted for carriage by rail, see 2.2.41.2.3)	

- a) *Metals and metal alloys in powdered or other flammable form, liable to spontaneous combustion, are substances of Class 4.2.*
- b) *Metals and metal alloys in powdered or other flammable form, which in contact with water, emit flammable gases, are substances of Class 4.3.*
- c) *Metals hydrides which, in contact with water, emit flammable gases, are substances of Class 4.3. Aluminium borohydride or aluminium borohydride in devices are substances of Class 4.2, UN No. 2870.*

2.2.41.4 List of currently assigned self-reactive substances (with UN numbers) in packagings.

In the column "Packing Method", codes "OP1" to "OP8" refer to packing methods in 4.1.4.1, packing instruction P520 (see also 4.1.7.1). Self-reactive substances to be carried shall fulfil the classification as listed. For substances permitted in IBCs, see 4.1.4.2, packing instruction IBC520 and, for those permitted in tanks according to Chapter 4.2, see 4.2.5.6, portable tank instruction T23. The formulations not listed in this subsection but listed in packing instruction IBC 520 of 4.1.4.2 and in portable tank instruction T 23 of 4.2.5.2.6 may also be carried packed in accordance with packing method OP8 of packing instruction P 520 of 4.1.4.1.

Note: *The classification given in this table is based on the technically pure substance (except where a concentration of less than 100% is specified). For other concentrations, the substance may be classified differently following the procedures given in Part II of the Manual of Tests and Criteria.*

NAME OF THE SUBSTANCE	Concentration (%)	Packing method	UN No	Remarks
ACETONE-PYROGALLOL COPOLYMER 2-DIAZO-1-NAPHTHOL-5-SULPHONATE	100	OP8	3228	
AZODICARBONAMIDE FORMULATION TYPE B, TEMPERATURE CONTROLLED	< 100		3232	prohibited
AZODICARBONAMIDE FORMULATION TYPE C	< 100	OP6	3224	(3)
AZODICARBONAMIDE FORMULATION TYPE C, TEMPERATURE CONTROLLED	< 100		3234	prohibited
AZODICARBONAMIDE FORMULATION TYPE D	< 100	OP7	3226	(5)
AZODICARBONAMIDE FORMULATION TYPE D, TEMPERATURE CONTROLLED	< 100		3236	prohibited
2,2'-AZODI(2,4-DIMETHYL-4-METHOXYVALERONITRILE)	100		3236	prohibited
2,2'-AZODI(2,4-DIMETHYLVALERONITRILE)	100		3236	prohibited
2,2'-AZODI(ETHYL-2-METHYLPROPIONATE)	100		3235	prohibited
1,1-AZODI(HEXAHYDROBENZONITRILE)	100	OP7	3226	
2,2'-AZODI(ISOBUTYRONITRILE	100		3234	prohibited
2,2'-AZODI(ISOBUTYRONITRILE) as a water based paste	≤ 50	OP6	3224	
2,2'-AZODI(2-METHYLBUTYRO-NITRILE)	100		3236	prohibited
BENZENE-1,3-DISULPHONYL HYDRAZIDE, as a paste	52	OP7	3226	
BENZENE SULPHONYL HYDRAZIDE	100	OP7	3226	
4-(BENZYL(ETHYL)AMINO)-3-ETHOXY-BENZENEDIAZONIUM ZINC CHLORIDE	100	OP7	3226	

NAME OF THE SUBSTANCE	Concentration (%)	Packing method	UN No	Remarks
4-(BENZYL(METHYL)AMINO)-3-ETHOXYBENZENEDIAZONIUM ZINC CHLORIDE	100		3236	prohibited
3-CHLORO-4-DIETHYLAMINO BENZENE-DIAZONIUM ZINC CHLORIDE	100	OP7	3226	
2-DIAZO-1-NAPHTHOL-4-SULPHONYL CHLORIDE	100	OP5	3222	(2)
2-DIAZO-1-NAPHTHOL-5-SULPHONYL CHLORIDE	100	OP5	3222	(2)
2-DIAZO-1-NAPHTHOL SULPHONIC ACID ESTER MIXTURE, TYPE D	< 100	OP7	3226	(9)
2,5-DIBUTOXY-4-(4-MORPHOLINY)-BENZENEDIAZONIUM, TETRACHLOROZIN-CATE (2:1)	100	OP8	3228	
2,5-DIETHOXY-4-MORPHOLINO-BENZENEDIAZONIUM ZINC CHLORIDE	67 – 100		3236	prohibited
2,5-DIETHOXY-4-MORPHOLINO-BENZENEDIAZONIUM ZINC CHLORIDE	66		3236	prohibited
2,5-DIETHOXY-4-MORPHOLINO-BENZENEDIAZONIUM TETRAFLUOROBORATE	100		3236	prohibited
2,5-DIETHOXY-4-(4-MORPHOLINY)-BENZENEDIAZONIUM SULPHATE	100	OP7	3226	
2,5-DIETHOXY-4-(PHENYLSULPHONYL)-BENZENEDIAZONIUM ZINC CHLORIDE	67		3236	prohibited
DIETHYLENEGLYCOL BIS (ALLYL CARBONATE) + DI-ISOPROPYLPEROXYDICARBONATE	≥ 88 ≤ 12		3237	prohibited
2,5-DIMETHOXY-4-(4-METHYL-PHENYLSULPHONYL)BENZENEDIAZONIUM ZINC CHLORIDE	79		3236	prohibited
4-(DIMETHYLAMINO)-BENZENEDIAZONIUM TRICHLOROZINCATE (-1)	100	OP8	3228	
4-DIMETHYLAMINO-6-(2-DIMETHYL-AMINOETHOXY) TOLUENE-2-DIAZONIUM ZINC CHLORIDE	100		3236	prohibited
N,N'-DINITROSO-N,N'-DIMETHYL TEREPHTHALAMIDE, as a paste	72	OP6	3224	
N,N'-DINITROSOPENTAMETHYLENE-TETRAMINE	82	OP6	3224	(7)
DIPHENYLOXIDE-4,4'-DISULPHONYL HYDRAZIDE	100	OP7	3226	
4-DIPROPYLAMINO BENZENEDIAZONIUM ZINC CHLORIDE	100	OP7	3226	

NAME OF THE SUBSTANCE	Concentration (%)	Packing method	UN No	Remarks
2-(N,N-ETHOXYCARBONYL-PHENYLAMINO)-3-METHOXY-4-(N-METHYL-N-CYCLOHEXYLAMINO) BENZENEDIAZONIUM ZINC CHLORIDE	63 – 92		3236	prohibited
2-(N,N-ETHOXYCARBONYL-PHENYLAMINO)-3-METHOXY-4-(N-METHYL-N-CYCLOHEXYLAMINO) BENZENEDIAZONIUM ZINC CHLORIDE	62		3236	prohibited
N-FORMYL-2-(NITROMETHYLENE)-1,3-PERHYDROTHIAZINE	100		3236	prohibited
2-(2-HYDROXYETHOXY)-1-(PYRROLIDIN-1-YL)BENZENE-4-DIAZONIUM ZINC CHLORIDE	100		3236	prohibited
3-(2-HYDROXYETHOXY)-4-(PYRROLIDIN-1-YL)BENZENE DIAZONIUM ZINC CHLORIDE	100		3236	prohibited
(7-METHOXY-5-METHYL-BENZOTHIOPHEN-2-YL) BORONIC ACID	88 – 100	OP7	3230	(11)
2-(N,N-METHYLAMINOETHYL-CARBONYL)-4-(3,4-DIMETHYL-PHENYLSULPHONYL)BENZENEDIAZONIUM HYDROGEN SULPHATE	96		3236	prohibited
4-METHYLBENZENESULPHONYL-HYDRAZIDE	100	OP7	3226	
3-METHYL-4-(PYRROLIDIN-1YL) BENZENEDIAZONIUM TETRAFLUOROBORATE	95		3234	prohibited
PHOSPHOROTHIOIC ACID, O-[(CYANOPHENYL METHYLENE) AZANYL] O,O-DIETHYL ESTER	82 – 91 (Z isomer)	OP8	3227	(10)
SODIUM 2-DIAZO-1-NAPHTHOL-4-SULPHONATE	100	OP7	3226	
SODIUM 2-DIAZO-1-NAPHTHOL-5-SULPHONATE	100	OP7	3226	
4-NITROSOPHENOL	100		3236	prohibited
SELF-REACTIVE LIQUID, SAMPLE		OP2	3223	(8)
SELF-REACTIVE LIQUID, SAMPLE, TEMPERATURE CONTROLLED			3233	prohibited
SELF-REACTIVE SOLID, SAMPLE		OP2	3224	(8)
SELF-REACTIVE SOLID, SAMPLE, TEMPERATURE CONTROLLED			3234	prohibited
TETRAMINE PALLADIUM (II) NITRATE	100		3234	prohibited

Remarks:

- (1) (Reserved)
- (2) "EXPLOSIVE" subsidiary risk label required (Model No. 1, see 5.2.2.2.2).
- (3) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (c) of the Manual of Tests and Criteria.
- (4) (Reserved)
- (5) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (d) of the Manual of Tests and Criteria.
- (6) (Reserved)
- (7) With a compatible diluent having a boiling point of not less than 150 °C.
- (8) See 2.2.41.1.15.
- (9) This entry applies to mixtures of esters of 2-diazo-1-naphthol-4-sulphonic acid and 2-diazo-1-naphthol- 5 sulphonic acid which fulfil the criteria of paragraph 20.4.2 (d) of the Manual of Test
- (10) This entry applies to the technical mixture in n-butanol within the specified concentration limits of the (Z) isomer.
- (11) The technical compound with the specified concentration limits may contain up to 12 % water and up to 1 % organic impurities.

2.2.42 CLASS 4.2. SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION

2.2.42.1 Criteria

2.2.42.1.1 The heading of Class 4.2 covers:

- Pyrophoric substances which are substances, including mixtures and solutions (liquid or solid), which even in small quantities ignite on contact with air within five minutes. These are the Class 4.2 substances the most liable to spontaneous combustion; and
- Self-heating substances and articles which are substances and articles, including mixtures and solutions, which, on contact with air, without energy supply, are liable to self-heating. These substances will ignite only in large amounts (kilogrammes) and after long periods of time (hours or days).

2.2.42.1.2 The substances and articles of Class 4.2 are subdivided as follows:

- S Substances liable to spontaneous combustion, without subsidiary risk, articles containing such substances:
 - S1 Organic, liquid;
 - S2 Organic, solid;
 - S3 Inorganic, liquid;
 - S4 Inorganic, solid;
 - S5 Organometallic
 - S6 Articles
- SW Substances liable to spontaneous combustion, which, in contact with water, emit flammable gases, and articles containing such substances:
 - SW1 Substances;
 - SW2 Articles;
- SO Substances liable to spontaneous combustion, oxidizing;
- ST Substances liable to spontaneous combustion, toxic:
 - ST1 Organic, toxic, liquid;
 - ST2 Organic, toxic, solid;
 - ST3 Inorganic, toxic, liquid;
 - ST4 Inorganic, toxic, solid;
- SC Substances liable to spontaneous combustion, corrosive:
 - SC1 Organic, corrosive, liquid;
 - SC2 Organic, corrosive, solid;
 - SC3 Inorganic, corrosive, liquid;
 - SC4 Inorganic, corrosive, solid.

Properties

- 2.2.42.1.3** Self-heating of a substance is a process where the gradual reaction of that substance with oxygen (in air) generates heat. If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance will rise which, after an induction time, may lead to self-ignition and combustion.

Classification

- 2.2.42.1.4** Substances and articles classified in Class 4.2 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant specific n.o.s. entry of 2.2.42.3 in accordance with the provisions of Chapter 2.1 can be based on experience or the results of the test procedures in accordance with the Manual of Tests and Criteria, Part III, sub-section 33.4. Assignment to general n.o.s. entries of Class 4.2 shall be based on the results of the test procedures

in accordance with the Manual of Tests and Criteria, Part III, sub-section 33.4; experience shall also be taken into account when it leads to a more stringent assignment.

- 2.2.42.1.5** When substances or articles not mentioned by name are assigned to one of the entries listed in 2.2.42.3 on the basis of the test procedures in accordance with the Manual of Tests and Criteria, Part III, sub-section 33.4, the following criteria shall apply:
- Solids liable to spontaneous combustion (pyrophoric) shall be assigned to Class 4.2 when they ignite on falling from a height of 1 m or within five minutes;
 - Liquids liable to spontaneous combustion (pyrophoric) shall be assigned to Class 4.2 when:
 - on being poured on an inert carrier, they ignite within five minutes, or
 - in the event of a negative result of the test according to (i), when poured on a dry, indented filter paper (Whatman No. 3 filter), they ignite or carbonize it within five minutes;
 - Substances in which, in a 10 cm sample cube, at 140 °C test temperature, spontaneous combustion or a rise in temperature to over 200 °C is observed within 24 hours shall be assigned to Class 4.2. This criterion is based on the temperature of the spontaneous combustion of charcoal, which is at 50 °C for a sample cube of 27 m³. Substances with a temperature of spontaneous combustion higher than 50 °C for a volume of 27 m³ are not to be assigned to Class 4.2.

Note 1: *Substances carried in packages with a volume of not more than 3 m³ are exempted from Class 4.2 if, tested with a 10 cm sample cube at 120 °C, no spontaneous combustion nor a rise in temperature to over 180 °C is observed within 24 hours.*

Note 2: *Substances carried in packages with a volume of not more than 450 litres are exempted from Class 4.2 if, tested with a 10 cm sample cube at 100 °C, no spontaneous combustion nor a rise in temperature to over 160 °C is observed within 24 hours.*

Note 3: *Since organometallic substances can be classified in Class 4.2 or 4.3 with additional subsidiary risks, depending on their properties, a specific classification flow chart for these substances is given in 2.3.5.*

- 2.2.42.1.6** If substances of Class 4.2, as a result of admixtures, come into different categories of risk from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

Note: For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.

- 2.2.42.1.7** On the basis of the test procedure in the Manual of Tests and Criteria, Part III, sub-section 33.4 and the criteria set out in 2.2.42.1.5, it may also be determined whether the nature of a substance mentioned by name is such that the substance is not subject to the provisions for this Class.

Assignment of packing groups

- 2.2.42.1.8** Substances and articles classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, sub-section 33.4, in accordance with the following criteria:
- Substances liable to spontaneous combustion (pyrophoric) shall be assigned to packing group I;
 - Self-heating substances and articles in which, in a 2.5 cm sample cube, at 140 °C test temperature, spontaneous combustion or a rise in temperature to over 200 °C is observed within 24 hours, shall be assigned to packing group II; Substances with a temperature of spontaneous combustion higher than 50 °C for a volume of 450 litres are not to be assigned to packing group II;

- c) Slightly self-heating substances in which, in a 2.5 cm sample cube, the phenomena referred to under (b) are not observed, in the given conditions, but in which in a 10 cm sample cube at 140 °C test temperature spontaneous combustion or a rise in temperature to over 200 °C is observed within 24 hours, shall be assigned to packing group III.

2.2.42.2 Substances not accepted for carriage

The following substances shall not be accepted for carriage:

- UN No. 3255 tert-BUTYL HYPOCHLORITE; and
- Self-heating solids, oxidizing, assigned to UN No. 3127 unless they meet the requirements for Class 1 (see 2.1.3.7).

2.2.42.3 List of collective entries

Subsidiary risk		Classification code	UN No	Name of the substance or article
Substances liable to spontaneous combustion, and articles containing such substances				
Without subsidiary risk S	organic	liquid S1	2845	PYROPHORIC LIQUID, ORGANIC, N.O.S.
			3183	SELF-HEATING LIQUID, ORGANIC, N.O.S.
		solid S2	1373	FIBRES or FABRICS, ANIMAL or VEGETABLE or SYNTHETIC, N.O.S. with oil
			2006	PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.
			3313	ORGANIC PIGMENTS, SELF HEATING
			2846	PYROPHORIC SOLID, ORGANIC, N.O.S.
	3088	SELF-HEATING SOLID, ORGANIC, N.O.S.		
	inorganic	liquid S3	3194	PYROPHORIC LIQUID, INORGANIC, N.O.S.
			3186	SELF-HEATING LIQUID, INORGANIC, N.O.S.
		solid S4	1383	PYROPHORIC METAL, N.O.S. or
			1383	PYROPHORIC ALLOY, N.O.S.
			1378	METAL CATALYST, WETTED with a visible excess of liquid
			2881	METAL CATALYST, DRY
	3189		METAL POWDER, SELF-HEATING, N.O.S. ^(a)	
	3205		ALKALINE EARTH METAL ALCOHOLATES, N.O.S.	
	3200		PYROPHORIC SOLID, INORGANIC, N.O.S.	
3190	SELF-HEATING SOLID, INORGANIC, N.O.S.			
Organo-metallic	S5		3391	ORGANOMETALLIC SUBSTANCE, SOLID, PYRO PHORIC
		3392	ORGANOMETALLIC SUBSTANCE, LIQUID, PYRO PHORIC	
		3400	ORGANOMETALLIC SUBSTANCE, SOLID, SELF- HEATING	
Articles	S6	3452	ARTICLES CONTAINING A SUBSTANCE LIABLE TO SPONTANEOUS COMBUSTION, N.O.S.	
Water-reactive Substances	SW1	3393	ORGANOMETALLIC SUBSTANCE, SOLID, PYRO- PHORIC, WATER- REACTIVE	
		3394	ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE	
	Articles	SW2	(No collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to the table of precedence of hazard in 2.1.3.10.)	
Oxidizing	organic	liquid ST1	3127	SELF-HEATING SOLID, OXIDIZING, N.O.S. (not accepted for carriage, see 2.2.42.2)
			3184	SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.
		solid ST2	3128	SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.

Toxic ST	inorganic	liquid	ST3	3187	SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.
		solid	ST4	3191	SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.
Corrosive SC	organic	liquid	SC1	3185	SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.
		solid	SC2	3126	SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.
	inorganic	liquid	SC3	3188	SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.K
		solid	SC4	3206	ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.
				3192	SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.

Note: ^(a) Dust and powder of metals, non toxic in a non-spontaneous combustible form which nevertheless, in contact with water, emit flammable gases, are substances of Class 4.3.

2.2.43 CLASS 4.3. SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

2.2.43.1 Criteria

2.2.43.1.1 The heading of Class 4.3 covers substances which react with water to emit flammable gases liable to form explosive mixtures with air, and articles containing such substances.

2.2.43.1.2 Substances and articles of Class 4.3 are subdivided as follows:

W Substances which, in contact with water, emit flammable gases, without subsidiary risk, and articles containing such substances:

W1 Liquid;

W2 Solid;

W3 Articles;

WF1 Substances which, in contact with water, emit flammable gases, liquid, flammable;

WF2 Substances which, in contact with water, emit flammable gases, solid, flammable;

WS Substances which, in contact with water, emit flammable gases, solid, self-heating;

WO Substances which, in contact with water, emit flammable gases, oxidizing, solid;

WT Substances which, in contact with water, emit flammable gases, toxic:

WT1 Liquid;

WT2 Solid;

WC Substances which, in contact with water, emit flammable gases, corrosive:

WC1 Liquid;

WC2 Solid;

WFC Substances which, in contact with water, emit flammable gases, flammable, corrosive.

Properties

2.2.43.1.3 Certain substances in contact with water may emit flammable gases that can form explosive mixtures with air. Such mixtures are easily ignited by all ordinary sources of ignition, for example naked lights, sparking handtools or unprotected lamps. The resulting blast wave and flames may endanger people and the environment. The test method referred to in 2.2.43.1.4 below is used to determine whether the reaction of a substance with water leads to the development of a dangerous amount of gases which may be flammable. This test method shall not be applied to pyrophoric substances.

Classification

2.2.43.1.4 Substances and articles classified in Class 4.3 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of 2.2.43.3 in accordance with the provisions of Chapter 2.1 shall be based on the results of the test procedure in accordance with the Manual of Tests and Criteria, Part III, sub-section 33.5; experience shall also be taken into account when it leads to a more stringent assignment.

2.2.43.1.5 When substances not mentioned by name are assigned to one of the entries listed in 2.2.43.3 on the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, sub-section 33.5, the following criteria shall apply:

A substance shall be assigned to Class 4.3 if:

- spontaneous ignition of the gas emitted takes place in any step of the test procedure;
- there is an evolution of flammable gas at a rate greater than 1 litre per kilogramme of the substance to be tested per hour.

Note: Since organometallic substances can be classified in Class 4.2 or 4.3 with additional subsidiary risks, depending on their properties, a specific classification flow chart for these substances is given in 2.3.5.

2.2.43.1.6 If substances of Class 4.3, as a result of admixtures, come into different categories of risk from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

Note: For the classification of solutions and mixtures (such as preparations and wastes) see also 2.1.3.

- 2.2.43.1.7** On the basis of the test procedures in accordance with the Manual of Tests and Criteria, Part III, sub-section 33.5, and the criteria set out in 2.2.43.1.5, it may also be determined whether the nature of a substance mentioned by name is such that the substance is not subject to the provisions for this Class.

Assignment of packing groups

- 2.2.43.1.8** Substances and articles classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, sub-section 33.5, in accordance with the following criteria:

- a) Packing group I shall be assigned to any substance which reacts vigorously with water at ambient temperature and generally demonstrates a tendency for the gas produced to ignite spontaneously, or one which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 litres per kilogramme of substance over any one minute period;
- b) Packing group II shall be assigned to any substance which reacts readily with water at ambient temperature such that the maximum rate of evolution of flammable gas is equal to or greater than 20 litres per kilogramme of substance per hour, and which does not meet the criteria of packing group I;
- c) Packing group III shall be assigned to any substance which reacts slowly with water at ambient temperature such that the maximum rate of evolution of flammable gas is greater than 1 litre per kilogramme of substance per hour, and which does not meet the criteria of packing groups I or II.

2.2.43.2 Substances not accepted for carriage

Water-reactive solids, oxidizing, assigned to UN No. 3133 shall not be accepted for carriage unless they meet the requirements for Class 1 (see also 2.1.3.7).

2.2.43.3 List of collective entries

Subsidiary risk	Classification code	UN No	Name of the substance or article
Substances which, in contact with water, emit flammable gases, and articles containing such substances			
Without subsidiary risk W	liquid	W1	1389 ALKALI METAL AMALGAM, LIQUID 1391 ALKALI METAL DISPERSION or 1391 ALKALINE EARTH METAL DISPERSION 1392 ALKALINE EARTH METAL AMALGAM, LIQUID 1420 POTASSIUM METAL ALLOYS, LIQUID 1422 POTASSIUM SODIUM ALLOYS, LIQUID 3398 ORGANOMETALLIC SUBSTANCE, LIQUID, WATER- REACTIVE 1421 ALKALI METAL ALLOY, LIQUID, N.O.S. 3148 WATER-REACTIVE LIQUID, N.O.S.
	solid	W2 ^{a)}	1390 ALKALI METAL AMIDES 3170 ALUMINIUM SMELTING BY-PRODUCTS or 3170 ALUMINIUM REMELTING BY-PRODUCTS 3401 ALKALI METAL AMALGAM, SOLID 3402 ALKALINE EARTH METAL AMALGAM, SOLID 3403 POTASSIUM METAL ALLOYS, SOLID 3404 POTASSIUM SODIUM ALLOYS, SOLID 3395 ORGANOMETALLIC SUBSTANCE, SOLID, WATER- REACTIVE 1393 ALKALINE EARTH METAL ALLOY, N.O.S. 1409 METAL HYDRIDES, WATER-REACTIVE, N.O.S. 3208 METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. 2813 WATER-REACTIVE SOLID, N.O.S.
	articles	W3	3292 BATTERIES, CONTAINING SODIUM or 3292 CELLS, CONTAINING SODIUM 3543 ARTICLES CONTAINING A SUBSTANCE WHICH IN CONTACT WITH WATER EMITS FLAMMABLE GASES, N.O.S.
Liquid, flammable		WF1	1 3482 ALKALI METAL DISPERSION, FLAMMABLE or 3482 ALKALINE EARTH METAL DISPERSION, FLAMMABLE 3399 ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE
Solid, flammable		WF2	3396 ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, FLAMMABLE 3132 WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.
Solid, Self-heating		WS ^b	3397 ORGANOMETALLIC SUBSTANCE, SOLID, WATER- REACTIVE, SELF-HEATING 3209 METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S. 3135 WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.
Solid, oxidizing		WO	3133 WATER-REACTIVE SOLID, OXIDIZING, N.O.S. (not accepted for carriage, see 2.2.43.2)
Toxic	liquid	WT1	3130 WATER-REACTIVE LIQUID, TOXIC, N.O.S.
WT	solid	WT2	3134 WATER-REACTIVE SOLID, TOXIC, N.O.S.
Corrosive	liquid	WC1	3129 WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.
WC	solid	WC2	3131 WATER-REACTIVE SOLID, CORROSIVE, N.O.S.

Flammable corrosive	2988 CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S. (No other collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to the table of precedence of hazard in 2.1.3.10.)
	WFC ^c

Notes:

- a) *Metals and metal alloys which, in contact with water, do not emit flammable gases and are not pyrophoric or self-heating, but which are readily flammable, are substances of Class 4.1. Alkaline-earth metals and alkaline-earth metal alloys in pyrophoric form are substances of Class 4.2 Dust and powders of metals in pyrophoric form are substances of Class 4.2. Metals and metal alloys in pyrophoric form are substances of Class 4.2. Compounds of phosphorus with heavy metals such as iron, copper, etc. are not subject to the provisions of Annex 2 to SMGS.*
- b) *Metals and metal alloys in pyrophoric form are substances of Class 4.2.*
- c) *Chlorosilanes, having a flash-point of less than 23 °C and which, in contact with water, do not emit flammable gases, are substances of Class 3. Chlorosilanes, having a flash-point equal to or greater than 23 °C and which, in contact with water, do not emit flammable gases, are substances of Class 8.*

2.2.51 CLASS 5.1 OXIDIZING SUBSTANCES

2.2.51.1 Criteria

2.2.51.1.1 The heading of Class 5.1 covers substances which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause or contribute to the combustion of other material, and articles containing such substances.

2.2.51.1.2 The substances of Class 5.1 and articles containing such substances are subdivided as follows:

O Oxidizing substances without subsidiary risk or articles containing such substances:

O1 Liquid

O2 Solid

O3 Articles

OF Oxidizing substances, solid, flammable

OS Oxidizing substances, solid, self-heating

OW Oxidizing substances, solid which, in contact with water, emit flammable gases

OT Oxidizing substances, toxic

OT1 Liquid

OT2 Solid

OC Oxidizing substances, corrosive

OC1 Liquid

OC2 Solid

OTC Oxidizing substances, toxic, corrosive.

2.2.51.1.3 Substances and articles classified in Class 5.1 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of 2.2.51.3 in accordance with the provisions of Chapter 2.1 can be based on the tests, methods and criteria in 2.2.51.1.6 to 2.2.51.1.9 below and the Manual of Tests and Criteria, Part III, Section 34.4. In the event of divergence between test results and known experience, judgement based on known experience shall take precedence over test results.

2.2.51.1.4 If substances of Class 5.1, as a result of admixtures, come into different categories of risk from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

Note: *For the classification of solutions and mixtures (such as preparations and wastes), see also Section 2.1.3.*

2.2.51.1.5 On the basis of the test procedures in the Manual of Tests and Criteria, Part III, Section 34.4 and the criteria set out in 2.2.51.1.6 to 2.2.51.1.9 it may also be determined whether the nature of a substance mentioned by name in Table A of Chapter 3.2 is such that the substance is not subject to the provisions for this class.

Oxidizing solids

Classification

2.2.51.1.6 When oxidizing solid substances not mentioned by name in Table A of Chapter 3.2 are assigned to one of the entries listed in 2.2.51.3 on the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, sub-section 34.4.1 (test O.1) or alternatively, sub section 34.4.3 (test O.3), the following criteria shall apply:

a) In the test O.1, a solid substance shall be assigned to Class 5.1 if, in the 4:1 or the 1:1 sample-to-cellulose ratio (by mass) tested, it ignites or burns or exhibits mean burning times equal to or less than that of a 3:7 mixture (by mass) of potassium bromate and cellulose; or

b) In the test O.3, a solid substance shall be assigned to Class 5.1 if, in the 4:1 or the 1:1 sample-to-cellulose ratio (by mass) tested, it exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose.

2.2.51.1.7 By exception, solid ammonium nitrate based fertilizers shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39.

Assignment of packing groups

2.2.51.1.8 Oxidizing solids classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, sub-section 34.4.1 (test O.1) or sub-section 34.4.3 (test O.3), in accordance with the following criteria:

a) Test O.1:

- i) Packing group I: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose;
- ii) Packing group II: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for packing group I are not met;
- iii) Packing group III: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for packing groups I and II are not met;

b) Test O.3

- i) Packing group I: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose;
- ii) Packing group II: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose, and the criteria for packing group I are not met;
- iii) Packing group III: any substance which, in the 4:1 or 1:1 sample-to-cellulose (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose, and the criteria for packing groups I and II are not met.

Oxidizing liquids

Classification

2.2.51.1.9 When oxidizing liquid substances not mentioned by name in Table A of Chapter 3.2 are assigned to one of the entries listed in 2.2.51.3 on the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, sub-section 34.4.2, the following criteria shall apply:

A liquid substance shall be assigned to Class 5.1 if, in the 1:1 mixture, by mass, of substance and cellulose tested, it exhibits a pressure rise of 2070 kPa gauge or more and a mean pressure rise time equal to or less than the mean pressure rise time of a 1:1 mixture, by mass, of 65% aqueous nitric acid and cellulose.

Assignment of packing groups

2.2.51.1.10 Oxidizing liquids classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, section 34.4.2, in accordance with the following criteria:

- a) Packing group I: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of substance and cellulose is less than that of a 1:1 mixture, by mass, of 50% perchloric acid and cellulose;
- b) Packing group II: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure

rise time of a 1:1 mixture, by mass, of 40% aqueous sodium chlorate solution and cellulose; and the criteria for packing group I are not met;

- c) Packing group III: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 65% aqueous nitric acid and cellulose; and the criteria for packing groups I and II are not met.

2.2.51.2 Substances not accepted for carriage

2.2.51.2.1 The chemically unstable substances of Class 5.1 shall not be accepted for carriage unless the necessary steps have been taken to prevent their dangerous decomposition or polymerization during carriage. To this end it shall in particular be ensured that receptacles and tanks do not contain any material liable to promote these reactions.

2.2.51.2.2 The following substances and mixtures shall not be accepted for carriage:

- Oxidizing solids, self-heating, assigned to UN No. 3100, oxidizing solids, water-reactive, assigned to UN No. 3121 and oxidizing solids, flammable, assigned to UN No. 3137, unless they meet the requirements for Class 1 (see also 2.1.3.7);
- Hydrogen peroxide, not stabilized or hydrogen peroxide, aqueous solutions, not stabilized containing more than 60% hydrogen peroxide;
- Tetranitromethane not free from combustible impurities;
- Perchloric acid solutions containing more than 72% (mass) acid, or mixtures of perchloric acid with any liquid other than water;
- Chloric acid solution containing more than 10% chloric acid or mixtures of chloric acid with any liquid other than water;
- Halogenated fluor compounds other than UN Nos. 1745 BROMINE PENTAFLUORIDE; 1746 BROMINE TRIFLUORIDE and 2495 IODINE PENTAFLUORIDE of Class 5.1 as well as UN Nos. 1749 CHLORINE TRIFLUORIDE and 2548 CHLORINE PENTAFLUORIDE of Class 2;
- Ammonium chlorate and its aqueous solutions and mixtures of a chlorate with an ammonium salt;
- Ammonium chlorite and its aqueous solutions and mixtures of a chlorite with an ammonium salt;
- Mixtures of a hypochlorite with an ammonium salt;
- Ammonium bromate and its aqueous solutions and mixtures of a bromate with an ammonium salt;
- Ammonium permanganate and its aqueous solutions and mixtures of a permanganate with an ammonium salt;
- Ammonium nitrate containing more than 0.2% combustible substances (including any organic substance calculated as carbon) unless it is a constituent of a substance or article of Class 1;
- Ammonium nitrate based fertilizers with compositions that lead to exit boxes 4, 6, 8, 15, 31, or 33 of the flowchart of paragraph 39.5.1 of the Manual of Tests and Criteria, Part III, Section 39, unless they have been assigned a suitable UN number in Class 1;

Ammonium nitrate based fertilizers with compositions that lead to exit boxes 20, 23 or 39 of the flowchart of paragraph 39.5.1 of the Manual of Tests and Criteria, Part III, Section 39, unless they have been assigned a suitable UN number in Class 1 or, provided that the suitability for carriage has been demonstrated and that this has been approved by the competent authority, in Class 5.1 other than UN No. 2067;

Note: The term "competent authority" means the competent authority of the country of origin. If the country of origin is not an SMGS Contracting State, the classification and conditions of carriage shall be recognized by the competent authority of the first SMGS Contracting State reached by the consignment.

- Ammonium nitrite and its aqueous solutions and mixtures of an inorganic nitrite with an ammonium salt;
- Mixtures of potassium nitrate, sodium nitrite and an ammonium salt.

2.2.51.3 List of collective entries

Subsidiary risk	Classification code	UN No.	Name of the substance or article
Oxidizing substances and articles			
Containing such substances			
Without subsidiary risk O	Liquid	O1	3210 CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3211 PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3213 BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3214 PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3216 PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3218 NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3219 NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3139 OXIDIZING LIQUID, N.O.S.
		O2	1450 BROMATES, INORGANIC, N.O.S. 1461 CHLORATES, INORGANIC, N.O.S. 1462 CHLORITES, INORGANIC, N.O.S. 1477 NITRATES, INORGANIC, N.O.S. 1481 PERCHLORATES, INORGANIC, N.O.S. 1482 PERMANGANATES, INORGANIC, N.O.S. 1483 PEROXIDES, INORGANIC, N.O.S. 2627 NITRITES, INORGANIC, N.O.S. 3212 HYPOCHLORITES, INORGANIC, N.O.S. 3215 PERSULPHATES, INORGANIC, N.O.S. 1479 OXIDIZING SOLID, N.O.S.
	solid	O2	
		O3	3356 OXYGEN GENERATOR, CHEMICAL 3544 ARTICLES CONTAINING OXIDIZING SUBSTANCE, N.O.S.
		O3	
	articles	O3	
		O3	
	articles	O3	
		O3	
	articles	O3	
		O3	
Solid, flammable		OF	3137 OXIDIZING SOLID, FLAMMABLE, N.O.S. (not accepted for carriage, see 2.2.51.2)
Solid, self-heating		OS	3100 OXIDIZING SOLID, SELF-HEATING, N.O.S. (not accepted for carriage, see 2.2.51.2)
Solid, water-reactive		OW	3121 OXIDIZING SOLID, WATER-REACTIVE, N.O.S. (not accepted for carriage, see 2.2.51.2)
Toxic	OT	OT1	3099 OXIDIZING LIQUID, TOXIC, N.O.S.
		OT2	3087 OXIDIZING SOLID, TOXIC, N.O.S.
Corrosive	OC	OC1	3098 OXIDIZING LIQUID, CORROSIVE, N.O.S.
		OC2	3085 OXIDIZING SOLID, CORROSIVE, N.O.S.
Toxic corrosive		OTC	(No collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to the precedence of hazard in 2.1.3.10.)

2.2.52 CLASS 5.2 ORGANIC PEROXIDES

2.2.52.1 Criteria

2.2.52.1.1 The heading of Class 5.2 covers organic peroxides and formulations of organic peroxides.

2.2.52.1.2 The substances of Class 5.2 are subdivided as follows:

P1 Organic peroxides, not requiring temperature control;

P2 Organic peroxides, requiring temperature control (not accepted for carriage by rail).

Definition

2.2.52.1.3 Organic peroxides are organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals

Properties

2.2.52.1.4 Organic peroxides are liable to exothermic decomposition at normal or elevated temperatures. The decomposition can be initiated by heat, contact with impurities (e.g. acids, heavy-metal compounds, amines), friction or impact. The rate of decomposition increases with temperature and varies with the organic peroxide formulation. Decomposition may result in the evolution of harmful, or flammable, gases or vapours. Some organic peroxides may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Many organic peroxides burn vigorously. Contact of organic peroxides with the eyes is to be avoided. Some organic peroxides will cause serious injury to the cornea, even after brief contact, or will be corrosive to the skin.

Note: Test methods for determining the flammability of organic peroxides are set out in the Manual of Tests and Criteria, Part III, sub-section 32.4. Because organic peroxides may react vigorously when heated, it is recommended to determine their flash-point using small sample sizes such as described in ISO 3679:1983.

Classification

2.2.52.1.5 Any organic peroxide shall be considered for classification in Class 5.2 unless the organic peroxide formulation contains:

a) Not more than 1.0% available oxygen from the organic peroxides when containing not more than 1.0% hydrogen peroxide;

(b) Not more than 0.5% available oxygen from the organic peroxides when containing more than 1.0% but not more than 7.0% hydrogen peroxide.

Note: The available oxygen content (%) of an organic peroxide formulation is given by the formula

$$16 \times \sum (n_i \times c_i / m_i)$$

where:

n_i – number of peroxygen groups per molecule of organic peroxide i ;

c_i – concentration (mass %) of organic peroxide i ; and

m_i – molecular mass of organic peroxide i .

2.2.52.1.6 Organic peroxides are classified into seven types according to the degree of danger they present. The types of organic peroxide range from type A, which is not accepted for carriage in the packaging in which it is tested, to type G, which is not subject to the provisions of Class 5.2. The classification of types B to F is directly related to the maximum quantity allowed in one packaging. The principles to be applied to the classification of substances not listed in 2.2.52.4 are set out in the Manual of Tests and Criteria, Part II.

2.2.52.1.7 Organic peroxides which have already been classified and are already permitted for carriage in packagings are listed in 2.2.52.4, those already permitted for carriage in IBCs are listed in 4.1.4.2, packing instruction IBC520 and those already permitted for carriage in tanks in accordance with Chapters 4.2 and 4.3 are listed in 4.2.5.2, portable tank instruction T23. Each permitted substance listed is assigned to a generic entry of Table A of Chapter 3.2 (UN Nos. 3101 to 3120) and appropriate subsidiary risks and remarks providing relevant transport information are given.

These generic entries specify:

- the type (B, C, D, E, F) of organic peroxide (see. 2.2.52.1.6);
- physical state (liquid/solid).

Mixtures of these formulations may be classified as the same type of organic peroxide as that of the most dangerous component and be carried under the conditions of carriage given for this type. However, as two stable components can form a thermally less stable mixture, the self-accelerating decomposition temperature (SADT) of the mixture shall be determined.

2.2.52.1.8 Classification of organic peroxides not listed in 2.2.52.4, 4.1.4.2, packing instruction IBC520 or 4.2.5.2, portable tank instruction T23, and assignment to a collective entry shall be made by the competent authority of the country of origin. The statement of approval shall contain the classification and the relevant conditions of carriage. If the country of origin is not an SMGS Contracting State, the classification and conditions of carriage shall be recognized by the competent authority of the first SMGS Contracting State reached by the consignment.

2.2.52.1.9 Samples of organic peroxides or formulations of organic peroxides not listed in 2.2.52.4, for which a complete set of test results is not available and which are to be carried for further testing or evaluation, shall be assigned to one of the appropriate entries for organic peroxides type C provided the following conditions are met:

- the available data indicate that the sample would be no more dangerous than organic peroxides type B;
- the sample is packaged in accordance with packing method OP2 and the quantity per wagon is limited to 10 kg.

Samples requiring temperature control shall not be accepted for carriage by rail.

Desensitization of organic peroxides

2.2.52.1.10 In order to ensure safety during carriage, organic peroxides are in many cases desensitized by organic liquids or solids, inorganic solids or water. Where a percentage of a substance is stipulated, this refers to the percentage by mass, rounded to the nearest whole number. In general, desensitization shall be such that, in case of spillage, the organic peroxide will not concentrate to a dangerous extent.

2.2.52.1.11 Unless otherwise stated for the individual organic peroxide formulation, the following definition(s) shall apply to diluents used for desensitization:

- diluents type A are organic liquids which are compatible with the organic peroxide and which have a boiling point of not less than 150 °C. Type A diluents may be used for desensitizing all organic peroxides.
- diluents type B are organic liquids which are compatible with the organic peroxide and which have a boiling point of less than 150 °C but not less than 60 °C and a flash-point of not less than 5 °C.

Type B diluents may be used for desensitization of all organic peroxides, provided that the boiling point of the liquid is at least 60 °C higher than the SADT in a 50 kg package.

2.2.52.1.12 Diluents, other than type A or type B, may be added to organic peroxide formulations as listed in 2.2.52.4, provided that they are compatible. However, replacement of all or part of a type A or type B diluent by another diluent with differing properties requires that the organic peroxide formulation be re-assessed in accordance with the normal acceptance procedure for Class 5.2.

2.2.52.1.13 Water may only be used for the desensitization of organic peroxides which are listed in 2.2.52.4 or in the competent authority decision according to 2.2.52.1.8 as being "with water" or "as a stable dispersion in water". Samples of organic peroxides or formulations of organic peroxides not listed in 2.2.52.4 may also be desensitized with water provided the requirements of 2.2.52.1.9 are met.

2.2.52.1.14 Organic and inorganic solids may be used for desensitization of organic peroxides, provided that they are compatible. Compatible liquids and solids are those which have no detrimental influence on the thermal stability and hazard type of the organic peroxide formulation.

2.2.52.1.15 -

2.2.52.1.16 (Reserved)

2.2.52.2 Substances not accepted for carriage

The following organic peroxides shall not be accepted for carriage under the requirements of Class 5.2:

- Organic peroxides, type A (see Manual of Tests and Criteria, Part II, paragraph 20.4.3 a)).

The following organic peroxides requiring temperature control are not to be accepted for carriage by rail:

- Organic peroxides, types B and C with an SADT (self-accelerating decomposition temperature) $\leq 50\text{ }^{\circ}\text{C}$:

UN 3111 ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED;

UN 3112 ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED;

UN 3113 ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED;

UN 3114 ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED;

- Organic peroxides type D showing a violent or medium effect when heated under confinement with an SADT $\leq 50\text{ }^{\circ}\text{C}$ or showing a low or no effect when heated under confinement with an SADT $\leq 45\text{ }^{\circ}\text{C}$:

UN 3115 ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED;

UN 3116 ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED

- Organic peroxides types E and F with an SADT $\leq 45\text{ }^{\circ}\text{C}$:

UN 3117 ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED;

UN 3118 ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED;

UN 3119 ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED;

UN 3120 ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED

2.2.52.3 List of collective entries

Subsidiary risk	Classification code	UN No.	Name of the substance or article
Organic peroxides	P1		ORGANIC PEROXIDE TYPE A, LIQUID (not accepted for carriage, see 2.2.52.2)
			ORGANIC PEROXIDE TYPE A, SOLID (not accepted for carriage, see 2.2.52.2)
		3101	ORGANIC PEROXIDE TYPE B, LIQUID
		3102	ORGANIC PEROXIDE TYPE B, SOLID
		3103	ORGANIC PEROXIDE TYPE C, LIQUID
		3104	ORGANIC PEROXIDE TYPE C, SOLID
		3105	ORGANIC PEROXIDE TYPE D, LIQUID
		3106	ORGANIC PEROXIDE TYPE D, SOLID
		3107	ORGANIC PEROXIDE TYPE E, LIQUID
		3108	ORGANIC PEROXIDE TYPE E, SOLID
		3109	ORGANIC PEROXIDE TYPE F, LIQUID
		3110	ORGANIC PEROXIDE TYPE F, SOLID
			ORGANIC PEROXIDE TYPE G, LIQUID (not subject to the provisions applicable to Class 5.2, see 2.2.52.1.6)
			ORGANIC PEROXIDE TYPE G, SOLID (not subject to the provisions applicable to Class 5.2, see 2.2.52.1.6)
		3545	ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.
Not requiring temperature control	P1		
Requiring temperature control	P2	3111	ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)
		3112	ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)
		3113	ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)
		3114	ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)
		3115	ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)
		3116	ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)
		3117	ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)
		3118	ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)
		3119	ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)
		3120	ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED (not accepted for carriage by rail, see 2.2.52.2)

2.2.52.4 List of currently assigned organic peroxides in packagings (with UN numbers)

Note: In the column "Packing Method", codes "OP1" to "OP8" refer to packing methods in 4.1.4.1 packing instruction P520 (see also 4.1.7.1). Organic peroxides to be carried shall fulfil the classification as listed. For substances permitted in IBCs, see 4.1.4.2, packing instruction IBC520 and, for those permitted in tanks according to Chapters 4.2 and 4.3, see 4.2.5.6, portable tank instruction T23. The formulations not listed in this packing instruction but listed in packing instruction IBC 520 of 4.1.4.2 and in portable tank instruction T 23 of 4.2.5.2.6 may also be carried packed in accordance with packing method OP8 of packing instruction P 520 of 4.1.4.1.

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1	Inert solid (%)	Water (%)	Packing method	UN No. (generic entry)	Subsidiary risks and remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ACETYL ACETONE PEROXIDE	≤42	≥48			≥8	OP7	3105	2)
"	≤ 35	≤ 57			≥8	OP8	3107	
"	≤ 32 as a paste					OP7	3106	20)
ACETYL CYCLOHEXANESULPHONYL PEROXIDE	≤ 82				≥12		3112	Carriage prohibited
"	≤ 32		≥ 68				3115	Carriage prohibited
tert-AMYL HYDROPEROXIDE	≤ 88	≥ 6			≥ 6	OP8	3107	
tert-AMYL PEROXYACETATE	≤ 62	≥ 38				OP7	3105	
tert-AMYL PEROXYBENZOATE	≤ 100					OP5	3103	
tert-AMYL PEROXY-2-ETHYLHEXANOATE	≤100						3115	Carriage prohibited
tert-AMYL PEROXY-2-ETHYLHEXYL CARBONATE	≤100					OP7	3105	
tert-AMYLPEROXY ISOPROPYL CARBONATE	≤ 77		≥ 23				3115	Carriage prohibited
tert-AMYL PEROXYNEODECANOATE	≤ 47	≥ 53					3119	Carriage prohibited
tert-AMYL PEROXYPIVALATE	≤ 77		≥ 23				3113	Carriage prohibited
tert-AMYLPEROXY-3,5-TRIMETHYLHEXANOATE	≤100					OP7	3105	
tert-BUTYL CUMYL PEROXIDE	> 42 - 100					OP8	3109	
"	≤52			≥ 48		OP8	3108	
n-BUTYL-4,4-DI-(tert-BUTYLPEROXY) VALERATE	> 52 - 100					OP5	3103	
"	≤ 52			≥ 48		OP8	3108	
tert-BUTYL HYDROPEROXIDE	> 79 - 90				≥ 10	OP5	3103	13)
"	≤ 80	≥ 20				OP7	3105	4) 13)
"	≤ 79				> 14	OP8	3107	13) 23)
"	≤ 72				≥ 28	OP8	3109	13)
tert-BUTYL HYDROPEROXIDE + DI-tert-BUTYLPEROXIDE	≤ 82 + > 9				≥ 7	OP5	3103	13)
tert-BUTYL MONOPEROXYMALEATE	> 52 - 100					OP5	3102	3)
"	≤ 52	≥ 48				OP6	3103	
"	≤ 52			≥ 48		OP8	3108	
"	≤ 52 – as a paste					OP8	3108	
tert-BUTYL PEROXYACETATE	> 52 - 77	≥ 23				OP5	3101	3)
"	> 32 - 52	≥ 48				OP6	3103	
"	≤ 32		≥ 68			OP8	3109	
tert-BUTYL PEROXYBENZOATE	> 77 - 100					OP5	3103	
"	> 52 - 77	≥ 23				OP7	3105	
"	≤ 52			≥ 48		OP7	3106	
tert-BUTYL PEROXYBUTYL FUMARATE	≤ 52	≥ 48				OP7	3105	
tert-BUTYL PEROXYCROTONATE	≤ 77	≥ 23				OP7	3105	
tert-BUTYL PEROXYDIETHYLACETATE	≤100						3113	Carriage prohibited
tert-BUTYL PEROXY-2-ETHYLHEXANOATE	> 52 - 100						3113	Carriage prohibited
"	> 32 - 52		≥ 48				3117	Carriage prohibited
"	≤52			≥ 48			3118	Carriage prohibited
"	≤ 32		≥ 68				3119	Carriage prohibited
tert-BUTYL PEROXY-2-ETHYLHEXANOATE + 2,2-DI-(tert-BUTYLPEROXY)BUTANE	≤ 12 + ≤ 14	≥14		≥ 60		OP7	3106	
"	≤ 31 + ≤ 36		≥ 33				3115	Carriage prohibited
tert-BUTYL PEROXY-2-ETHYLHEXYLCARBONATE	≤ 100					OP7	3105	
tert-BUTYL PEROXYISOBUTYRATE	> 52 - 77		≥ 23				3111	Carriage prohibited
"	≤ 52		≥ 48				3115	Carriage prohibited

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing method	UN No. (generic entry)	Subsidiary risks and remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
tert-BUTYLPEROXY ISOPROPYLCARBONATE	≤ 77	≥ 23				OP5	3103	
"	≤ 62		≥ 38			OP7	3105	
1-(2-tert-BUTYLPEROXY ISOPROPYL)-ISOPROPENYLBENZENE	≤ 77	≥ 23				OP7	3105	
"	≤ 42			≥ 58		OP8	3108	
tert-BUTYL PEROXY-2-METHYLBENZONATE	≤ 100					OP5	3103	
tert-BUTYL PEROXYNEODECANOATE	> 77 - 100					OP7	3115	Carriage prohibited
"	≤ 77		≥ 23				3115	Carriage prohibited
"	≤ 52 as a stable dispersion in water						3119	Carriage prohibited
"	≤ 42 as a stable dispersion in water (frozen).						3118	Carriage prohibited
"	≤ 32	≥ 68					3119	Carriage prohibited
tert-BUTYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23					3115	Carriage prohibited
"	≤ 42 as a stable dispersion in water						3117	
tert-BUTYL PEROXYPIVALATE	> 67 - 77	≥ 23					3113	Carriage prohibited
"	> 27 - 67		≥ 33				3115	Carriage prohibited
"	≤ 27		≥ 73				3119	Carriage prohibited
tert-BUTYL PEROXY STEARYLCARBONATE	≤ 100					OP7	3106	
tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	> 37 - 100					OP7	3105	
"	≤ 42			≥ 58		OP7	3106	
"	≤ 37		≥ 63			OP8	3109	
3-CHLOROPEROXYBENZOIC ACID	> 57 - 86			≥ 14		OP1	3102	3)
"	≤ 57			≥ 3	≥ 40	OP7	3106	
"	≤ 77			≥ 6	≥ 17	OP7	3106	
CUMYL HYDROPEROXIDE	> 90 - 98	≥ 10				OP8	3107	13)
"	≤ 90	≥ 10				OP8	3109	13) 18)
CUMYL PEROXYNEODECANOATE	≤ 87	≥ 13					3115	Carriage prohibited
"	≤ 77		≥ 23				3115	Carriage prohibited
"	≤ 52 as a stable dispersion in water						3119	Carriage prohibited
CUMYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23					3115	Carriage prohibited
CUMYL PEROXYPIVALATE	≤ 77		≥ 23				3115	Carriage prohibited
CYCLOHEXANONE PEROXIDE(S)	≤ 91				≥ 9	OP6	3104	13)
"	≤ 72	≥ 28				OP7	3105	5)
"	≤ 72 as a paste					OP7	3106	5) 20)
"	≤ 32			≥ 68			exempt	29)
DIACETONE ALCOHOL PEROXIDES	≤ 57		≥ 26		≥ 8		3115	Carriage prohibited
DIACETYL PEROXIDE	≤ 27		≥ 73				3115	Carriage prohibited
DI-tert-AMYL PEROXIDE	≤ 100					OP8	3107	
2,2-DI-(tert-AMYLPEROXY)-BUTANE	≤ 57	≥ 43				OP7	3105	
1,1-DI-(tert-AMYLPEROXY)CYCLOHEXANE	≤ 82	≥ 18				OP6	3103	
DIBENZOYL PEROXIDE	> 52 - 100			≤ 48		OP2	3102	3)
"	> 77 - 94				≥ 6	OP4	3102	3)
"	≤ 77				≥ 23	OP6	3104	
"	≤ 62			≥ 28	≥ 10	OP7	3106	
"	> 52 - 62 – as a paste					OP7	3106	20)
"	> 35 – 52			≥ 48		OP7	3106	
"	> 36 – 42	≥ 18			≤ 40	OP8	3107	
"	≤ 56,5 - as a paste				≥ 15	OP8	3108	
"	≤ 52 – as a paste					OP8	3108	20)
"	≤ 42	≤ 38			≤ 13	OP8	3109	
"	≤ 42 as a stable dispersion in water					OP8	3109	
"	≤ 35			≥ 65			exempt	29)
DI-tert-BUTYL PEROXIDE	> 52 - 100					OP8	3107	
"	≤ 52		≥ 48			OP8	3109	25)
DI-tert-BUTYL PEROXYAZELATE	≤ 52	≥ 48				OP7	3105	
2,2-DI-(tert-BUTYLPEROXY)BUTANE	≤ 52	≥ 48				OP6	3103	
1,1-DI-(tert-BUTYLPEROXY)CYCLOHEXANE	≤ 72		≥ 28			OP5	3103	30)
1,1-DI-(tert-BUTYLPEROXY)CYCLOHEXANE + tert-BUTYL PEROXYETHYLHEXANOATE	≤ 43	≥ 41				OP7	3105	
1,1-DI-(tert-BUTYLPEROXY)CYCLOHEXANE	> 80 - 100					OP5	3101	3)

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing method	UN No. (generic entry)	Subsidiary risks and remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
"	> 52 - 80	≥ 20				OP5	3103	
"	> 42 - 52	≥ 48				OP7	3105	
"	≤ 42	≥ 13		≥ 45		OP7	3106	
"	≤ 27	≥ 25				OP8	3107	21)
"	≤ 42	≥ 58				OP8	3109	
"	≤ 13	≥ 13	≥ 74			OP8	3109	
DI-n-BUTYL PEROXYDICARBONATE	> 27 - 52		≥ 48				3115	Carriage prohibited
"	≤ 27		≥ 73				3117	Carriage prohibited
"	≤ 42 as a stable dispersion in water						3118	Carriage prohibited
DI-sec-BUTYL PEROXYDICARBONATE	> 52 - 100						3113	Carriage prohibited
"	≤ 52	≥ 48					3115	Carriage prohibited
DI-(4-tert-BUTYLCYCLOHEXYL)-PEROXYDICARBONATE	≤ 100						3114	Carriage prohibited
"	≤ 42 as a stable dispersion in water						3119	Carriage prohibited
"	≤ 42 as a paste						3118	Carriage prohibited
DI-(tert-BUTYLPEROXYISOPROPYL) BENZENE(S)	> 42 - 100			≤ 57		OP7	3106	
"	≤ 42			≥ 58			exempt	29)
DI-(tert-BUTYLPEROXY) PHTHALATE	> 42 - 52	≥ 48				OP7	3105	
"	≤ 52 as a paste					OP7	3106	20)
"	≤ 42	≥ 58				OP8	3107	
2,2-DI-(tert-BUTYLPEROXY) PROPANE	≤ 52	≥ 48				OP7	3105	
"	≤ 42	≥ 13		≥ 45		OP7	3106	
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE	> 90 - 100					OP5	3101	3)
"	≤ 90		≥ 10			OP5	3103	30)
"	> 57 - 90	≥ 10				OP5	3103	
"	≤ 77		≥ 23			OP5	3103	
"	≤ 57			≥ 43		OP8	3110	
"	≤ 57	≥ 43				OP8	3107	
"	≤ 32	≥ 26	≥ 42			OP8	3107	
DICETYL PEROXYDICARBONATE	≤ 100						3120	Carriage prohibited
"	≤ 42 as a stable dispersion in water						3119	Carriage prohibited
DIDECANOYL PEROXIDE	≤ 100						3114	Carriage prohibited
DI-4-CHLOROBENZOYL PEROXIDE	≤ 77				≥ 23	OP5	3102	3)
"	≤ 52 – as a paste					OP7	3106	20)
"	≤ 32			≥ 68			exempt	29)
DICUMYL PEROXIDE	> 52 - 100					OP8	3110	12)
"	≤ 52			≥ 48			exempt	29)
2,2-DI-(4,4-DI (tert-BUTYLPEROXY) CYCLOHEXYL) PROPANE	≤ 42			≥ 58		OP7	3106	
"	≤ 22		≥ 78			OP8	3107	
DI-2,4-DICHLOROBENZOYL PEROXIDE	≤ 52 – as a paste						3118	Carriage prohibited
DI-4- DICHLOROBENZOYL PEROXIDE	≤ 77				≥ 23	OP5	3102	3)
"	≤ 52 – as a paste with silicon oil					OP7	3106	
DI-(2-ETHOXYETHYL) PEROXYDICARBONATE	≤ 52		≥ 48				3115	Carriage prohibited
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE	> 77 - 100						3113	Carriage prohibited
"	≤ 77		≥ 23				3115	Carriage prohibited
"	≤ 62 as a stable dispersion in water						3119	Carriage prohibited
"	≤ 52 as a stable dispersion in water						3120	Carriage prohibited
2,2-DIHYDROPEROXYPROPANE	≤ 27			≥ 73		OP5	3102	3)
DI-(1-HYDROXYCYCLOHEXYL) PEROXIDE	≤ 100					OP7	3106	
DIISOBUTYRYL PEROXIDE	> 32 - 52		≥ 48				3111	Carriage prohibited
"	≤ 32		≥ 68				3115	Carriage prohibited
"	≤ 42 as a stable dispersion in water						3119	Carriage prohibited
DI-ISOPROPYLBENZENE DIHYDROPEROXIDE	≤ 82	≥ 5			≥ 5	OP7	3106	24)
DIISOPROPYL PEROXYDICARBONATE	> 52 - 100						3112	Carriage prohibited
"	≤ 52		≥ 48				3115	Carriage prohibited
"	≤ 32	≥ 68					3115	Carriage prohibited
DI-(1-HYDROXYCYCLOHEXYL) PEROXIDE	≤ 100					OP7	3106	
"	≤ 42 as a stable dispersion in water					OP8	3109	

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing method	UN No. (generic entry)	Subsidiary risks and remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
DI-(3-METHOXYBUTYL) PEROXYDICARBONATE	≤ 52		≥ 48				3115	Carriage prohibited
DI-(2-METHYLBENZOYL) PEROXIDE	≤ 87				≥ 13		3112	Carriage prohibited
DI-(3-METHYLBENZOYL) PEROXIDE	≤ 20 +		≥ 58				3115	Carriage prohibited
BENZOYL (3-METHYLBENZOYL) PEROXIDE + DIBENZOYL PEROXIDE	≤ 18 + ≤ 4							
2,5-DIMETHYL-2,5-DI-(BENZOYLPEROXY) HEXANE	> 82 - 100					OP5	3102	3)
"	≤ 82			≥ 18		OP7	3106	
"	≤ 82				≥ 18	OP5	3104	
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY) HEXANE	> 90 - 100					OP5	3103	
"	> 52 - 90	≥ 10				OP7	3105	
"	≤ 77			≥ 23		OP8	3108	
"	≤ 52	≥ 48				OP8	3109	
"	≤ 47 as a paste			OP8		3108	"	≤ 47 as a paste
"	≤ 22			≤ 78			exempt	29)
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY) HEXANE-3	> 52 - 86	≥ 14				OP5		26)
"	≤ 52			≥ 48		OP7	3106	
"	> 86 - 100					OP5	3101	3)
2,5-DIMETHYL-2,5-DI-(2-ETHYLHEXANOYLPEROXY) HEXANE	≤ 100						3113	Carriage prohibited
2,5-DIMETHYL-2,5-DIHYDROPEROXYHEXANE	≤ 82				≥ 18	OP6	3104	
2,5-DIMETHYL-2,5-DI-(3,5,5-TRIMETHYLHEXANOYLPEROXY) HEXANE	≤ 77	≥ 23				OP7	3105	
1,1-DIMETHYL-3-HYDROXYBUTYLPEROXYNEOHEPTANE	≤ 52	≥ 48					3117	Carriage prohibited
DIMYRISTYL PEROXYDICARBONATE	≤ 100						3116	Carriage prohibited
"	≤ 42 as a stable dispersion in water						3119	Carriage prohibited
DI-(2-NEODECANOYLPEROXYISOPROPYL) BENZENE	≤ 52	≥ 48					3115	Carriage prohibited
DI-n-NONANOYL PEROXIDE	≤ 100						3116	Carriage prohibited
DI-n-OCTANOYL PEROXIDE	≤ 100						3114	Carriage prohibited
DIPEROXY DODECANEDIOIC ACID	□ ≤ 13			≥ 87	-		exempt	29)
DI-(2-PHENOXYETHYL) PEROXYDICARBONATE	> 85 - 100					OP5	3102	3)
"	≤ 85				≥ 15	OP7	3106	
DIPROPIONYL PEROXIDE	≤ 27		≥ 73				3117	Carriage prohibited
DI-n-PROPYL PEROXYDICARBONATE	≤ 100						3113	Carriage prohibited
"	□ ≤ 77		≥ 23				3113	Carriage prohibited
DISUCCINIC ACID PEROXIDE	> 72 - 100					OP4	3102	3) 17)
"	≤ 72				≥ 28		3116	Carriage prohibited
DI-(3,5,5-TRIMETHYLHEXANOYL) PEROXIDE	> 52 - 82	≥ 18					3115	Carriage prohibited
"	> 38-52	≥ 48		+10	+15		3119	Carriage prohibited
"	≤ 52 as a stable dispersion in water						3119	Carriage prohibited
"	≤ 38	≥ 62					3119	Carriage prohibited
ETHYL 3,3-DI-(tert-AMYLPEROXY) BUTYRATE	≤ 67	≥ 33				OP7	3105	
ETHYL 3,3-DI-(tert-BUTYLPEROXY) BUTYRATE	> 77 - 100					OP5	3103	
"	≤ 77	≥ 23				OP7	3105	
"	≤ 52			≥ 48		OP7	3106	
tert-HEXYL PEROXYNEODECANOATE	≤ 71	≥ 29					3115	Carriage prohibited
tert-HEXYL PEROXYPIVALATE	≤ 72		≥ 28				3115	Carriage prohibited
"	≤ 52 as a stable dispersion in water					OP8	3117	
ISOPROPYL sec-BUTYL	≤ 32 +	≥ 38					3115	Carriage prohibited

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing method	UN No. (generic entry)	Subsidiary risks and remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PEROXYDICARBONATE + DI-sec-BUTYL PEROXYDICARBONATE + DI-ISOPROPYL PEROXYDICARBONATE	≤ 15–18 + ≤ 12 - 15							
ISOPROPYL sec-BUTYL PEROXYDICARBONATE + DI-sec-BUTYL PEROXYDICARBONATE + DI-ISOPROPYL PEROXYDICARBONATE	≤ 52 + ≤ 28 + ≤ 22						3111	Carriage prohibited
ISOPROPYLCUMYL HYDROPEROXIDE	≤ 72	≥ 28				OP8	3109	13)
p-MENTHYL HYDROPEROXIDE	> 72 - 100					OP7	3105	13)
"	≤ 72	≥ 28				OP8	3109	27)
METHYLCYCLOHEXANONE PEROXIDE	≤ 67		≥ 33				3115	Carriage prohibited
METHYL ETHYL KETONE PEROXIDE(See remark 33)	See remark 33)	≥ 41			≥ 9	OP8	3105	33), 34)
"	See remark 8	≥ 48				OP5	3101	3) 8) 13)
"	See remark 9	≥ 55				OP7	3105	9)
"	See remark 10	≥ 60				OP8	3107	10)
METHYL ISOBUTYL KETONE PEROXIDE	≤ 62	≥ 19				OP7	3105	22)
ORGANIC PEROXIDE, LIQUID, SAMPLE						OP2	3103	11)
ORGANIC PEROXIDE, LIQUID, SAMPLE, TEMPERATURE CONTROLLED							3113	Carriage prohibited
ORGANIC PEROXIDE, SOLID, SAMPLE						OP2	3104	11)
ORGANIC PEROXIDE, SOLID, SAMPLE, TEMPERATURE CONTROLLED							3114	Carriage prohibited
PEROXYACETIC ACID, TYPE D, stabilized	≤ 43					OP7	3105	13) 14) 19)
PEROXYACETIC ACID, TYPE E, stabilized	≤ 43					OP8	3107	13) 15) 19)
PEROXYACETIC ACID, TYPE F, stabilized	≤ 43					OP8	3109	13) 16) 19)
1-PHENYLETHYL HYDROPEROXIDE	≤ 38		≥ 62			OP8	3109	
PINANYL HYDROPEROXIDE	> 56 - 100					OP7	3105	13)
"	≤ 56	≥ 44				OP8	3109	
1,1,3,3-TETRAMETHYLBUTYL HYDROPEROXIDE	≤ 100					OP7	3105	
1,1,3,3-TETRAMETHYLBUTYL PEROXY-2 ETHYLHEXANOATE	≤ 100						3115	Carriage prohibited
1,1,3,3- TETRAMETHYLBUTYL PEROXYNEODECANOATE	≤ 72		≥ 28				3115	Carriage prohibited
"	≤ 52 as a stable dispersion in water						3119	Carriage prohibited
1,1,3,3-TETRAMETHYL-BUTYL PEROXYPIVALATE	≤ 37		≥ 63				3115	Carriage prohibited
3,6,9-TRIETHYL-3,6,9-TRIMETHYL-TRIPEROXONANE	≤ 42	≥ 58				OP7	3105	28)
tert-AMYLPEROXY ISOPROPYL CARBONATE	≤ 77	≥ 23				OP5	3103	
1,6-Di-(tert-BUTYLPEROXY-CARBONYLOXY) HEXANE	≤ 72	≥ 28				OP5	3103	
DICETYL PEROXYDICARBONATE	≤ as a stable dispersion in water						3119	Carriage prohibited
1-(2-ETHYLHEXANOYL-PEROXY)-1,3-DIMETHYLBUTYL PEROXYPIVALATE	≤ 52	≥ 45	≥ 10			OP7	3115	
PEROXYLAURIC ACID	≤ 100					OP8	3118	
POLYETHER POLY-tert-BUTYLPEROXYCARBONATE	≤ 52		≥ 48			OP8	3107	
1,1,3,3-TETRAMETHYL-BUTYL PEROXYPIVALATE	≤ 77	≥ 23					3115	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 77	≥ 23					3115	Carriage prohibited
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 52 as a stable dispersion in water						3119	Carriage prohibited
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 52	≥ 48					3117	Carriage prohibited

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) 1)	Inert solid (%)	Water (%)	Packing method	UN No. (generic entry)	Subsidiary risks and remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
METHYL ISOPROPYL KETONE PEROXIDE(S)	see remark 31)	≥ 70				OP8	3109	31)
3,3,5,7,7-PENTAMETHYL-1,2,4-TRIOXEPANE	≤ 100					OP8	3107	
3,6,9-TRIETHYL-3,6,9-TRIMETHYL-1,4,4-TRIPEROXONANE	≤ 17	≥ 18	≥ 65			OP8	3110	
[3R-(3R,5aS,6S,8aS,9R,10R,12S,12aR**)]-DECAHYDRO-10-METHOXY-3,6,9-TRIMETHYL-3,12-EPOXY-12H-PYRANO[4,3-j]-1,2-BENZODIOXEPIN)	≤ 100					OP7	3106	

- Remarks:**
- 1) Diluent type B may always be replaced by diluent type A. The boiling point of diluent type B shall be at least 60 °C higher than the SADT of the organic peroxide.
 - 2) Available oxygen ≤ 4.7%.
 - 3) "EXPLOSIVE" subsidiary risk label required (Model No.1, see 5.2.2.2.2).
 - 4) Diluent may be replaced by di-tert-butyl peroxide.
 - 5) Available oxygen ≤ 9%.
 - 6) (Reserved)
 - 7) (Reserved)
 - 8) Available oxygen > 10% and ≤ 10.7%, with or without water
 - 9) Available oxygen ≤ 10%, with or without water
 - 10) Available oxygen ≤ 8.2%, with or without water
 - 11) See 2.2.52.1.9
 - 12) Up to 2 000 kg per receptacle assigned to ORGANIC PEROXIDE TYPE F on the basis of large scale trials.
 - 13) "CORROSIVE" subsidiary risk label required (Model No.8, see 5.2.2.2.2).
 - 14) Peroxyacetic acid formulations which fulfil the criteria of the Manual of Tests and Criteria, paragraph 20.4.3 (d).
 - 15) Peroxyacetic acid formulations which fulfil the criteria of the Manual of Tests and Criteria, paragraph 20.4.3 (e).
 - 16) Peroxyacetic acid formulations which fulfil the criteria of the Manual of Tests and Criteria, paragraph 20.4.3 (f).
 - 17) Addition of water to this organic peroxide will decrease its thermal stability.
 - 18) No "CORROSIVE" subsidiary risk label (Model No.8, see 5.2.2.2.2) required for concentrations below 80%.
 - 19) Mixtures with hydrogen peroxide, water and acid(s).
 - 20) With diluent type A, with or without water.
 - 21) With ≥ 25% diluent type A by mass, and in addition ethylbenzene.
 - 22) With ≥ 19% diluent type A by mass, and in addition methyl isobutyl ketone.
 - 23) With < 6% di-tert-butyl peroxide.
 - 24) With ≤ 8% 1-isopropylhydroperoxy-4-isopropylhydroxybenzene.
 - 25) Diluent type B with boiling point > 110 °C.

- 26) With < 0.5% hydroperoxides content.
- 27) For concentrations more than 56%, "CORROSIVE" subsidiary risk label required (Model No.8, see 5.2.2.2.2).
- 28) Available active oxygen $\leq 7.6\%$ in diluent Type A having a 95% boil-off point in the range of 200 °C – 260 °C.
- 29) Not subject to the requirements of Annex 2 to SMGS for Class 5.2.
- 30) Diluent type B with boiling point > 130 °C.
- 31) Active oxygen $\leq 6.7\%$.
- 32) Active oxygen $\leq 4.15\%$.
- 33) Available oxygen $\leq 10\%$.
- 34) Sum of diluent type A and water $\geq 55\%$, and in addition methyl ethyl ketone.

2.2.61 CLASS 6.1 TOXIC (POISONOUS) SUBSTANCES

2.2.61.1 Criteria

2.2.61.1.1 The heading of Class 6.1 covers substances of which it is known by experience or regarding which it is presumed from experiments on animals that in relatively small quantities they are able by a single action or by action of short duration to cause damage to human health, or death, by inhalation, by cutaneous absorption or by ingestion.

Note: Genetically modified microorganisms and organisms shall be assigned to this Class if they meet the conditions for this Class.

2.2.61.1.2 Substances and articles of Class 6.1 are subdivided as follows:

T Toxic substances without subsidiary risk, and articles containing such substances:

T1 Organic, liquid

T2 Organic, solid

T3 Organometallic substances

T4 Inorganic, liquid

T5 Inorganic, solid

T6 Liquid, used as pesticides

T7 Solid, used as pesticides

T8 Samples;

T9 Other toxic substances

T10 Articles

TF Toxic substances, flammable, and articles containing such substances

TF1 Liquid

TF2 Liquid, used as pesticides

TF3 Solid

TF4 Articles

TS Toxic substances, self-heating, solid

TW Toxic substances, which, in contact with water, emit flammable gases

TW1 Liquid

TW2 Solid

TO Toxic substances, oxidizing

TO1 Liquid

TO2 Solid

TC Toxic substances, corrosive, and articles containing such substances

TC1 Organic, liquid

TC2 Organic, solid

TC3 Inorganic, liquid

TC4 Inorganic, solid

TC5 Articles

TFC Toxic substances, flammable, corrosive.

TFW Toxic substances, flammable, which, in contact with water, emit flammable gases.

Definitions

2.2.61.1.3 Acute oral intoxication level LD₅₀ (median lethal dose) for acute oral toxicity is the statistically derived single dose of a substance that can be expected to cause death within 14 days in 50 per cent of young adult albino rats when administered by the oral route. The LD₅₀ value is expressed in terms of mass of test substance per mass of test animal (mg/kg);

LD₅₀ for acute dermal toxicity is that dose of the substance which, administered by continuous contact for 24 hours with the bare skin of albino rabbits, is most likely to cause death within 14 days in one half of the animals tested. The number of animals tested shall be sufficient to give a statistically significant result and be in conformity with good pharmacological practice. The result is expressed in milligrams per kg body mass;

LC₅₀ for acute toxicity on inhalation is that concentration of vapour, mist or dust which, administered by continuous inhalation to both male and female young adult albino rats for one hour, is most likely to cause death within 14 days in one half of the animals tested. A solid substance shall be tested if at least 10% (by mass) of its total mass is likely to be dust in a respirable range, e.g. the aerodynamic diameter of that particle fraction is 10 µm or less. A liquid substance shall be tested if a mist is likely to be generated in a leakage of the transport containment.

Both for solid and liquid substances more than 90% (by mass) of a specimen prepared for inhalation toxicity shall be in the respirable range as defined above. The result is expressed in milligrams per litre of air for dusts and mists or in millilitres per cubic metre of air (parts per million) for vapours.

Classification and assignment of packing groups

2.2.61.1.4 Substances of Class 6.1 shall be classified in three packing groups according to the degree of danger they present for carriage, as follows:

- Packing group I: highly toxic substances,
- Packing group II: toxic substances,
- Packing group III: slightly toxic substances.

2.2.61.1.5 Substances, mixtures, solutions and articles classified in Class 6.1 are listed in Table A of Chapter 3.2. The assignment of substances, mixtures and solutions not mentioned by name in Table A of Chapter 3.2 to the relevant entry of 2.2.61.3 and to the relevant packing group in accordance with the provisions of Chapter 2.1, shall be made according to the following criteria in 2.2.61.1.6 to 2.2.61.1.11.

2.2.61.1.6 To assess the degree of toxicity, account shall be taken of human experience of instances of accidental poisoning, as well as special properties possessed by any individual substances: liquid state, high volatility, any special likelihood of cutaneous absorption, and special biological effects.

2.2.61.1.7 In the absence of observations on humans, the degree of toxicity shall be assessed using the available data from animal experiments in accordance with the table below:

	Packing group	Oral toxicity LD ₅₀ , mg/kg	Dermal toxicity LD ₅₀ (mg/kg)	Inhalation toxicity by dusts and mists LC ₅₀ (mg/l)
Highly toxic	I	≤ 5	≤ 50	≤ 0,2
Toxic	II	> 5-50	> 50 - 200	> 0,2-2
Slightly toxic	III ^{a)}	> 50-300	> 200 – 1000	> 2-4

^{a)} Tear gas substances shall be included in packing group II even if data concerning their toxicity correspond to packing group III criteria.

2.2.61.1.7.1 Where a substance exhibits different degrees of toxicity for two or more kinds of exposure, it shall be classified under the highest such degree of toxicity.

2.2.61.1.7.2 Substances meeting the criteria of Class 8 and with an inhalation toxicity of dusts and mists (LC₅₀) leading to packing group I shall only be accepted for an allocation to Class 6.1 if the toxicity through oral ingestion or dermal contact is at least in the range of packing groups I or II. Otherwise an assignment to Class 8 shall be made if appropriate (see 2.2.8.1.4.5).

2.2.61.1.7.3 The criteria for inhalation toxicity of dusts and mists are based on LC₅₀ data relating to 1-hour exposure, and where such information is available it shall be used. However, where only LC₅₀ data relating to 4-hour exposure are available, such figures can be multiplied by four and the product substituted in the above criteria, i.e. LC₅₀ value multiplied by four (4 hour) is considered the equivalent of LC₅₀ (1 hour).

Inhalation toxicity of vapours

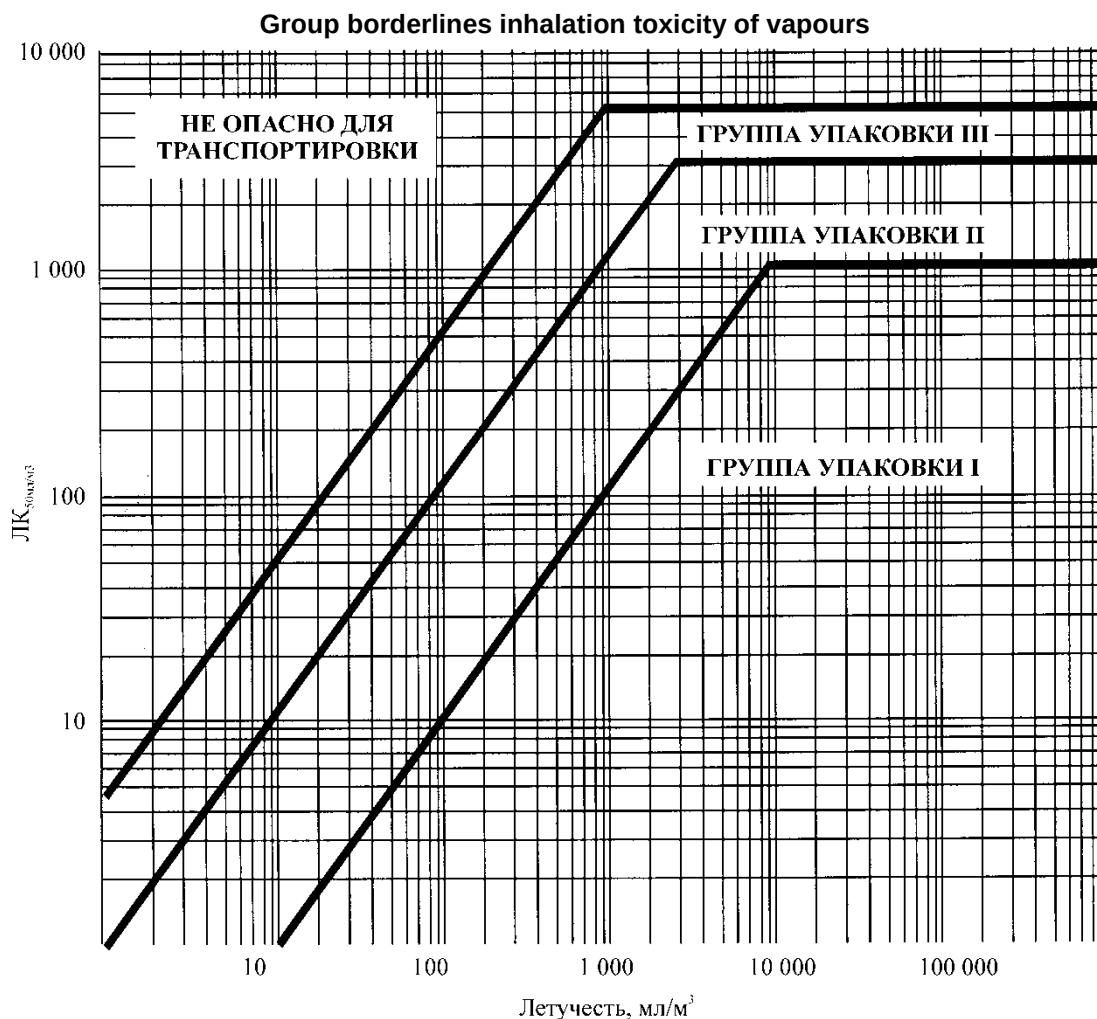
2.2.61.1.8 Liquids giving off toxic vapours shall be classified into the following groups where "V" is the saturated vapour concentration (in ml/m³ of air) (volatility) at 20 °C and standard atmospheric pressure:

	Packing group	Vapour concentration
Highly toxic	I	Where $V \geq 10 \text{ LC}_{50}$ and $\text{LC}_{50} \leq 1\,000 \text{ ml/m}^3$
Toxic	II	Where $V \geq \text{LC}_{50}$ and $\text{LC}_{50} \leq 3\,000 \text{ ml/m}^3$ and the criteria for packing group I are not met
Slightly toxic	III ^{a)}	Where $V \geq 1/5 \text{ LC}_{50}$ and $\text{LC}_{50} \leq 5\,000 \text{ ml/m}^3$ and the criteria for packing groups I and II are not met

a) Tear gas substances shall be included in packing group II even if data concerning their toxicity correspond to packing group III criteria.

These criteria for inhalation toxicity of vapours are based on LC₅₀ data relating to 1-hour exposure, and where such information is available, it shall be used.

However, where only LC₅₀ data relating to 4-hour exposure to the vapours are available, such figures can be multiplied by two and the product substituted in the above criteria, i.e. LC₅₀ (4 hour) × 2 is considered the equivalent of LC₅₀ (1 hour).



(Not dangerous for transport, Packing Group III, Packing Group II, Packing Group I, Volatility ml/m³)

In this figure, the criteria are expressed in graphical form, as an aid to easy classification. However, due to approximations inherent in the use of graphs, substances falling on or near group borderlines shall be checked using numerical criteria.

Mixtures of liquids

2.2.61.1.9 Mixtures of liquids which are toxic on inhalation shall be assigned to packing groups according to the following criteria:

2.2.61.1.9.1 If LC₅₀ is known for each of the toxic substances constituting the mixture, the packing group may be determined as follows:

a) Calculation of the LC₅₀ of the mixture:

$$LC_{50(\text{mixture})} = \frac{1}{\sum_{i=1}^n \frac{f_i}{LC_{50i}}},$$

where:

f_i – molar fraction of constituent i of the mixture;

LC_{50i} – average lethal concentration of constituent i in ml/m³.

b) Calculation of volatility of each mixture constituent:

$$V_i = \frac{P_i \times 10^6}{101,3}, \text{ ml / m}^3,$$

where:

P_i – partial pressure of constituent i in kPa at 20 °C and at standard atmospheric pressure.

c) Calculation of the ratio of volatility to LC50:

$$R = \sum_{i=1}^n \frac{V_i}{LC_{50i}}$$

d) The values calculated for LC50 (mixture) and R are then used to determine the packing group of the mixture:

Packing group I $R \geq 10$ and $LC_{50} \text{ (mixture)} \leq 1000 \text{ ml/m}^3$;

Packing group II $R \geq 1$ and $LC_{50} \text{ (mixture)} \leq 3000 \text{ ml/m}^3$, If the mixture does not meet the criteria for packing group I;

Packing group III $R \geq 1/5$ and $LC_{50} \text{ (mixture)} \leq 5000 \text{ ml/m}^3$, If the mixture does not meet the criteria for packing group I or II.

2.2.61.1.9.2 In the absence of LC50 data on the toxic constituent substances, the mixture may be assigned to a group based on the following simplified threshold toxicity tests. When these threshold tests are used, the most restrictive group shall be determined and used for carrying the mixture.

2.2.61.1.9.3 A mixture is assigned to packing group I only if it meets both of the following criteria:

a) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 1 000 ml/m³ vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC50 equal to or less than 1 000 ml/m³;

b) A sample of vapour in equilibrium with the liquid mixture is diluted with 9 equal volumes of air to form a test atmosphere. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have a volatility equal to or greater than 10 times the mixture LC50.

2.2.61.1.9.4 A mixture is assigned to packing group II only if it meets both of the following criteria, and does not meet the criteria for packing group I:

a) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 3 000 ml/m³ vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC50 equal to or less than 3 000 ml/m³;

b) A sample of the vapour in equilibrium with the liquid mixture is used to form a test atmosphere. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have a volatility equal to or greater than the mixture LC50.

2.2.61.1.9.5 A mixture is assigned to packing group III only if it meets both of the following criteria, and does not meet the criteria for packing groups I or II:

a) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of 5 000 ml/m³ vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC50 equal to or less than 5 000 ml/m³;

b) The vapour concentration (volatility) of the liquid mixture is measured and if the vapour concentration is equal to or greater than 1 000 ml/m³, the mixture is presumed to have a volatility equal to or greater than 1/5 the mixture LC50.

Methods for determining oral and dermal toxicity of mixtures

2.2.61.1.10 When classifying and assigning the appropriate packing group to mixtures in Class 6.1 in accordance with the oral and dermal toxicity criteria (see 2.2.61.1.3), it is necessary to determine the acute LD50 of the mixture.

2.2.61.1.10.1 If a mixture contains only one active substance, and the LD50 of that constituent is known, in the absence of reliable acute oral and dermal toxicity data on the actual mixture to be carried, the oral or dermal LD50 may be obtained by the following method:

$$\text{LD}_{50} \text{ value of preparation} = \frac{\text{LD50 value of active substance} \times 100}{\text{percentage of active substance by mass}}$$

2.2.61.1.10.2 If a mixture contains more than one active constituent, there are three possible approaches that may be used to determine the oral or dermal LD50 of the mixture. The preferred method is to obtain reliable acute oral and dermal toxicity data on the actual mixture to be carried. If reliable, accurate data are not available, then either of the following methods may be performed:

- a) Classify the formulation according to the most hazardous constituent of the mixture as if that constituent were present in the same concentration as the total concentration of all active constituents; or
- b) Apply the formula:

$$\frac{C_A}{T_A} + \frac{C_B}{T_B} + \dots + \frac{C_Z}{T_Z} = \frac{100}{T_M}$$

where:

C – the percentage concentration of constituent A, B, ..., Z in the mixture;

T – the oral LD50 values of constituent A, B, ... Z;

T_M – the oral LD50 value of the mixture.

Note: This formula can also be used for dermal toxicities, provided that this information is available on the same species for all constituents. The use of this formula does not take into account any potentiation or protective phenomena.

Classification of pesticides

2.2.61.1.11 All active pesticide substances and their preparations for which the LC50 and/or LD50 values are known and which are classified in Class 6.1 shall be classified under appropriate packing groups in accordance with the criteria given in 2.2.61.1.6 to 2.2.61.1.9. Substances and preparations which are characterized by subsidiary risks shall be classified according to the precedence of hazard Table in 2.1.3.10 with the assignment of appropriate packing groups.

2.2.61.1.11.1 If the oral or dermal LD50 value for a pesticide preparation is not known, but the LD50 value of its active substance(s) is known, the LD50 value for the preparation may be obtained by applying the procedures in 2.2.61.1.10.

Note: LD50 toxicity data for a number of common pesticides may be obtained from the most current edition of the document "The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification" available from the International Programme on Chemical Safety, World Health Organisation (WHO), 1211 Geneva 27, Switzerland. While that document may be used as a source of LD50 data for pesticides, its classification system shall not be used for purposes of transport classification of, or assignment of packing groups to, pesticides, which shall be in accordance with the requirements of Annex 2 to SMGS.

2.2.61.1.11.2 The proper shipping name used in the carriage of the pesticide shall be selected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary risks it may exhibit (see 3.1.2).

2.2.61.1.12 If substances of Class 6.1, as a result of admixtures, come into categories of risk different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

Note: For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.

2.2.61.1.13 On the basis of the criteria of 2.2.61.1.6 to 2.2.61.1.11, it may also be determined whether the nature of a solution or mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the requirements for this Class 6.1.

2.2.61.1.14 Substances, solutions and mixtures, with the exception of substances and preparations used as pesticides, which are not classified as acute toxic category 1, 2 or 3 according to GHS or document No. 9 of the List, may be considered as substances not belonging to Class 6.1.

2.2.61.2 Substances not accepted for carriage

2.2.61.2.1 Chemically unstable substances of Class 6.1 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions. If temperature control is required to prevent polymerization of a substance the substance shall not be accepted for carriage:

- in a packaging or IBC with an SAPT of 50 °C or less,
- or in a tank with an SAPT of 45 °C or less.

2.2.61.2.2 The following substances and mixtures shall not be accepted for carriage:

- Hydrogen cyanide, anhydrous or in solution, which do not meet the descriptions of UN Nos. 1051, 1613, 1614 and 3294;
- Metal carbonyls, having a flash-point below 23 °C, other than UN Nos. 1259 NICKEL CARBONYL and 1994 IRON PENTACARBONYL;
- 2,3,7,8– TETRACHLORODIBENZO-P-DIOXINE (TCDD) in concentrations considered highly toxic in accordance with the criteria in 2.2.61.1.7;
- UN No. 2249 DICHLORODIMETHYL ETHER, SYMMETRICAL;
- Preparations of phosphides without additives inhibiting the emission of toxic flammable gases.

The following substances shall not be accepted for carriage by rail:

- Barium azide, dry or with less than 50% water or alcohols;
- UN 0135 MERCURY FULMINATE, WETTED.

2.2.61.3 List of collective entries

Subsidiary risk	Classification code	UN No.	Name of substance or article		
Toxic substances and articles containing such substances					
Organic	liquid ^a T1	1583	CHLOROPICRIN MIXTURE, N.O.S.		
		1602	DYE, LIQUID, TOXIC, N.O.S., or		
		1602	DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S..		
		1693	TEAR GAS SUBSTANCE, LIQUID, N.O.S.		
		1851	MEDICINE, LIQUID, TOXIC, N.O.S.		
		2206	ISOCYANATES, TOXIC, N.O.S. or		
		2206	ISOCYANATE SOLUTION, TOXIC, N.O.S		
		3140	ALKALOIDS, LIQUID, N.O.S. or		
		3140	ALKALOID SALTS, LIQUID, N.O.S..		
		3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.		
		3144	NICOTINE COMPOUND, LIQUID, N.O.S. or		
		3144	NICOTINE PREPARATION, LIQUID, N.O.S.		
		3172	TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.		
		3276	NITRILES, LIQUID, TOXIC, N.O.S.		
		3278	ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S.		
Organic	liquid ^a T1	3381	TOXIC BY INHALATION LIQUID, N.O.S. with an LC ₅₀ lower than or equal to 500 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀		
		3382	TOXIC BY INHALATION LIQUID, N.O.S. with an LC ₅₀ lower than or equal to 1 000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀		
		2810	TOXIC LIQUID, ORGANIC, N.O.S.		
Without subsidiary risk	Solid ^{a,b} T2	1544	ALKALOIDS, SOLID, N.O.S. or		
		1544	ALKALOID SALTS, SOLID, N.O.S.		
		1601	DISINFECTANT, SOLID, TOXIC, N.O.S.		
		1655	NICOTINE COMPOUND, SOLID, N.O.S., or		
		1655	NICOTINE PREPARATION, SOLID, N.O.S.		
		3143	DYE, SOLID, TOXIC, N.O.S. or		
		3143	DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.		
		3249	MEDICINE, SOLID, TOXIC, N.O.S.		
		3439	NITRILES, SOLID, TOXIC, N.O.S.		
		3448	TEAR GAS SUBSTANCE, SOLID, N.O.S.		
		3462	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.		
		Organometallic ^{c,d}	Organometallic ^{c,d} T3	2026	PHENYLMERCURIC COMPOUND, N.O.S.
				2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.
				3146	ORGANOTIN COMPOUND, SOLID, N.O.S.
			Organometallic ^{c,d}	Organometallic ^{c,d} T3	3280
3281	METAL CARBONYLS, LIQUID, N.O.S.				
3465	ORGANOARSENIC COMPOUND, SOLID, N.O.S.				
3466	METAL CARBONYLS, SOLID, N.O.S.				
3282	ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.				
3467	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.				
Without subsidiary risk	Liquid ^e T4		1556	ARSENIC COMPOUND, LIQUID, N.O.S., inorganic including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, N.O.S.	
			1935	CYANIDE SOLUTION, N.O.S.	
			2024	MERCURY COMPOUND, LIQUID, N.O.S.	
			3141	ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S.	
			3287	TOXIC LIQUID, INORGANIC, N.O.S.	
			3440	SELENIUM COMPOUND, LIQUID, N.O.S.	
		3381	TOXIC BY INHALATION LIQUID, N.O.S with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀		
		3382	TOXIC BY INHALATION LIQUID, N.O.S. with an LC ₅₀ lower than or equal to 1 000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀		

Inorganic	Solid f,g	T5	1549	ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S.
			1557	ARSENIC COMPOUND, SOLID, N.O.S., including: Arsenates, n.o.s.; Arsenites, n.o.s.;
			1564	BARIUM COMPOUND, N.O.S.
			1566	BERYLLIUM COMPOUND, N.O.S.
			1588	CYANIDES, INORGANIC, SOLID, N.O.S.
			1707	THALLIUM COMPOUND, N.O.S.
			2025	MERCURY COMPOUND, SOLID, N.O.S.
Pesticides	Liquidⁿ	T6	2291	LEAD COMPOUND, SOLUBLE, N.O.S.
			2570	CADMIUM COMPOUND
			2630	SELENATES or
			2630	SELENITES
			2856	FLUOROSILICATES, N.O.S.
			3283	SELENIUM COMPOUND, SOLID, N.O.S.
			3284	TELLURIUM COMPOUND, N.O.S.
			3285	VANADIUM COMPOUND, N.O.S.
			3288	TOXIC SOLID, INORGANIC, N.O.S.
			2992	CARBAMATE PESTICIDE, LIQUID, TOXIC
			2994	ARSENICAL PESTICIDE, LIQUID, TOXIC
			2996	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC
			2998	TRIAZINE PESTICIDE, LIQUID, TOXIC
			3006	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC
			3010	COPPER BASED PESTICIDE, LIQUID, TOXIC
			3012	MERCURY BASED PESTICIDE, LIQUID, TOXIC
			3014	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC
			3016	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC
			3018	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC
			3020	ORGANOTIN PESTICIDE, LIQUID, TOXIC
			3026	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC
			3348	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC
			3352	PYRETHROID PESTICIDE, LIQUID, TOXIC
			2902	PESTICIDE, LIQUID, TOXIC, N.O.S.
Pesticides	Solid^h	T7	2757	CARBAMATE PESTICIDE, SOLID, TOXIC
			2759	ARSENICAL PESTICIDE, SOLID, TOXIC
			2761	ORGANOCHLORINE PESTICIDE, SOLID, TOXIC
			2763	TRIAZINE PESTICIDE, SOLID, TOXIC
			2771	THIOCARBAMATE PESTICIDE, SOLID, TOXIC
			2775	COPPER BASED PESTICIDE, SOLID, TOXIC
			2777	MERCURY BASED PESTICIDE, SOLID, TOXIC
			2779	SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC
			2781	BIPYRIDILIUM PESTICIDE, SOLID, TOXIC
			2783	ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC
			2786	ORGANOTIN PESTICIDE, SOLID, TOXIC
			3027	COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC
			3048	ALUMINIUM PHOSPHIDE PESTICIDE
			3345	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC
			3349	PYRETHROID PESTICIDE, SOLID, TOXIC
			2588	PESTICIDE, SOLID, TOXIC, N.O.S.
Samples		T8	3315	CHEMICAL SAMPLE, TOXIC
Other toxic substancesⁱ		T9	3243	SOLIDS CONTAINING TOXIC LIQUID, N.O.S.
Articles		T10	3546	ARTICLES CONTAINING TOXIC SUBSTANCE, N.O.S.

Flammable TF	Liquid ^{i,k}	TF1	3071	MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S. or
			3071	MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.
			3080	ISOCYANATES, TOXIC, FLAMMABLE, N.O.S.or
			3080	ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.
			3275	NITRILES, TOXIC, FLAMMABLE, N.O.S.
			3279	ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.
			3383	TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
			3384	TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 1 000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
			2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.
2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE			
2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE			
2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE			
3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE			
3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE			
3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE			
3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE			
3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE			
	Pesticides (flash-point less than 23°C)	TF2		
			3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S.
			2930	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.
			3535	TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.
			1700	TEAR GAS CANDLES
Solid, Self-heating ^c		TS	3124	TOXIC SOLID, SELF-HEATING, N.O.S.
Water-reactive ^d	Liquid	TW1	3385	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
			3386	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC ₅₀ lower than or equal to 1 000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
			3123	TOXIC LIQUID, WATER-REACTIVE, N.O.S.
TW	Solid ⁱ	TW2	3125	TOXIC SOLID, WATER-REACTIVE, N.O.S.
Oxidizing ^m	Liquid	TO1	3387	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
			3388	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC ₅₀ lower than or equal to 1 000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
			3122	TOXIC LIQUID, OXIDIZING, N.O.S.
TO	Solid	TO2	3086	TOXIC SOLID, OXIDIZING, N.O.S.
	Liquid	TC1	3277	CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.
			3361	CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.
			3389	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
			3390	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 1 000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
			2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.
	Organic			

		Solid	TC2	2928	TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.
Corrosive ⁿ TC	Inorganic	Liquid	TC3	3389	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
				3390	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 1 000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
				3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.
		Solid	TC4	3290	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.
		Articles	TC5	(No collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to the table of precedence of hazard in 2.1.3.10)	
Flammable, corrosive			TFC	2742	CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.
				3362	CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.
				3488	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
				3489	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀ .
Flammable, water-reactive			TFW	3490	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
				3491	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m ³ and saturated vapour

Remarks:

- Substances and preparations containing alkaloids or nicotine used as pesticides shall be classified under UN No. 2588 PESTICIDES, SOLID, TOXIC, N.O.S., UN No. 2902 PESTICIDES, LIQUID, TOXIC, N.O.S. or UN No. 2903 PESTICIDES, LIQUID, TOXIC, FLAMMABLE, N.O.S.
- Active substances and triturations or mixtures of substances intended for laboratories and experiments and for the manufacture of pharmaceutical products with other substances shall be classified according to their toxicity (see 2.2.61.1.7 to 2.2.61.1.11).
- Self-heating substances, slightly toxic and spontaneously combustible organometallic compounds, are substances of Class 4.2.
- Water-reactive substances, slightly toxic, and water-reactive organometallic compounds, are substances of Class 4.3.
- Mercury fulminate, wetted with not less than 20% water, or mixture of alcohol and water by mass is a substance of Class 1, UN No. 0135.
- Ferricyanides, ferrocyanides, alkaline thiocyanates and ammonium thiocyanates are not subject to the provisions of Annex 2 to SMGS.
- Lead salts and lead pigments which, when mixed in a ratio of 1:1000 with 0.07M hydrochloric acid and stirred for one hour at a temperature of 23 °C ± 2 °C, exhibit a solubility of 5% or less, are not subject to the provisions of Annex 2 to SMGS.
- Articles impregnated with this pesticide, such as fibreboard plates, paper strips, cotton-wool balls, sheets of plastics material, in hermetically closed wrappings, are not subject to the provisions of Annex 2 to SMGS.
- Mixtures of solids which are not subject to the provisions of Annex 2 to SMGS and of toxic liquids may be carried under UN No. 3243 without first applying the classification criteria of Class 6.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging, wagon or container is closed. Each packaging shall correspond to a design type that has passed a leakproofness test at the packing group II level. This entry shall not be used for solids containing a packing group I liquid.
- Highly toxic and toxic flammable liquids having a flash-point below 23 °C are substances of Class 3 except those which are highly toxic by inhalation, as defined in 2.2.61.1.4 to 2.2.61.1.9. Liquids which are highly toxic by inhalation are indicated as "toxic by inhalation" in their proper shipping name in Column (2) or by special provision 354 in Column (6) of Table A of Chapter 3.2.
- Flammable liquids, slightly toxic, with the exception of substances and preparations used as pesticides, having a flash-point between 23 °C and 60 °C inclusive, are substances of Class 3.

- l) Metal phosphides assigned to UN Nos. 1360, 1397, 1432, 1714, 2011 and 2013 are substances of Class 4.3.
- m) Oxidizing substances, slightly toxic, are substances of Class 5.1.
- n) Substances slightly toxic and slightly corrosive, are substances of Class 8.

2.2.62 CLASS 6.2 INFECTIOUS SUBSTANCES

2.2.62.1 Criteria

2.2.62.1.1 The heading of Class 6.2 covers infectious substances. Infectious substances are substances which are known or are reasonably expected to contain pathogens. Pathogens are defined as microorganisms (including bacteria, viruses, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.

Note 1: *Genetically modified microorganisms and organisms, biological products, diagnostic specimens and infected live animals shall be assigned to this Class if they meet the conditions for the class 6.2. The carriage of unintentionally or naturally infected live animals is subject only to the relevant rules and regulations of the respective countries of origin, transit and destination.*

Note 2: *Toxins from plant, animal or bacterial sources which do not contain any infectious substances or organisms or which are not contained in them are substances of Class 6.1, UN No. 3172 or 3462.*

2.2.62.1.2 Substances of Class 6.2 are subdivided as follows:

- I1** Infectious substances affecting humans
- I2** Infectious substances affecting animals only
- I3** Clinical waste
- I4** Biological substances

Definitions

2.2.62.1.3 For the purposes of Annex 2 to SMGS:

"Biological products" are those products derived from living organisms which are manufactured and distributed in accordance with the requirements of appropriate national authorities, which may have special licensing requirements, and are used either for prevention, treatment, or diagnosis of disease in humans or animals, or for development, experimental or investigational purposes related thereto. They include, but are not limited to, finished or unfinished products such as vaccines;

"Cultures" are the result of a process by which pathogens are intentionally propagated. This definition does not include human or animal patient specimens as defined in this paragraph;

"Medical or clinical wastes" are wastes derived from the veterinary treatment of animals, the medical treatment of humans or from bio-research;

"Patient specimens" are those, collected directly from humans or animals, including, but not limited to, excreta, secreta, blood and its components, tissue and tissue fluid swabs, and body parts being carried for purposes such as research, diagnosis, investigational activities, disease treatment and prevention.

Classification

2.2.62.1.4 Infectious substances shall be classified in Class 6.2 and assigned to UN Nos. 2814, 2900, 3291, 3373 or 3549, as appropriate.

Infectious substances are divided into the following categories:

2.2.62.1.4.1 Category A: An infectious substance which is carried in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. Indicative examples of substances that meet these criteria are given in the table in this paragraph.

Note: An exposure occurs when an infectious substance is released outside of the protective packaging, resulting in physical contact with humans or animals.

(a) Infectious substances meeting these criteria which cause disease in humans or both in humans and animals shall be assigned to UN No. 2814. Infectious substances which cause disease only in animals shall be assigned to UN No. 2900;

(b) Assignment to UN No. 2814 or UN No. 2900 shall be based on the known medical history and symptoms of the source human or animal, endemic local conditions, or professional judgement concerning individual circumstances of the source human or animal.

Note 1: The proper shipping name for UN No. 2814 is "INFECTIOUS SUBSTANCE, AFFECTING HUMANS". The proper shipping name for UN No. 2900 is "INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only".

Note 2: The following table is not exhaustive. Infectious substances, including new or emerging pathogens, which do not appear in the table but which meet the same criteria shall be assigned to Category A. In addition, if there is doubt as to whether or not a substance meets the criteria it shall be included in Category A.

Note 3: In the following table, the microorganisms written in italics are bacteria or fungi.

Indicative examples of infectious substances included in Category A in any form unless otherwise indicated (see 2.2.62.1.4.1)	
UN Number and name	Microorganism
UN No. 2814 Infectious substances affecting humans	Bacillus anthracis (cultures only) <i>Brucella abortus</i> (cultures only) <i>Brucella melitensis</i> (cultures only) <i>Brucella suis</i> (cultures only) Burkholderia mallei - Pseudomonas mallei - Glanders (cultures only) Burkholderia pseudomallei - Pseudomonas pseudomallei (cultures only) <i>Chlamydia psittaci</i> - avian strains (cultures only) Clostridium botulinum (cultures only) Coccidioides immitis (cultures only) Coxiella burnetii (cultures only) Crimean-Congo haemorrhagic fever virus Dengue virus (cultures only) Eastern equine encephalitis virus (cultures only) <i>Escherichia coli</i>, verotoxigenic (cultures only)¹⁰ Ebola virus Flexal virus Francisella tularensis (cultures only) Guanarito virus Hantaan virus Hantavirus causing haemorrhagic fever with renal syndrome Hendra virus Hepatitis B virus (cultures only) Herpes B virus (cultures only) Human immunodeficiency virus (cultures only) Highly pathogenic avian influenza virus (cultures only) Japanese Encephalitis virus (cultures only) Junin virus Kyasanur Forest disease virus Lassa virus Machupo virus Marburg virus

¹⁰ Nevertheless, when the cultures are intended for diagnostic or clinical purposes, they may be classified as infectious substances of Category B.

Indicative examples of infectious substances included in Category A in any form unless otherwise indicated (see 2.2.62.1.4.1)	
UN Number and name	Microorganism
	Monkeypox virus (cultures only) Mycobacterium tuberculosis (cultures only) ¹⁰ Nipah virus Omsk haemorrhagic fever virus Poliovirus (cultures only) Rabies virus (cultures only) Rickettsia prowazekii (cultures only) Rickettsia rickettsii (cultures only) Rift Valley fever virus (cultures only) Russian spring-summer encephalitis virus (cultures only) Sabia virus Shigella dysenteriae, type 1 (cultures only) ¹⁰ Tick-borne encephalitis virus (cultures only) Variola virus Venezuelan equine encephalitis virus (cultures only) West Nile virus (cultures only) Yellow fever virus (cultures only) Yersinia pestis (cultures only)
UN No. 2900 Infectious substances affecting animals only	African swine fever virus (cultures only) Avian paramyxovirus Type 1 - Velogenic Newcastle disease (cultures only) Classical swine fever virus (cultures only) Foot and mouth disease virus (cultures only) Lumpy skin disease virus (cultures only) Mycoplasma mycoides - Contagious bovine pleuropneumonia (cultures only) Peste des petits ruminants virus (cultures only) Rinderpest virus (cultures only) Sheep-pox virus (cultures only) Goatpox virus (cultures only) Swine vesicular disease virus (cultures only) Vesicular stomatitis virus (cultures only)

2.2.62.1.4.2 Category B: An infectious substance which does not meet the criteria for inclusion in Category A. Infectious substances in Category B shall be assigned to UN No. 3373.

Note: The proper shipping name of UN No. 3373 is "BIOLOGICAL SUBSTANCE, CATEGORY B".

2.2.62.1.5 Exemptions

2.2.62.1.5.1 Substances which do not contain infectious substances or substances which are unlikely to cause disease in humans or animals are not subject to the provisions of Annex 2 to SMGS unless they meet the criteria for inclusion in another class.

2.2.62.1.5.2 Substances containing microorganisms which are non-pathogenic to humans or animals are not subject to Annex 2 to SMGS unless they meet the criteria for inclusion in another class.

2.2.62.1.5.3 Substances in a form that any present pathogens have been neutralized or inactivated such that they no longer pose a health risk are not subject to Annex 2 to SMGS unless they meet the criteria for inclusion in another class.

Note: Medical equipment which has been drained of free liquid is deemed to meet the requirements of this paragraph and is not subject to the provisions of Annex 2 to SMGS.

2.2.62.1.5.4 Substances where the concentration of pathogens is at a level naturally encountered (including foodstuff and water samples) and which are not considered to pose a significant risk of infection are not subject to Annex 2 to SMGS unless they meet the criteria for inclusion in another class.

2.2.62.1.5.5 Dried blood spots, collected by applying a drop of blood onto absorbent material, are not subject to Annex 2 to SMGS.

2.2.62.1.5.6 Faecal occult blood screening samples are not subject to Annex 2 to SMGS.

2.2.62.1.5.7 Blood or blood components which have been collected for the purposes of transfusion or for the preparation of blood products to be used for transfusion or transplantation and any tissues or organs intended for use in transplantation as well as samples drawn in connection with such purposes are not subject to Annex 2 to SMGS.

2.2.62.1.5.8 Human or animal specimens for which there is minimal likelihood that pathogens are present are not subject to Annex 2 to SMGS if the specimen is carried in a packaging which will prevent any leakage and which is marked with the words "EXEMPT HUMAN SPECIMEN" or "EXEMPT ANIMAL SPECIMEN", as appropriate.

The packaging is deemed to comply with the above requirements if it meets the following conditions:

a) The packaging consists of three components:

- a leak-proof primary receptacle(s) ;
- a leak-proof secondary packaging; and
- an outer packaging of adequate strength for its capacity, mass and intended use, and with at least one surface having minimum dimensions of 100 mm x 100 mm;

b) For liquids, absorbent material in sufficient quantity to absorb the entire contents is placed between the primary receptacle(s) and the secondary packaging so that, during carriage, any release or leak of a liquid substance will not reach the outer packaging and will not compromise the integrity of the cushioning material;

c) When multiple fragile primary receptacles are placed in a single secondary packaging, they are either individually wrapped or separated to prevent contact between them.

Note 1: An element of professional judgment is required to determine if a substance is exempt under this paragraph. That judgment should be based on the known medical history, symptoms and individual circumstances of the source, human or animal, and endemic local conditions. Examples of specimens which may be carried under this paragraph include

- the blood or urine tests to monitor cholesterol levels, blood glucose levels, hormone levels, or prostate specific antibodies (PSA);
- those required to monitor organ function such as heart, liver or kidney function for humans or animals with non-infectious diseases, or for therapeutic drug monitoring;
- those conducted for insurance or employment purposes and are intended to determine the presence of drugs or alcohol;
- pregnancy test;
- biopsies to detect cancer; and
- antibody detection in humans or animals in the absence of any concern for infection (e.g. evaluation of vaccine induced immunity, diagnosis of autoimmune disease, etc.).

Note 2: For air transport, packagings for specimens exempted under this paragraph shall meet the conditions in (a) to (c).

2.2.62.1.5.9 Except for:

- a) Medical waste (UN Nos. 3291 and 3549);
- b) Medical devices or equipment contaminated with or containing infectious substances in Category A (UN No. 2814 or UN No. 2900); and

- c) Medical devices or equipment contaminated with or containing other dangerous goods that meet the definition of another class,

medical devices or equipment potentially contaminated with or containing infectious substances which are being carried for disinfection, cleaning, sterilization, repair, or equipment evaluation are not subject to the provisions of Annex 2 to SMGS other than those of this paragraph if packed in packagings designed and constructed in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents. Packagings shall be designed to meet the construction requirements listed in 6.1.4 or 6.6.4.

These packagings shall meet the general packing requirements of 4.1.1.1 and 4.1.1.2 and be capable of retaining the medical devices and equipment when dropped from a height of 1.2 m.

The packagings shall be marked "USED MEDICAL DEVICE" or "USED MEDICAL EQUIPMENT". When using overpacks, these shall be marked in the same way, except when the inscription remains visible.

2.2.62.1.6 (Reserved)

2.2.62.1.7 (Reserved)

2.2.62.1.8 (Reserved)

2.2.62.1.9 Biological products

For the purposes of Annex 2 to SMGS, biological products are divided into the following groups:

- a) those which are manufactured and packaged in accordance with the requirements of appropriate national authorities and carried for the purposes of final packaging or distribution, and use for personal health care by medical professionals or individuals. Substances in this group are not subject to the provisions of Annex 2 to SMGS;
- (b) those which do not fall under paragraph (a) and are known or reasonably believed to contain infectious substances and which meet the criteria for inclusion in Category A or Category B. Substances in this group shall be assigned to UN Nos. 2814, 2900 or 3373, as appropriate.

Note: Some licensed biological products may present a biohazard only in certain parts of the world. In that case, competent authorities may require these biological products to be in compliance with local requirements for infectious substances or may impose other restrictions.

2.2.62.1.10 Genetically modified microorganisms and organisms

Genetically modified microorganisms not meeting the definition of infectious substance shall be classified according to section 2.2.9.

2.2.62.1.11 Medical or clinical wastes

2.2.62.1.11.1 Medical or clinical wastes containing

- a) Category A infectious substances shall be assigned to UN No. 2814, UN No. 2900 or UN No. 3549, as appropriate. Solid medical waste containing Category A infectious substances generated from the medical treatment of humans or veterinary treatment of animals may be assigned to UN No. 3549. The UN No. 3549 entry shall not be used for waste from bio-research or liquid waste;
- b) Category B infectious substances shall be assigned to UN No. 3291

Note 1: The proper shipping name for UN No. 3549 is "MEDICAL WASTE, CATEGORY A, AFFECTING HUMANS, solid" or "MEDICAL WASTE, CATEGORY A, AFFECTING ANIMALS only, solid"

Note 2: Medical or clinical wastes assigned to number 18 01 03 (Wastes from human or animal health care and/or related research – wastes from natal care, diagnosis, treatment or prevention of disease in humans – wastes whose collection and disposal is subject to special requirements in order to prevent infection) or 18 02 02 (Wastes from human or animal health care and/or related research – wastes from research, diagnosis, treatment or prevention of disease involving animals – wastes whose collection and disposal is subject to special requirements in order to prevent infection) according to the Document No. 9A of the List shall be classified according to the provisions set out in this paragraph, based on the medical or veterinary diagnosis concerning the patient or the animal.

2.2.62.1.11.2 Medical or clinical wastes which are reasonably believed to have a low probability of containing infectious substances shall be assigned to UN No. 3291. For the assignment, international, regional or national waste catalogues may be taken into account.

Note 1: The proper shipping name for UN No. 3291 is "CLINICAL WASTE, UNSPECIFIED, N.O.S." or "(BIO) MEDICAL WASTE, N.O.S." or "REGULATED MEDICAL WASTE, N.O.S."

Note 2: Notwithstanding the classification criteria set out above, medical or clinical wastes assigned to number 18 01 04 (Wastes from human or animal health care and/or related research – wastes from natal care, diagnosis, treatment or prevention of disease in humans – wastes whose collection and disposal is not subject to special requirements in order to prevent infection) or 18 02 03 (Wastes from human or animal health care and/or related research – wastes from research, diagnosis, treatment or prevention of disease involving animals – wastes whose collection and disposal is not subject to special requirements in order to prevent infection) according to the Document No. 9A of the List, are not subject to the provisions of Annex 2 to SMGS.

2.2.62.1.11.3 Decontaminated medical or clinical wastes which previously contained infectious substances are not subject to the provisions of Annex 2 to SMGS unless they meet the criteria for inclusion in another class.

2.2.62.1.11.4 (Reserved).

2.2.62.1.12 Infected animals

2.2.62.1.12.1 Unless an infectious substance cannot be consigned by any other means, live animals shall not be used to consign such a substance. A live animal which has been intentionally infected and is known or suspected to contain an infectious substance shall only be carried under terms and conditions approved by the competent.

Note: *The approval of the competent authorities shall be issued on the basis of the relevant rules for the carriage of live animals, taking into consideration dangerous goods aspects. The authorities that are competent to lay down these conditions and rules for approval shall be regulated at national level.*

If there is no approval by a competent authority of an SMGS Contracting State, the competent authority of an SMGS Contracting State may recognize an approval issued by the competent authority of a country that is not an SMGS Contracting State.

Rules for the carriage of livestock are, for example, contained in documents Nos. 10 and 11 of the List.

2.2.62.1.12.2 (Reserved)

2.2.62.2 Substances not accepted for carriage

Live vertebrate or invertebrate animals shall not be used to carry an infectious agent unless the agent can not be carried by other means or unless this carriage has been approved by the competent authority (see 2.2.62.1.12.1).

2.2.62.3 List of collective entries

Classification code explanation	Classification code	UN NO.	Name of the substance or article
Effects on humans	I1	2814	INFECTIOUS SUBSTANCE, AFFECTING HUMANS
Effects on animals only	I2	2900	INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only
Clinical waste	I3	3549	MEDICAL WASTE, CATEGORY A, AFFECTING HUMANS, solid or
		3549	MEDICAL WASTE, CATEGORY A, AFFECTING ANIMALS only, solid
		3291	CLINICAL WASTE, UNSPECIFIED, N.O.S. or
		3291	(BIO)MEDICAL WASTE, N.O.S. or
		3291	REGULATED MEDICAL WASTE, N.O.S.
Biological substance	I4	3373	BIOLOGICAL SUBSTANCE, CATEGORY B

2.2.7 CLASS 7 RADIOACTIVE MATERIEL

2.2.7.1 Definitions

2.2.7.1.1 Radioactive material means any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 2.2.7.2.2.1 to 2.2.7.2.2.6.

2.2.7.1.2 Radioactive contamination

Radioactive contamination means the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm² for all other alphaemitters.

Non-fixed radioactive contamination means contamination that can be removed from a surface during routine conditions of carriage.

Fixed radioactive contamination means contamination that can't be removed from a surface during routine conditions of carriage.

2.2.7.1.3 Definitions of specific terms

A₁ and A₂:

A₁ means the activity value of special form radioactive material which is listed in Table 2.2.7.2.2.1 or derived in 2.2.7.2.2.2 and is used to determine the activity limits for the requirements of Annex 2 to SMGS.

A₂ means the activity value of radioactive material, other than special form radioactive material, which is listed in Table 2.2.7.2.2.1 or derived in 2.2.7.2.2.2 and is used to determine the activity limits for the requirements of Annex 2 to SMGS.

Fissile nuclides means uranium-233, uranium-235, plutonium-239 and plutonium-241.

Fissile material means a material containing any of the fissile nuclides. Excluded from the definition of fissile material are the following:

- (a) Natural uranium or depleted uranium which is unirradiated;
- (b) Natural uranium or depleted uranium which has been irradiated in thermal reactors only;
- (c) Material with fissile nuclides less than a total of 0.25 g;
- (d) Any combination of (a), (b) and/or (c).

These exclusions are only valid if there is no other material with fissile nuclides in the package or in the consignment if shipped unpackaged.

Low dispersible radioactive material means either a solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form.

Low specific activity (LSA) material means radioactive material which by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply. External shielding materials surrounding the LSA material shall not be considered in determining the estimated average specific activity.

Low toxicity alpha emitters are: natural uranium; depleted uranium; natural thorium; uranium-235 or uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

Specific activity of a radionuclide means the activity per unit mass of that nuclide. The specific activity of a material shall mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.

NOTE: The terms "activity concentration" and "specific activity" are synonymous for the purpose of Annex 2 to SMGS.

Special form radioactive material means either:

- (a) An indispersible solid radioactive material; or
- (b) A sealed capsule containing radioactive material.

Surface contaminated object (SCO¹¹) means a solid object which is not itself radioactive but which has radioactive material distributed on its surface.

¹¹ "SCO" is an abbreviation of the English term "Surface Contaminated Object"

Unirradiated thorium means thorium containing not more than 10^{-7} g of uranium-233 per gram of thorium-232.

Unirradiated uranium means uranium containing not more than 2×10^3 Bq of plutonium per gram of uranium-235, not more than 9×10^6 Bq of fission products per gram of uranium-235 and not more than 5×10^{-3} g of uranium-236 per gram of uranium-235.

Uranium natural, depleted, enriched means the following:

Natural uranium means uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238, and 0.72% uranium-235 by mass).

Depleted uranium means uranium containing a lesser mass percentage of uranium-235 than in natural uranium.

Enriched uranium means uranium containing a greater mass percentage of uranium-235 than 0.72%.

In all cases, a very small mass percentage of uranium-234 is present.

2.2.7.2 Classification

2.2.7.2.1 General provisions

2.2.7.2.1.1 Radioactive material shall be assigned to one of the UN numbers specified in Table 2.2.7.2.1.1, in accordance with 2.2.7.2.4 and 2.2.7.2.5, taking into account the material characteristics determined in 2.2.7.2.3.

Table 2.2.7.2.1.1 Assignment of UN numbers

	UN No.	Proper shipping name and description ^a
Excepted packages (1.7.1.5)		
	2908	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – EMPTY PACKAGING
	2909	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM
	2910	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – LIMITED QUANTITY OF MATERIAL
	2911	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – INSTRUMENTS or ARTICLES
	3507	URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE less than 0.1 kg per package, non-fissile or fissile-excepted ^{b,c}
Low specific activity radioactive material (2.2.7.2.3.1)		
	2912	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non-fissile or fissile-excepted ^b
	3321	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non fissile or fissile-excepted ^b
	3322	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted ^b
	3324	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE
	3325	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY, (LSA-III), FISSILE
Surface contaminated objects (2.2.7.2.3.2)		
	2913	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I, SCO-II or SCO-III), non-fissile or fissile-excepted ^b
	3326	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE
Type A packages (2.2.7.2.4.4)		
	2915	RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non-fissile or fissile- excepted ^b
	3327	RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form
	3332	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile- excepted ^b
	3333	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE
Type B(U) packages (2.2.7.2.4.6)		
	2916	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non-fissile or fissile-excepted ^b
	3328	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE
Type B(M) packages (2.2.7.2.4.6)		
	2917	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non-fissile or fissile-excepted ^b
	3329	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE
Type C packages (2.2.7.2.4.6)		
	3323	RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted ^b
	3330	RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE
Special arrangement (2.2.7.2.5)		

	2919	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non-fissile or fissile-excepted ^b
	3331	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE
Uranium hexafluoride (2.2.7.2.4.5)		
	2977	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE
	2978	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted ^b
	3507	URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE less than 0.1 kg per package, non-fissile or fissile-excepted ^{b,c}

^a The proper shipping name is found in the column "proper shipping name and description" and is restricted to that part shown in capital letters. In the cases of UN Nos. 2909, 2911, 2913 and 3326, where alternative proper shipping names are separated by the word "or" only the relevant proper shipping name shall be used.

^b The term "fissile-excepted" refers only to material excepted under 2.2.7.2.3.5

^c For UN No. 3507, see also special provision 369 in Chapter 3.3

2.2.7.2.2 Determination of basic radionuclide values

2.2.7.2.2.1 The following basic values for individual radionuclides are given in Table 2.2.7.2.2.1:

- a) A1 and A2 in TBq;
- b) Activity concentration limits for exempt material in Bq/g;
- c) Activity limits for exempt consignments in Bq.

Table 2.2.7.2.2.1: Basic radionuclides values for individual radionuclides

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Actinium (89)				
Ac-225 (a)	8×10^{-1}	6×10^{-3}	1×10^1	1×10^4
Ac-227 (a)	9×10^{-1}	9×10^{-5}	1×10^{-1}	1×10^3
Ac-228	6×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Silver (47)				
Ag-105	2×10^0	2×10^0	1×10^2	1×10^6
Ag-108m (a)	7×10^{-1}	7×10^{-1}	1×10^1 (b)	1×10^6 (b)
Ag-110m (a)	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Ag-111	2×10^0	6×10^{-1}	1×10^3	1×10^6
Aluminium (13)				
Al-26	1×10^{-1}	1×10^{-1}	1×10^1	1×10^5
Americium (95)				
Am-241	1×10^1	1×10^{-3}	1×10^0	1×10^4
Am-242m (a)	1×10^1	1×10^{-3}	1×10^0 (b)	1×10^4 (b)
Am-243 (a)	5×10^0	1×10^{-3}	1×10^0 (b)	1×10^3 (b)
Argon (18)				
Ar-37	4×10^1	4×10^1	1×10^6	1×10^8
Ar-39	4×10^1	2×10^1	1×10^7	1×10^4
Ar-41	3×10^{-1}	3×10^{-1}	1×10^2	1×10^9
Arsenic (33)				
As-72	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
As-73	4×10^1	4×10^1	1×10^3	1×10^7
As-74	1×10^0	9×10^{-1}	1×10^1	1×10^6
As-76	3×10^{-1}	3×10^{-1}	1×10^2	1×10^5
As-77	2×10^1	7×10^{-1}	1×10^3	1×10^6
Astatine (85)				
At-211 (a)	2×10^1	5×10^{-1}	1×10^3	1×10^7
Gold (79)				
Au-193	7×10^0	2×10^0	1×10^2	1×10^7
Au-194	1×10^0	1×10^0	1×10^1	1×10^6

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Au-195	1×10^1	6×10^0	1×10^2	1×10^7
Au-198	1×10^0	6×10^{-1}	1×10^2	1×10^6
Au-199	1×10^1	6×10^{-1}	1×10^2	1×10^6
Barium (56)				
Ba-131 (a)	2×10^0	2×10^0	1×10^2	1×10^6
Ba-133	3×10^0	3×10^0	1×10^2	1×10^6
Ba-133m	2×10^1	6×10^{-1}	1×10^2	1×10^6
Ba-135m	2×10^1	6×10^{-1}	1×10^2	1×10^6
1	2	3	4	5
Ba-140 (a)	5×10^{-1}	3×10^{-1}	1×10^1 (b)	1×10^5 (b)
Beryllium (4)				
Be-7	2×10^1	2×10^1	1×10^3	1×10^7
Be-10	4×10^1	6×10^{-1}	1×10^4	1×10^6
Bismuth (83)				
Bi-205	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Bi-206	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Bi-207	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Bi-210	1×10^0	6×10^{-1}	1×10^3	1×10^6
Bi-210m (a)	6×10^{-1}	2×10^{-2}	1×10^1	1×10^5
Bi-212 (a)	7×10^{-1}	6×10^{-1}	1×10^1 (b)	1×10^5 (b)
Berkelium (97)				
Bk-247	8×10^0	8×10^{-4}	1×10^0	1×10^4
Bk-249 (a)	4×10^1	3×10^{-1}	1×10^3	1×10^6
Bromine (35)				
Br-76	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Br-77	3×10^0	3×10^0	1×10^2	1×10^6
Br-82	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Carbon (6)				
C-11	1×10^0	6×10^{-1}	1×10^1	1×10^6
C-14	4×10^1	3×10^0	1×10^4	1×10^7
Calcium (20)				
Ca-41	Unlimited	Unlimited	1×10^5	1×10^7
Ca-45	4×10^1	1×10^0	1×10^4	1×10^7
Ca-47 (a)	3×10^0	3×10^{-1}	1×10^1	1×10^6
Cadmium (48)				
Cd-109	3×10^1	2×10^0	1×10^4	1×10^6
Cd-113m	4×10^1	5×10^{-1}	1×10^3	1×10^6
Cd-115 (a)	3×10^0	4×10^{-1}	1×10^2	1×10^6
Cd-115m	5×10^{-1}	5×10^{-1}	1×10^3	1×10^6
Cerium (58)				
Ce-139	7×10^0	2×10^0	1×10^2	1×10^6
Ce-141	2×10^1	6×10^{-1}	1×10^2	1×10^7
Ce-143	9×10^{-1}	6×10^{-1}	1×10^2	1×10^6
Ce-144 (a)	2×10^{-1}	2×10^{-1}	1×10^2 (b)	1×10^5 (b)
Californium (98)				
Cf-248	4×10^1	6×10^{-3}	1×10^1	1×10^4
Cf-249	3×10^0	8×10^{-4}	1×10^0	1×10^3
Cf-250	2×10^1	2×10^{-3}	1×10^1	1×10^4
Cf-251	7×10^0	7×10^{-4}	1×10^0	1×10^3
Cf-252	1×10^{-1}	3×10^{-3}	1×10^1	1×10^4
Cf-253 (a)	4×10^1	4×10^{-2}	1×10^2	1×10^5
Cf-254	1×10^{-3}	1×10^{-3}	1×10^0	1×10^3
Chlorine (17)				
Cl-36	1×10^1	6×10^{-1}	1×10^4	1×10^6
Cl-38	2×10^{-1}	2×10^{-1}	1×10^1	1×10^5

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Curium (96)				
Cm-240	4×10^1	2×10^{-2}	1×10^2	1×10^5
Cm-241	2×10^0	1×10^0	1×10^2	1×10^6
Cm-242	4×10^1	1×10^{-2}	1×10^2	1×10^5
Cm-243	9×10^0	1×10^{-3}	1×10^0	1×10^4
Cm-244	2×10^1	2×10^{-3}	1×10^1	1×10^4
Cm-245	9×10^0	9×10^{-4}	1×10^0	1×10^3
Cm-246	9×10^0	9×10^{-4}	1×10^0	1×10^3
Cm-247 (a)	3×10^0	1×10^{-3}	1×10^0	1×10^4
Cm-248	2×10^{-2}	3×10^{-4}	1×10^0	1×10^3
Cobalt (27)				
Co-55	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Co-56	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Co-57	1×10^1	1×10^1	1×10^2	1×10^6
Co-58	1×10^0	1×10^0	1×10^1	1×10^6
Co-58m	4×10^1	4×10^1	1×10^4	1×10^7
Co-60	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Chromium (24)				
Cr-51	3×10^1	3×10^1	1×10^3	1×10^7
Caesium (55)				
Cs-129	4×10^0	4×10^0	1×10^2	1×10^5
Cs-131	3×10^1	3×10^1	1×10^3	1×10^6
Cs-132	1×10^0	1×10^0	1×10^1	1×10^5
Cs-134	7×10^{-1}	7×10^{-1}	1×10^1	1×10^4
Cs-134m	4×10^1	6×10^{-1}	1×10^3	1×10^5
Cs-135	4×10^1	1×10^0	1×10^4	1×10^7
Cs-136	5×10^{-1}	5×10^{-1}	1×10^1	1×10^5
Cs-137 (a)	2×10^0	6×10^{-1}	1×10^1 (b)	1×10^4 (b)
Copper (29)				
Cu-64	6×10^0	1×10^0	1×10^2	1×10^6
Cu-67	1×10^1	7×10^{-1}	1×10^2	1×10^6
Dysprosium (66)				
Dy-159	2×10^1	2×10^1	1×10^3	1×10^7
Dy-165	9×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Dy-166 (a)	9×10^{-1}	3×10^{-1}	1×10^3	1×10^6
Erbium (68)				
Er-169	4×10^1	1×10^0	1×10^4	1×10^7
Er-171	8×10^{-1}	5×10^{-1}	1×10^2	1×10^6
Europium (63)				
Eu-147	2×10^0	2×10^0	1×10^2	1×10^6
Eu-148	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Eu-149	2×10^1	2×10^1	1×10^2	1×10^7
Eu-150 (short lived)	2×10^0	7×10^{-1}	1×10^3	1×10^6
Eu-150 (long lived)	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Eu-152	1×10^0	1×10^0	1×10^1	1×10^6
Eu-152m	8×10^{-1}	8×10^{-1}	1×10^2	1×10^6
Eu-154	9×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Eu-155	2×10^1	3×10^0	1×10^2	1×10^7
Eu-156	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Fluorine (9)				
F-18	1×10^0	6×10^{-1}	1×10^1	1×10^6
Iron (26)				
Fe-52 (a)	3×10^{-1}	3×10^{-1}	1×10^1	1×10^6
Fe-55	4×10^1	4×10^1	1×10^4	1×10^6
Fe-59	9×10^{-1}	9×10^{-1}	1×10^1	1×10^6

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Fe-60 (a)	4×10^1	2×10^{-1}	1×10^2	1×10^5
Gallium (31)				
Ga-67	7×10^0	3×10^0	1×10^2	1×10^6
Ga-68	5×10^{-1}	5×10^{-1}	1×10^1	1×10^5
Ga-72	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Gadolinium (64)				
Gd-146 (a)	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Gd-148	2×10^1	2×10^{-3}	1×10^1	1×10^4
Gd-153	1×10^1	9×10^0	1×10^2	1×10^7
Gd-159	3×10^0	6×10^{-1}	1×10^3	1×10^6
Germanium (32)				
Ge-68 (a)	5×10^{-1}	5×10^{-1}	1×10^1	1×10^5
Ge-69	1×10^0	1×10^0	1×10^1	1×10^6
Ge-71	4×10^1	4×10^1	1×10^4	1×10^8
Ge-77	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Hafnium (72)				
Hf-172 (a)	6×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Hf-175	3×10^0	3×10^0	1×10^2	1×10^6
Hf-181	2×10^0	5×10^{-1}	1×10^1	1×10^6
Hf-182	Unlimited	Unlimited	1×10^2	1×10^6
Mercury (80)				
Hg-194 (a)	1×10^0	1×10^0	1×10^1	1×10^6
Hg-195m (a)	3×10^0	7×10^{-1}	1×10^2	1×10^6
Hg-197	2×10^1	1×10^1	1×10^2	1×10^7
Hg-197m	1×10^1	4×10^{-1}	1×10^2	1×10^6
Hg-203	5×10^0	1×10^0	1×10^2	1×10^5
Holmium (67)				
Ho-166	4×10^{-1}	4×10^{-1}	1×10^3	1×10^5
Ho-166m	6×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Iodine (53)				
I-123	6×10^0	3×10^0	1×10^2	1×10^7
I-124	1×10^0	1×10^0	1×10^1	1×10^6
I-125	2×10^1	3×10^0	1×10^3	1×10^6
I-126	2×10^0	1×10^0	1×10^2	1×10^6
I-129	Unlimited	Unlimited	1×10^2	1×10^5
I-131	3×10^0	7×10^{-1}	1×10^2	1×10^6
I-132	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
I-133	7×10^{-1}	6×10^{-1}	1×10^1	1×10^6
I-134	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
I-135 (a)	6×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Indium (49)				
In-111	3×10^0	3×10^0	1×10^2	1×10^6
In-113m	4×10^0	2×10^0	1×10^2	1×10^6
In-114m (a)	1×10^1	5×10^{-1}	1×10^2	1×10^6
In-115m	7×10^0	1×10^0	1×10^2	1×10^6
Iridium (77)				
Ir-189 (a)	1×10^1	1×10^1	1×10^2	1×10^7
Ir-190	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Ir-192	1×10^0 (c)	6×10^{-1}	1×10^1	1×10^4
Ir-193m	4×10^1	4×10^0	1×10^4	1×10^7
Ir-194	3×10^{-1}	3×10^{-1}	1×10^2	1×10^5
Potassium (19)				
K-40	9×10^{-1}	9×10^{-1}	1×10^2	1×10^6
K-42	2×10^{-1}	2×10^{-1}	1×10^2	1×10^6
K-43	7×10^{-1}	6×10^{-1}	1×10^1	1×10^6

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Krypton (36)				
Kr-79	4×10^0	2×10^0	1×10^3	1×10^5
Kr-81	4×10^1	4×10^1	1×10^4	1×10^7
Kr-85	1×10^1	1×10^1	1×10^5	1×10^4
Kr-85m	8×10^0	3×10^0	1×10^3	1×10^{10}
Kr-87	2×10^{-1}	2×10^{-1}	1×10^2	1×10^9
Lanthanum (57)				
La-137	3×10^1	6×10^0	1×10^3	1×10^7
La-140	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Lutetium (71)				
Lu-172	6×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Lu-173	8×10^0	8×10^0	1×10^2	1×10^7
Lu-174	9×10^0	9×10^0	1×10^2	1×10^7
Lu-174m	2×10^1	1×10^1	1×10^2	1×10^7
Lu-177	3×10^1	7×10^{-1}	1×10^3	1×10^7
Magnesium (12)				
Mg-28 (a)	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Manganese (25)				
Mn-52	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Mn-53	Unlimited	Unlimited	1×10^4	1×10^9
Mn-54	1×10^0	1×10^0	1×10^1	1×10^6
Mn-56	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Molybdenum (42)				
Mo-93	4×10^1	2×10^1	1×10^3	1×10^8
Mo-99 (a)	1×10^0	6×10^{-1}	1×10^2	1×10^6
Nitrogen (7)				
N-13	9×10^{-1}	6×10^{-1}	1×10^2	1×10^9
Sodium (11)				
Na-22	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Na-24	2×10^{-1}	2×10^{-1}	1×10^1	1×10^5
Niobium (41)				
Nb-93m	4×10^1	3×10^1	1×10^4	1×10^7
Nb-94	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Nb-95	1×10^0	1×10^0	1×10^1	1×10^6
Nb-97	9×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Neodymium (60)				
Nd-147	6×10^0	6×10^{-1}	1×10^2	1×10^6
Nd-149	6×10^{-1}	5×10^{-1}	1×10^2	1×10^6
Nickel (28)				
Ni-57	6×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Ni-59	Unlimited	Unlimited	1×10^4	1×10^8
Ni-63	4×10^1	3×10^1	1×10^5	1×10^8
Ni-65	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Neptunium (93)				
Np-235	4×10^1	4×10^1	1×10^3	1×10^7
Np-236 (short lived)	2×10^1	2×10^0	1×10^3	1×10^7
Np-236 (long lived)	9×10^0	2×10^{-2}	1×10^2	1×10^5
Np-237	2×10^1	2×10^{-3}	1×10^0 (b)	1×10^3 (b)
Np-239	7×10^0	4×10^{-1}	1×10^2	1×10^7
Osmium (76)				
Os-185	1×10^0	1×10^0	1×10^1	1×10^6
Os-191	1×10^1	2×10^0	1×10^2	1×10^7
Os-191m	4×10^1	3×10^1	1×10^3	1×10^7
Os-193	2×10^0	6×10^{-1}	1×10^2	1×10^6
Os-194 (a)	3×10^{-1}	3×10^{-1}	1×10^2	1×10^5

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Phosphorus (15)				
P-32	5×10^{-1}	5×10^{-1}	1×10^3	1×10^5
P-33	4×10^1	1×10^0	1×10^5	1×10^8
Protactinium (91)				
Pa-230 (a)	2×10^0	7×10^{-2}	1×10^1	1×10^6
Pa-231	4×10^0	4×10^{-4}	1×10^0	1×10^3
Pa-233	5×10^0	7×10^{-1}	1×10^2	1×10^7
Lead (82)				
Pb-201	1×10^0	1×10^0	1×10^{-1}	1×10^6
Pb-202	4×10^1	2×10^1	1×10^3	1×10^6
Pb-203	4×10^0	3×10^0	1×10^2	1×10^6
Pb-205	Unlimited	Unlimited	1×10^4	1×10^7
Pb-210 (a)	1×10^0	5×10^{-2}	1×10^1 (b)	1×10^4 (b)
Pb-212 (a)	7×10^{-1}	2×10^{-1}	1×10^1 (b)	1×10^5 (b)
Palladium (46)				
Pd-103 (a)	4×10^1	4×10^1	1×10^3	1×10^8
Pd-107	Unlimited	Unlimited	1×10^5	1×10^8
Pd-109	2×10^0	5×10^{-1}	1×10^3	1×10^6
Promethium (61)				
Pm-143	3×10^0	3×10^0	1×10^2	1×10^6
Pm-144	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Pm-145	3×10^1	1×10^1	1×10^3	1×10^7
Pm-147	4×10^1	2×10^0	1×10^4	1×10^7
Pm-148m (a)	8×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Pm-149	2×10^0	6×10^{-1}	1×10^3	1×10^6
Pm-151	2×10^0	6×10^{-1}	1×10^2	1×10^6
Polonium (84)				
Po-210	4×10^1	2×10^{-2}	1×10^1	1×10^4
Praseodymium (59)				
Pr-142	4×10^{-1}	4×10^{-1}	1×10^2	1×10^5
Pr-143	3×10^0	6×10^{-1}	1×10^4	1×10^6
Platinum (78)				
Pt-188 (a)	1×10^0	8×10^{-1}	1×10^1	1×10^6
Pt-191	4×10^0	3×10^0	1×10^2	1×10^6
Pt-193	4×10^1	4×10^1	1×10^4	1×10^7
Pt-193m	4×10^1	5×10^{-1}	1×10^3	1×10^7
Pt-195m	1×10^1	5×10^{-1}	1×10^2	1×10^6
Pt-197	2×10^1	6×10^{-1}	1×10^3	1×10^6
Pt-197m	1×10^1	6×10^{-1}	1×10^2	1×10^6
Plutonium (94)				
Pu-236	3×10^1	3×10^{-3}	1×10^1	1×10^4
Pu-237	2×10^1	2×10^1	1×10^3	1×10^7
Pu-238	1×10^1	1×10^{-3}	1×10^0	1×10^4
Pu-239	1×10^1	1×10^{-3}	1×10^0	1×10^4
Pu-240	1×10^1	1×10^{-3}	1×10^0	1×10^3
Pu-241 (a)	4×10^1	6×10^{-2}	1×10^2	1×10^5
Pu-242	1×10^1	1×10^{-3}	1×10^0	1×10^4
Pu-244 (a)	4×10^{-1}	1×10^{-3}	1×10^0	1×10^4
Radium (88)				
Ra-223 (a)	4×10^{-1}	7×10^{-3}	1×10^2 (b)	1×10^5 (b)
Ra-224 (a)	4×10^{-1}	2×10^{-2}	1×10^1 (b)	1×10^5 (b)
Ra-225 (a)	2×10^{-1}	4×10^{-3}	1×10^2	1×10^5
Ra-226 (a)	2×10^{-1}	3×10^{-3}	1×10^1 (b)	1×10^4 (b)
Ra-228 (a)	6×10^{-1}	2×10^{-2}	1×10^1 (b)	1×10^5 (b)
Rubidium (37)				

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Rb-81	2×10^0	8×10^{-1}	1×10^1	1×10^6
Rb-83 (a)	2×10^0	2×10^0	1×10^2	1×10^6
Rb-84	1×10^0	1×10^0	1×10^1	1×10^6
Rb-86	5×10^{-1}	5×10^{-1}	1×10^2	1×10^5
Rb-87	Unlimited	Unlimited	1×10^4	1×10^7
Rb (nat)	Unlimited	Unlimited	1×10^4	1×10^7
Rhenium (75)				
Re-184	1×10^0	1×10^0	1×10^1	1×10^6
Re-184m	3×10^0	1×10^0	1×10^2	1×10^6
Re-186	2×10^0	6×10^{-1}	1×10^3	1×10^6
Re-187	Unlimited	Unlimited	1×10^6	1×10^9
Re-188	4×10^{-1}	4×10^{-1}	1×10^2	1×10^5
Re-189 (a)	3×10^0	6×10^{-1}	1×10^2	1×10^6
Re (nat)	Unlimited	Unlimited	1×10^6	1×10^9
Rhodium (45)				
Rh-99	2×10^0	2×10^0	1×10^1	1×10^6
Rh-101	4×10^0	3×10^0	1×10^2	1×10^7
Rh-102	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Rh-102m	2×10^0	2×10^0	1×10^2	1×10^6
Rh-103m	4×10^1	4×10^1	1×10^4	1×10^8
Rh-105	1×10^1	8×10^{-1}	1×10^2	1×10^7
Radon (86)				
Rn-222 (a)	3×10^{-1}	4×10^{-3}	1×10^1 (b)	1×10^8 (b)
Ruthenium (44)				
Ru-97	5×10^0	5×10^0	1×10^2	1×10^7
Ru-103 (a)	2×10^0	2×10^0	1×10^2	1×10^6
Ru-105	1×10^0	6×10^{-1}	1×10^1	1×10^6
Ru-106 (a)	2×10^{-1}	2×10^{-1}	1×10^2 (b)	1×10^5 (b)
Sulphur (16)				
S-35	4×10^1	3×10^0	1×10^5	1×10^8
Antimony (51)				
Sb-122	4×10^{-1}	4×10^{-1}	1×10^2	1×10^4
Sb-124	6×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Sb-125	2×10^0	1×10^0	1×10^2	1×10^6
Sb-126	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Scandium (21)				
Sc-44	5×10^{-1}	5×10^{-1}	1×10^1	1×10^5
Sc-46	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Sc-47	1×10^1	7×10^{-1}	1×10^2	1×10^6
Sc-48	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Selenium (34)				
Se-75	3×10^0	3×10^0	1×10^2	1×10^6
Se-79	4×10^1	2×10^0	1×10^4	1×10^7
Silicon (14)				
Si-31	6×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Si-32	4×10^1	5×10^{-1}	1×10^3	1×10^6
Samarium (62)				
Sm-145	1×10^1	1×10^1	1×10^2	1×10^7
Sm-147	Unlimited	Unlimited	1×10^1	1×10^4
Sm-151	4×10^1	1×10^1	1×10^4	1×10^8
Sm-153	9×10^0	6×10^{-1}	1×10^2	1×10^6
Tin (50)				
Sn-113 (a)	4×10^0	2×10^0	1×10^3	1×10^7
Sn-117m	7×10^0	4×10^{-1}	1×10^2	1×10^6
Sn-119m	4×10^1	3×10^1	1×10^3	1×10^7

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Sn-121m (a)	4×10^1	9×10^{-1}	1×10^3	1×10^7
Sn-123	8×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Sn-125	4×10^{-1}	4×10^{-1}	1×10^2	1×10^5
Sn-126 (a)	6×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Strontium (38)				
Sr-82 (a)	2×10^{-1}	2×10^{-1}	1×10^1	1×10^5
Sr-83	1×10^0	1×10^0	1×10^1	1×10^8
Sr-85	2×10^0	2×10^0	1×10^2	1×10^6
Sr-85m	5×10^0	5×10^0	1×10^2	1×10^7
Sr-87m	3×10^0	3×10^0	1×10^2	1×10^6
Sr-89	6×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Sr-90 (a)	3×10^{-1}	3×10^{-1}	1×10^2 (b)	1×10^4 (b)
Sr-91 (a)	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Sr-92 (a)	1×10^0	3×10^{-1}	1×10^1	1×10^6
Tritium (1)				
T(H-3)	4×10^1	4×10^1	1×10^6	1×10^9
Tantalum (73)				
Ta-178 (long lived)	1×10^0	8×10^{-1}	1×10^1	1×10^6
Ta-179	3×10^1	3×10^1	1×10^3	1×10^7
Ta-182	9×10^{-1}	5×10^{-1}	1×10^1	1×10^4
Terbium (65)				
Tb-149	8×10^{-1}	8×10^{-1}	1×10^1	3×10^6
Tb-157	4×10^1	4×10^1	1×10^4	1×10^7
Tb-158	1×10^0	1×10^0	1×10^1	1×10^6
Tb-160	1×10^0	6×10^{-1}	1×10^1	1×10^6
Tb-161	3×10^1	7×10^{-1}	1×10^3	1×10^6
Technetium (43)				
Tc-95m (a)	2×10^0	2×10^0	1×10^1	1×10^6
Tc-96	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Tc-96m (a)	4×10^{-1}	4×10^{-1}	1×10^3	1×10^7
Tc-97	Unlimited	Unlimited	1×10^3	1×10^8
Tc-97m	4×10^1	1×10^0	1×10^3	1×10^7
Tc-98	8×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Tc-99	4×10^1	9×10^{-1}	1×10^4	1×10^7
Tc-99m	1×10^1	4×10^0	1×10^2	1×10^7
Tellurium (52)				
Te-121	2×10^0	2×10^0	1×10^1	1×10^6
Te-121m	5×10^0	3×10^0	1×10^2	1×10^6
Te-123m	8×10^0	1×10^0	1×10^2	1×10^7
Te-125m	2×10^1	9×10^{-1}	1×10^3	1×10^7
Te-127	2×10^1	7×10^{-1}	1×10^3	1×10^6
Te-127m (a)	2×10^1	5×10^{-1}	1×10^3	1×10^7
Te-129	7×10^{-1}	6×10^{-1}	1×10^2	1×10^6
Te-129m (a)	8×10^{-1}	4×10^{-1}	1×10^3	1×10^6
Te-131m (a)	7×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Te-132 (a)	5×10^{-1}	4×10^{-1}	1×10^2	1×10^7
Thorium (90)				
Th-227	1×10^1	5×10^{-3}	1×10^1	1×10^4
Th-228 (a)	5×10^{-1}	1×10^{-3}	1×10^0 (b)	1×10^4 (b)
Th-229	5×10^0	5×10^{-4}	1×10^0 (b)	1×10^3 (b)
Th-230	1×10^1	1×10^{-3}	1×10^0	1×10^4
Th-231	4×10^1	2×10^{-2}	1×10^3	1×10^7
Th-232	Unlimited	Unlimited	1×10^1	1×10^4
Th-234 (a)	3×10^{-1}	3×10^{-1}	1×10^3 (b)	1×10^5 (b)
Th (nat)	Unlimited	Unlimited	1×10^0 (b)	1×10^3 (b)

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Titanium (22)				
Ti-44 (a)	5×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Thallium (81)				
Tl-200	9×10^{-1}	9×10^{-1}	1×10^1	1×10^6
Tl-201	1×10^1	4×10^0	1×10^2	1×10^6
Tl-202	2×10^0	2×10^0	1×10^2	1×10^6
Tl-204	1×10^1	7×10^{-1}	1×10^4	1×10^4
Thulium (69)				
Tm-167	7×10^0	8×10^{-1}	1×10^2	1×10^6
Tm-170	3×10^0	6×10^{-1}	1×10^3	1×10^6
Tm-171	4×10^1	4×10^1	1×10^4	1×10^8
Uranium (92)				
U-230 (fast lung absorption) (a), (d)	4×10^1	1×10^{-1}	1×10^1 (b)	1×10^5 (b)
U-230 (medium lung absorption) (a), (e)	4×10^1	4×10^{-3}	1×10^1	1×10^4
U-230 (slow lung absorption) (a), (f)	3×10^1	3×10^{-3}	1×10^1	1×10^4
U-232 (fast lung absorption) (d)	4×10^1	1×10^{-2}	1×10^0 (b)	1×10^3 (b)
U-232 (medium lung absorption) (e)	4×10^1	7×10^{-3}	1×10^1	1×10^4
U-232 (slow lung absorption) (f)	1×10^1	1×10^{-3}	1×10^1	1×10^4
U-233 (fast lung absorption) (d)	4×10^1	9×10^{-2}	1×10^1	1×10^4
U-233 (medium lung absorption) (e)	4×10^1	2×10^{-2}	1×10^2	1×10^5
U-233 (slow lung absorption) (f)	4×10^1	6×10^{-3}	1×10^1	1×10^5
U-234 (fast lung absorption) (d)	4×10^1	9×10^{-2}	1×10^1	1×10^4
U-234 (medium lung absorption) (e)	4×10^1	2×10^{-2}	1×10^2	1×10^5
U-234 (slow lung absorption) (f)	4×10^1	6×10^{-3}	1×10^1	1×10^5
U-235 (all lung absorption types) (a), (d), (e), (f)	Unlimited	Unlimited	1×10^1 (b)	1×10^4 (b)
U-236 (fast lung absorption) (d)	Unlimited	Unlimited	1×10^1	1×10^4
U-236 (medium lung absorption) (e)	4×10^1	2×10^{-2}	1×10^2	1×10^5
U-236 (slow lung absorption) (f)	4×10^1	6×10^{-3}	1×10^1	1×10^4
U-238 (all lung absorption types) (d),(e),(f)	Unlimited	Unlimited	1×10^1 (b)	1×10^4 (b)
U (nat)	Unlimited	Unlimited	1×10^0 (b)	1×10^3 (b)
U (enriched to 20% or less) (g)	Unlimited	Unlimited	1×10^0	1×10^3
U (depleted)	Unlimited	Unlimited	1×10^0	1×10^3
Vanadium (23)				
V-48	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
V-49	4×10^1	4×10^1	1×10^4	1×10^7
Tungsten (74)				
W-178 (a)	9×10^0	5×10^0	1×10^1	1×10^6
W-181	3×10^1	3×10^1	1×10^3	1×10^7
W-185	4×10^1	8×10^{-1}	1×10^4	1×10^7
W-187	2×10^0	6×10^{-1}	1×10^2	1×10^6
W-188 (a)	4×10^{-1}	3×10^{-1}	1×10^2	1×10^5
Xenon (54)				
Xe-122 (a)	4×10^{-1}	4×10^{-1}	1×10^2	1×10^9
Xe-123	2×10^0	7×10^{-1}	1×10^2	1×10^9
Xe-127	4×10^0	2×10^0	1×10^3	1×10^5

Radionuclide (atomic number)	A ₁ , (TBq)	A ₂ , (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Xe-131m	4×10^1	4×10^1	1×10^4	1×10^4
Xe-133	2×10^1	1×10^1	1×10^3	1×10^4
Xe-135	3×10^0	2×10^0	1×10^3	1×10^{10}
Yttrium (39)				
Y-87 (a)	1×10^0	1×10^0	1×10^1	1×10^6
Y-88	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Y-90	3×10^{-1}	3×10^{-1}	1×10^3	1×10^5
Y-91	6×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Y-91m	2×10^0	2×10^0	1×10^2	1×10^6
Y-92	2×10^{-1}	2×10^{-1}	1×10^2	1×10^5
Y-93	3×10^{-1}	3×10^{-1}	1×10^2	1×10^5
Ytterbium (70)				
Yb-169	4×10^0	1×10^0	1×10^2	1×10^7
Yb-175	3×10^1	9×10^{-1}	1×10^3	1×10^7
Zinc (30)				
Zn-65	2×10^0	2×10^0	1×10^1	1×10^6
Zn-69	3×10^0	6×10^{-1}	1×10^4	1×10^6
Zn-69m (a)	3×10^0	6×10^{-1}	1×10^2	1×10^6
Zirconium (40)				
Zr-88	3×10^0	3×10^0	1×10^2	1×10^6
Zr-93	Unlimited	Unlimited	1×10^3 (b)	1×10^7 (b)
Zr-95 (a)	2×10^0	8×10^{-1}	1×10^1	1×10^6
Zr-97 (a)	4×10^{-1}	4×10^{-1}	1×10^1 (b)	1×10^5 (b)

a) A₁ and/or A₂ values for these parent radionuclides include contributions from their progeny with half-lives less than 10 days, as listed in the following:

Mg-28	Al-28
Ar-42	K-42
Ca-47	Sc-47
Ti-44	Sc-44
Fe-52	Mn-52m
Fe-60	Co-60m
Zn-69m	Zn-69
Ge-68	Ga-68
Rb-83	Kr-83m
Sr-82	Rb-82
Sr-90	Y-90
Sr-91	Y-91m
Sr-92	Y-92
Y-87	Sr-87m
Zr-95	Nb-95m
Zr-97	Nb-97m, Nb-97
Mo-99	Tc-99m
Tc-95m	Tc-95
Tc-96m	Tc-96
Ru-103	Rh-103m
Ru-106	Rh-106
Pd-103	Rh-103m
Ag-108m	Ag-108
Ag-110m	Ag-110

Cd-115	In-115m
In-114m	In-114
Sn-113	In-113m
Sn-121m	Sn-121
Sn-126	Sb-126m
Te-118	Sb-118
Te-127m	Te-127
Te-129m	Te-129
Te-131m	Te-131
Te-132	I-132
I-135	Xe-135m
Xe-122	I-122
Cs-137	Ba-137m
Ba-131	Cs-131
Ba-140	La-140
Ce-144	Pr-144m, Pr-144
Pm-148m	Pm-148
Gd-146	Eu-146
Dy-166	Ho-166
Hf-172	Lu-172
W-178	Ta-178
W-188	Re-188
Re-189	Os-189m
Os-194	Ir-194
Ir-189	Os-189m
Pt-188	Ir-188
Hg-194	Au-194
Hg-195m	Hg-195
Pb-210	Bi-210
Pb-212	Bi-212, Tl-208, Po-212
Bi-210m	Tl-206
Bi-212	Tl-208, Po-212
At-211	Po-211
Rn-222	Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Po-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Ra-225	Ac-225, Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ra-226	Rn-222, Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-228	Ac-228
Ac-225	Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ac-227	Fr-223
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Th-234	Pa-234m, Pa-234
Pa-230	Ac-226, Th-226, Fr-222, Ra-222, Rn-218, Po-214
U-230	Th-226, Ra-222, Rn-218, Po-214
U-235	Th-231
Pu-241	U-237
Pu-244	U-240, Np-240m

Am-242m	Am-242, Np-238
Am-243	Np-239
Cm-247	Pu-243
Bk-249	Am-245
Cf-253	Cm-249

b) Parent nuclides and their progeny included in secular equilibrium are listed in the following (the activity to be taken into account is that of the parent nuclide only):

Sr-90	Y-90
Zr-93	Nb-93m
Zr-97	Nb-97
Ru-106	Rh-106
Ag-108m	Ag-108
Cs-137	Ba-137m
Ce-144	Pr-144
Ba-140	La-140
Bi-212	Tl-208 (0,36), Po-212 (0,64)
Pb-210	Bi-210, Po-210
Pb-212	Bi-212, Tl-208 (0,36), Po-212 (0,64)
Rn-222	Po-218, Pb-214, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0,36), Po-212 (0,64)
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0,36), Po-212 (0,64)
Th-229	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209
Th-nat.	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0,36), Po-212 (0,64) ¹²
Th-234	Pa-234m
U-230	Th-226, Ra-222, Rn-218, Po-214
U-232	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0,36), Po-212 (0,64)
U-235	Th-231
U-238	Th-234, Pa-234m
U-nat.	Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210 ¹¹
Np-237	Pa-233
Am-242m	Am-242
Am-243	Np-239

c) The quantity may be determined from a measurement of the rate of decay or a measurement of the dose rate at a prescribed distance from the source.

d) These values apply only to compounds of uranium that take the chemical form of UF_6 , UO_2F_2 and $UO_2(NO_3)_2$ in both normal and accident conditions of carriage.

e) These values apply only to compounds of uranium that take the chemical form of UO_3 , UF_4 , UCl_4 and hexavalent compounds in both normal and accident conditions of carriage.

f) These values apply to all compounds of uranium other than those specified in (d) and (e) above.

g) These values apply to unirradiated uranium only.

For individual radionuclides

Which are not listed in Table 2.2.7.2.2.1 the determination of the basic radionuclide values referred to in 2.2.7.2.2.1 shall require multilateral approval. For these radionuclides, activity concentration limits

¹² In the case of Th-natural, the parent nuclide is Th-232, in the case of U-natural the parent nuclide is U-238.

for exempt material and activity limits for exempt consignments shall be calculated in accordance with the principles established in "Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards", IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014). It is permissible to use an A2 value calculated using a dose coefficient for the appropriate lung absorption type as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of carriage are taken into consideration. Alternatively, the radionuclide values in Table 2.2.7.2.2.2 may be used without obtaining competent authority approval;

In instruments or articles in which the radioactive material is enclosed or is included as a component part of the instrument or other manufactured article and which meet 2.2.7.2.4.1.3 (c), alternative basic radionuclide values to those in Table 2.2.7.2.2.1 for the activity limit for an exempt consignment are permitted and shall require multilateral approval. Such alternative activity limits for an exempt consignment shall be calculated in accordance with the principles set out in GSR Part 3.

Table 2.2.7.2.2.2:

Basic radionuclide values for unknown radionuclides or mixtures

Radioactive contents	A ₁ ,	A ₂ ,	Activity concentration limit for exempt material	Activity limit for an exempt consignment, Bq
	(TBq)	(TBq)	(Bq/g)	(Bq/g)
Only beta or gamma emitting nuclides are known to be present	0,1	0,02	1 × 10 ¹	1 × 10 ⁴
Alpha emitting nuclides but no neutron emitters are known to be present	0,2	9 × 10 ⁻⁵	1 × 10 ⁻¹	1 × 10 ³
Neutron emitting nuclides are known to be present or no relevant data are available	0,001	9 × 10 ⁻⁵	1 × 10 ⁻¹	1 × 10 ³

2.2.7.2.2.3 In the calculations of A₁ and A₂ for a radionuclide not in Table 2.2.7.2.2.1, a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, shall be considered as a single radionuclide; and the activity to be taken into account and the A₁ or A₂ value to be applied shall be those corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any daughter nuclide has a half-life either longer than 10 days or greater than that of the parent nuclide, the parent and such daughter nuclides shall be considered as mixtures of different nuclides

2.2.7.2.2.4 For mixtures of radionuclides, the basic radionuclide values referred to in 2.2.7.2.2.1 may be determined as follows:

$$X_m = \frac{1}{\sum_i \frac{f(i)}{X(i)}},$$

where:

f(i) – is the fraction of activity or activity concentration of radionuclide i in the mixture;

X(i) – is the appropriate value of A₁ or A₂, or the activity concentration limit for exempt material or the activity limit for an exempt consignment as appropriate for the radionuclide i; and

X_m – is the derived value of A₁ or A₂, or the activity concentration limit for exempt material or the activity limit for an exempt consignment in the case of a mixture.

2.2.7.2.2.5 When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest radionuclide value, as appropriate, for the radionuclides in each group may be used in applying the formulas in 2.2.7.2.2.4 and 2.2.7.2.4.4. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest radionuclide values for the alpha emitters or beta/gamma emitters, respectively.

2.2.7.2.2.6 For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 2.2.7.2.2.2 shall be used.

2.2.7.2.3 Determination of other material characteristics

2.2.7.2.3.1 Low specific activity (LSA) material

2.2.7.2.3.1.1 (Reserved)

2.2.7.2.3.1.2 LSA material shall be in one of three groups:

a) LSA-I

- 1) uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclides;
- 2) natural uranium, depleted uranium, natural thorium or their compounds or mixtures, that are unirradiated and in solid or liquid form;
- 3) radioactive material for which the A2 value is unlimited. Fissile material may be included only if excepted under 2.2.7.2.3.5;
- 4) radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in 2.2.7.2.2.1 to 2.2.7.2.2.6. Fissile material may be included only if excepted under 2.2.7.2.3.5;

b) LSA-II

- 1) water with tritium concentration up to 0.8 TBq/l;
- 2) other material in which the activity is distributed throughout and the estimated average specific activity does not exceed 10^{-4} A2/g for solids and gases, and 10^{-5} A2/g for liquids;

c) LSA-III – Solids (e.g. consolidated wastes, activated materials), excluding powders, in which:

- 1) the radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen and ceramic);
- 2) the estimated average specific activity of the solid, excluding any shielding material, does not exceed 2×10^{-3} A2/g.

2.2.7.2.3.1.3 Reserved

2.2.7.2.3.1.4 Reserved

2.2.7.2.3.1.5 Reserved

2.2.7.2.3.2 Surface contaminated object (SCO):

SCO is classified in one of three groups:

a) SCO-I: A solid object on which:

- 1) the non-fixed contamination on the accessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 0.4 Bq/cm² for all other alpha emitters; and
- 2) the fixed contamination on the accessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 4×10^4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 4×10^3 Bq/cm² for all other alpha emitters; and
- 3) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 4×10^4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 4×10^3 Bq/cm² for all other alpha emitters;

b) SCO-II: A solid object on which either the fixed or non-fixed contamination on the surface exceeds the applicable limits specified for SCO-I in (a) above and on which:

- 1) the non-fixed contamination on the accessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 400 Bq/cm² for beta and

gamma emitters and low toxicity alpha emitters, or 40 Bq/cm² for all other alpha emitters; and

2) the fixed contamination on the accessible surface, averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 8 × 10⁵ Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 8 × 10⁴ Bq/cm² for all other alpha emitters; and

3) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 8 × 10⁵ Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 8 × 10⁴ Bq/cm² for all other alpha emitters.

c) SCO-III: A large solid object which, because of its size, cannot be carried in a type of package described in RID and for which:

1) All openings are sealed to prevent release of radioactive material during conditions defined in 4.1.9.2.4 (e);

2) The inside of the object is as dry as practicable;

3) The non-fixed contamination on the external surfaces does not exceed the limits specified in 4.1.9.1.2; and

4) The non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm² does not exceed 8 × 10⁵ Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 8 × 10⁴ Bq/cm² for all other alpha emitters.

2.2.7.2.3.3 Special form radioactive material

2.2.7.2.3.3.1 Special form radioactive material shall have at least one dimension not less than 5 mm. When a sealed capsule constitutes part of the special form radioactive material, the capsule shall be so manufactured that it can be opened only by destroying it. The design for special form radioactive material requires unilateral approval.

2.2.7.2.3.3.2 Special form radioactive material shall be of such a nature or shall be so designed that if it is subjected to the tests specified in 2.2.7.2.3.3.4 to 2.2.7.2.3.3.8, it shall meet the following requirements:

a) It would not break or shatter under the impact, percussion and bending tests 2.2.7.2.3.3.5 (a), (b), (c) and 2.2.7.2.3.3.6 (a) as applicable

b) It would not melt or disperse in the applicable heat test 2.2.7.2.3.3.5 (d) or 2.2.7.2.3.3.6 (b) as applicable; and

c) The activity in the water from the leaching tests specified in 2.2.7.2.3.3.7 and 2.2.7.2.3.3.8 would not exceed 2 kBq; or alternatively for sealed sources, the leakage rate for the volumetric leakage assessment test specified in ISO 9978:1992 "Radiation Protection – Sealed Radioactive Sources – Leakage Test Methods", would not exceed the applicable acceptance threshold acceptable to the competent authority.

2.2.7.2.3.3.3 Demonstration of compliance with the performance standards in 2.2.7.2.3.3.2 shall be in accordance with 6.4.12.1 and 6.4.12.2.

2.2.7.2.3.3.4 Specimens that comprise or simulate special form radioactive material shall be subjected to the impact test, the percussion test, the bending test, and the heat test specified in 2.2.7.2.3.3.5 or alternative tests as authorized in 2.2.7.2.3.3.6. A different specimen may be used for each of the tests. Following each test, a leaching assessment or volumetric leakage test shall be performed on the specimen by a method no less sensitive than the methods given in 2.2.7.2.3.3.7 for indispersible solid material or 2.2.7.2.3.3.8 for encapsulated material.

2.2.7.2.3.3.5 The relevant test methods are:

a) Impact test: The specimen shall drop onto the target from a height of 9 m. The target shall be as defined in 6.4.14;

- b) Percussion test: The specimen shall be placed on a sheet of lead which is supported by a smooth solid surface and struck by the flat face of a mild steel bar so as to cause an impact equivalent to that resulting from a free drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of (3.0 ± 0.3) mm. The lead, of hardness number 3.5 to 4.5 on the Vickers scale and not more than 25 mm thick, shall cover an area greater than that covered by the specimen. A fresh surface of lead shall be used for each impact. The bar shall strike the specimen so as to cause maximum damage;
- c) Bending test: The test shall apply only to long, slender sources with both a minimum length of 10 cm and a length to minimum width ratio of not less than 10. The specimen shall be rigidly clamped in a horizontal position so that one half of its length protrudes from the face of the clamp. The orientation of the specimen shall be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel bar. The bar shall strike the specimen so as to cause an impact equivalent to that resulting from a free vertical drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of (3.0 ± 0.3) mm;
- d) Heat test: The specimen shall be heated in air to a temperature of 800 °C and held at that temperature for a period of 10 minutes and shall then be allowed to cool.

2.2.7.2.3.3.6 Specimens that comprise or simulate radioactive material enclosed in a sealed capsule may be excepted from:

- a) The tests prescribed in 2.2.7.2.3.3.5 (a) and (b) provided that the specimens are alternatively subjected to the impact test prescribed in ISO 2919:2012 "Radiation Protection – Sealed Radioactive Sources – General requirements and classification":
 - 1) The Class 4 impact test if the mass of the special form radioactive material is equal to or less than 200 g;
 - 2) The Class 5 impact test if the mass of the special form radioactive material is equal to or more than 200 g but is less than 500 g
- b) The test prescribed in 2.2.7.2.3.3.5 (d) provided they are alternatively subjected to the Class 6 temperature test specified in ISO 2919:2012 "Radiation protection – Sealed radioactive sources – General requirements and classification".

2.2.7.2.3.3.7 For specimens which comprise or simulate indispersible solid material, a leaching assessment shall be performed as follows:

- a) The specimen shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6–8 and a maximum conductivity of 1 mS/m at 20 °C;
- b) The water and the specimen shall then be heated to a temperature of (50 ± 5) °C and maintained at this temperature for 4 hours;
- c) The activity of the water shall then be determined;
- d) The specimen shall then be kept for at least 7 days in still air at not less than 30 °C and relative humidity not less than 90%;
- e) The specimen shall then be immersed in water of the same specification as in (a) above and the water and the specimen heated to (50 ± 5) °C and maintained at this temperature for 4 hours;
- f) The activity of the water shall then be determined.

2.2.7.2.3.3.8 For specimens which comprise or simulate radioactive material enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment shall be performed as follows:

- a) The leaching assessment shall consist of the following steps:
 - 1) the specimen shall be immersed in water at ambient temperature. The water shall have an initial pH of 6–8 with a maximum conductivity of 1 mS/m at 20 °C;
 - 2) the water and specimen shall then be heated to a temperature of (50 ± 5) °C and maintained at this temperature for 4 hours;
 - 3) the activity of the water shall then be determined;

- 4) specimen shall then be kept for at least 7 days in still air at not less than 30 °C and relative humidity of not less than 90%;
- 5) the process in (1), (2) and (3) shall be repeated;
- b) The alternative volumetric leakage assessment shall comprise any of the tests prescribed in ISO 9978:1992 "Radiation Protection – Sealed radioactive sources – Leakage test methods", provided that they are acceptable to the competent authority.

2.2.7.2.3.4 Low dispersible radioactive material

2.2.7.2.3.4.1 The design for low dispersible radioactive material shall require multilateral approval. Low dispersible radioactive material shall be such that the total amount of this radioactive material in a package, taking into account the provisions of 6.4.8.14, shall meet the following requirements:

- a) The dose rate at 3 m from the unshielded radioactive material does not exceed 10 mSv/h;
- b) If subjected to the tests specified in 6.4.20.3 and 6.4.20.4, the airborne release in gaseous and particulate forms of up to 100 µm aerodynamic equivalent diameter would not exceed 100 A2. A separate specimen may be used for each test; and
- c) If subjected to the test specified in 2.2.7.2.3.4.3 the activity in the water would not exceed 100 A2. In the application of this test, the damaging effects of the tests specified in (b) above shall be taken into account.

2.2.7.2.3.4.2 Low dispersible radioactive material shall be tested as follows:

A specimen that comprises or simulates low dispersible radioactive material shall be subjected to the enhanced thermal test specified in 6.4.20.3 and the impact test specified in 6.4.20.4. A different specimen may be used for each of the tests. Following each test, the specimen shall be subjected to the leach test specified in 2.2.7.2.3.4.3. After each test it shall be determined if the applicable requirements of 2.2.7.2.3.4.1 have been met.

2.2.7.2.3.4.3 A solid material sample representing the entire contents of the package shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7-day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10 % of the volume of the solid test sample itself. The water shall have an initial pH of 6-8 and a maximum conductivity of 1 mS/m at 20 °C. The total activity of the free volume of water shall be measured following the 7-day immersion of the test sample.

2.2.7.2.3.4.4 Demonstration of compliance with the performance standards in 2.2.7.2.3.4.1, 2.2.7.2.3.4.2 and 2.2.7.2.3.4.3 shall be in accordance with 6.4.12.1 and 6.4.12.2.

2.2.7.2.3.5 Fissile material

Fissile material and packages containing fissile material shall be classified under the relevant entry as "FISSILE" in accordance with Table 2.2.7.2.1.1 unless excepted by one of the provisions of paragraphs (a) to (f) below and carried subject to the requirements of 7.5.11 CW 33 (4.3). All provisions apply only to material in packages that meets the requirements of 6.4.7.2 unless unpackaged material is specifically allowed in the provision.

- a) Uranium enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the fissile nuclides are distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement;
- b) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2;
- c) Uranium with a maximum uranium enrichment of 5% by mass uranium-235 provided:
 - 1) There is no more than 3.5 g of uranium-235 per package;
 - 2) The total plutonium and uranium-233 content does not exceed 1% of the mass of uranium-235 per package;
 - 3) Carriage of the package is subject to the consignment limit provided in 7.5.11 CW 33 (4.3) (c);

- d) Fissile nuclides with a total mass not greater than 2.0 g per package provided the package is carried subject to the consignment limit provided in 7.5.11 CW 33 (4.3) (d);
- e) Fissile nuclides with a total mass not greater than 45 g either packaged or unpackaged subject to the requirements of 7.5.11 CW 33 (4.3) (e);
- f) A fissile material that meets the requirements of 7.5.11 CW 33 (4.3) (b), 2.2.7.2.3.6 and 5.1.5.2.1.

2.2.7.2.3.6 A fissile material excepted from classification as "FISSILE" under 2.2.7.2.3.5 (f) shall be subcritical without the need for accumulation control under the following conditions:

- a) The conditions of 6.4.11.1 (a);
- b) The conditions consistent with the assessment provisions stated in 6.4.11.12 (b) and 6.4.11.13 (b) for packages.

2.2.7.2.4 Classification of packages or unpacked material

The quantity of radioactive material in a package shall not exceed the relevant limits for the package type as specified below.

2.2.7.2.4.1 Classification as excepted package

2.2.7.2.4.1.1 A package may be classified as an excepted package if it meets one of the following conditions:

- a) It is an empty package having contained radioactive material;
- b) It contains instruments or articles not exceeding the activity limits specified in columns (2) and (3) of Table 2.2.7.2.4.1.2;
- c) It contains articles manufactured of natural uranium, depleted uranium or natural thorium;
- d) It contains radioactive material not exceeding the activity limits specified in column (4) of Table 2.2.7.2.4.1.2; or
- e) It contains less than 0.1 kg of uranium hexafluoride not exceeding the activity limits specified in column (4) of Table 2.2.7.2.4.1.2.

2.2.7.2.4.1.2 A package containing radioactive material may be classified as an excepted package, provided that the dose rate at any point on its external surface does not exceed 5 $\mu\text{Sv/h}$.

Table 2.2.7.2.4.1.2: Activity limits for excepted packages

Physical state of contents	Instruments or articles		Materials Package limits ^a
	Item limits ^a	Package limits ^a	
(1)	(2)	(3)	(4)
Solids			
special form	$10^{-2} A_1$	A_1	$10^{-3} A_1$
other forms	$10^{-2} A_2$	A_2	$10^{-3} A_2$
Liquids	$10^{-3} A_2$	$10^{-1} A_2$	$10^{-4} A_2$
Gases			
Tritium	$2 \times 10^{-2} A_2$	$2 \times 10^{-1} A_2$	$2 \times 10^{-2} A_2$
special form	$10^{-3} A_1$	$10^{-2} A_1$	$10^{-3} A_1$
other form	$10^{-3} A_2$	$10^{-2} A_2$	$10^{-3} A_2$

^a For mixtures of radionuclides, see 2.2.7.2.2.4 to 2.2.7.2.2.6

2.2.7.2.4.1.3 Radioactive material which is enclosed in or is included as a component part of an instrument or other manufactured article may be classified under UN No. 2911 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – INSTRUMENTS or ARTICLES, provided that:

- a) The dose rate at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h;
- b) Each instrument or manufactured article bears the mark "RADIOACTIVE" on its external surface except for the following:
 - 1) radioluminescent time-pieces or devices;
 - 2) consumer products that have either received regulatory approval in accordance with 1.7.1.4 (e) or do not individually exceed the activity limit for an exempt consignment in Table 2.2.7.2.2.1 (column 5), provided such products are transported in a package that

bears the mark "RADIOACTIVE" on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; and

- 3) other instruments or articles too small to bear the mark "RADIOACTIVE", provided that they are transported in a package that bears the marking "RADIOACTIVE" on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package;
- c) The active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material shall not be considered to be an instrument or manufactured article);
- d) The limits specified in columns 2 and 3 of Table 2.2.7.2.4.1.2 are met for each individual item and each package, respectively;
- e) Reserved
- f) If the package contains fissile material, one of the provisions of 2.2.7.2.3.5 (a) to (f) applies.

2.2.7.2.4.1.4 Radioactive material in forms other than as specified in 2.2.7.2.4.1.3 and with an activity not exceeding the limits specified in column 4 of Table 2.2.7.2.4.1.2, may be classified under UN No. 2910 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – LIMITED QUANTITY OF MATERIAL, provided that:

- a) The package retains its radioactive contents under routine conditions of carriage;
- b) The package bears the mark "RADIOACTIVE" on either:
 - 1) An internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; or
 - 2) The outside of the package, where it is impractical to mark an internal surface; and
- c) If the package contains fissile material, one of the provisions of 2.2.7.2.3.5 (a) to (f) applies.

2.2.7.2.4.1.5 Uranium hexafluoride not exceeding the limits specified in Column 4 of Table 2.2.7.2.4.1.2 may be classified under UN 3507 URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, less than 0.1 kg per package, non-fissile or fissile-excepted provided that:

- a) The mass of uranium hexafluoride in the package is less than 0.1 kg;
- b) The conditions of 2.2.7.2.4.5.2 and 2.2.7.2.4.1.4 (a) and (b) are met

2.2.7.2.4.1.6 Articles manufactured of natural uranium, depleted uranium or natural thorium and articles in which the sole radioactive material is unirradiated natural uranium, unirradiated depleted uranium or unirradiated natural thorium may be classified under UN No. 2909 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM, provided that the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.

2.2.7.2.4.1.7 An empty packaging which had previously contained radioactive material may be classified under UN No. 2908 RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – EMPTY PACKAGING, provided that:

- a) It is in a well-maintained condition and securely closed;
- b) The outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material;
- c) The level of internal non-fixed contamination, when averaged over any 300 cm², does not exceed:
 - 1) 400 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters; and
 - 2) 40 Bq/cm² for all other alpha emitters; and
- d) Any labels which may have been displayed on it in conformity with 5.2.2.1.11.1 will be removed or no longer visible; and
- e) If the packaging has contained fissile material, one of the provisions of 2.2.7.2.3.5 (a) to (f) or one of the provisions for exclusion in 2.2.7.1.3 applies.

2.2.7.2.4.2 Classification as Low specific activity (LSA) material

Radioactive material may only be classified as LSA material if the definition of LSA in 2.2.7.1.3 and the conditions of 2.2.7.2.3.1, 4.1.9.2 and 7.5.11 CW 33 (2) are met.

2.2.7.2.4.3 Classification as Surface contaminated object (SCO)

Radioactive material may be classified as SCO if the definition of SCO in 2.2.7.1.3 and the conditions of 2.2.7.2.3.2, 4.1.9.2 and 7.5.11 CW 33 (2) are met.

2.2.7.2.4.4 Classification as Type A package

Packages containing radioactive material may be classified as Type A packages, provided that the following conditions are met:

Type A packages shall not contain activities greater than either of the following:

- a) For special form radioactive material: A1;
- b) For all other radioactive material: A2.

For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the radioactive contents of a Type A package:

$$\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1,$$

where:

$B(i)$ is the activity of radionuclide i as special form radioactive material;

$A_1(i)$ is the A1 value for radionuclide i ;

$C(j)$ is the activity of radionuclide j as other than special form radioactive material;

$A_2(j)$ is the A2 value for radionuclide j .

2.2.7.2.4.5 Classification of uranium hexafluoride

2.2.7.2.4.5.1 Uranium hexafluoride shall only be assigned to:

- a) UN No. 2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSIONABLE;
- b) UN No. 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissionable or fissionable-excepted; or
- c) UN No. 3507, URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE less than 0.1 kg per package, non-fissionable or fissionable-excepted.

2.2.7.2.4.5.2 The contents of a package containing uranium hexafluoride shall comply with the following requirements

- a) For UN Nos. 2977 and 2978, the mass of uranium hexafluoride shall not be different from that allowed for the package design, and for UN No. 3507, the mass of uranium hexafluoride shall be less than 0.1 kg;
- b) The mass of uranium hexafluoride shall not be greater than a value that would lead to an ullage smaller than 5% at the maximum temperature of the package as specified for the plant systems where the package shall be used; and
- c) The uranium hexafluoride shall be in solid form and the internal pressure shall not be above atmospheric pressure when presented for carriage.

2.2.7.2.4.6 Classification as Type B(U), Type B(M) or Type C packages

2.2.7.2.4.6.1 Packages not otherwise classified in 2.2.7.2.4 (2.2.7.2.4.1 to 2.2.7.2.4.5) shall be classified in accordance with the competent authority certificate of approval for the package issued by the country of origin of design.

2.2.7.2.4.6.2 The contents of a Type B(U), Type B(M) or Type C package shall be as specified in the certificate of approval

2.2.7.2.4.6.3 (Reserved).

2.2.7.2.4.6.4 (Reserved).

2.2.7.2.5 Special arrangements

Radioactive material shall be classified as transported under special arrangement when it is intended to be carried in accordance with 1.7.4.

2.2.8 CLASS 8 CAUSTIC (CORROSIVE) SUBSTANCES

2.2.8.1 Definition and criteria

2.2.8.1.1 Caustic (corrosive) substances are substances which, by chemical action, will cause irreversible damage to the skin, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport. The heading of this class also covers other substances which form a corrosive liquid only in the presence of water, or which produce corrosive vapour or mist in the presence of natural moisture of the air.

2.2.8.1.2 For substances and mixtures that are corrosive to skin, general classification provisions are provided in 2.2.8.1.4. Skin corrosion refers to the production of irreversible damage to the skin, namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.

2.2.8.1.3 Liquids and solids which may become liquid during carriage, which are judged not to be skin corrosive shall still be considered for their potential to cause corrosion to certain metal surfaces in accordance with the criteria in 2.2.8.1.5.3 (c) (2).

2.2.8.1.4 General classification provisions

2.2.8.1.4.1 Substances and articles of Class 8 are subdivided as follows:

C1–C11 Corrosive substances without subsidiary risk and articles containing such substances

C1–C4 Acid substances:

C1 Inorganic, liquid;

C2 Inorganic, solid;

C3 Organic, liquid;

C4 Organic, solid;

C5–C8 Basic substances:

C5 Inorganic, liquid;

C6 Inorganic, solid;

C7 Organic, liquid;

C8 Organic, solid;

C9–C10 Other corrosive substances:

C9 Liquid;

C10 Solid;

C11 Articles

CF Corrosive substances, flammable:

CF1 Liquid

CF2 Solid

CS Corrosive substances, self-heating:

CS1 Liquid

CS2 Solid

CW Corrosive substances which, in contact with water, emit flammable gases:

CW1 Liquid

CW2 Solid

CO Corrosive substances, oxidizing:

CO1 Liquid

CO2 Solid

CT Corrosive substances, toxic and articles containing such substances:

CT1 Liquid

CT2 Solid

CT3 Articles

CFT Corrosive substances, flammable, liquid, toxic;

COT Corrosive substances, oxidizing, toxic.

2.2.8.1.4.2 Substances and mixtures of Class 8 are divided among the three packing groups according to their degree of danger in carriage:

- (a) *Packing group I*: very dangerous substances and mixtures;
- (b) *Packing group II*: substances and mixtures presenting medium danger;
- (c) *Packing group III*: substances and mixtures that present minor danger.

2.2.8.1.4.3 Allocation of substances listed in Table A of Chapter 3.2 to the packing groups in Class 8 has been made on the basis of experience taking into account such additional factors as inhalation risk (see 2.2.8.1.4.5) and reactivity with water (including the formation of dangerous decomposition products).

2.2.8.1.4.4 New substances and mixtures can be assigned to packing groups on the basis of the length of time of contact necessary to produce irreversible damage of intact skin tissue in accordance with the criteria in 2.2.8.1.5. Alternatively, for mixtures, the criteria in 2.2.8.1.6 can be used.

2.2.8.1.4.5 A substance or mixture meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists (LC50) in the range of packing group I, but toxicity through oral ingestion or dermal contact only in the range of packing group III or less, shall be allocated to Class 8 (see 2.2.61.1.7.2).

2.2.8.1.5 Packing group assignment for substances and mixtures

2.2.8.1.5.1 Existing human and animal data including information from single or repeated exposure shall be the first line of evaluation, as they give information directly relevant to effects on the skin.

2.2.8.1.5.2 In assigning the packing group in accordance with 2.2.8.1.4.4, account shall be taken of human experience in instances of accidental exposure. In the absence of human experience classification shall be based on data obtained from experiments in accordance with OECD Test Guidelines Nos. 404¹³, 435¹⁴, 431¹⁵ or 430¹⁶. A substance or mixture which is determined not to be corrosive in accordance with one of these or non-classified in accordance with OECD Test Guideline No. 439¹⁷, may be considered not to be corrosive to skin for the purposes of Annex 2 to SMGS without further testing. If the test results indicate that the substance or mixture is corrosive and not assigned to packing group I, but the test method does not allow discrimination between packing groups II and III, it shall be considered to be packing group II. If the test results indicate that the substance or mixture is corrosive, but the test method does not allow discrimination between packing groups, it shall be assigned to packing group I if no other test results indicate a different packing group.

2.2.8.1.5.3 Packing groups are assigned to corrosive substances in accordance with the following criteria (see Table 2.2.8.1.5.3):

- a) Packing group I is assigned to substances that cause irreversible damage of intact skin tissue within an observation period up to 60 minutes starting after the exposure time of 3 minutes or less.

¹³ OECD Guideline for the testing of chemicals No. 404 "Acute Dermal Irritation/Corrosion" 2015.

¹⁴ OECD Guideline for the testing of chemicals No. 435 "In Vitro Membrane Barrier Test Method for Skin Corrosion" 2015.

¹⁵ OECD Guideline for the testing of chemicals No. 431 "In vitro skin corrosion: reconstructed human epidermis (RHE) test method" 2016.

¹⁶ OECD Guideline for the testing of chemicals No. 430 "In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test Method (TER)" 2015.

¹⁷ OECD Guideline for the testing of chemicals No. 439 "In Vitro Skin Irritation: Reconstructed Human Epidermis Test Method" 2015.

b) Packing group II is assigned to substances that cause irreversible damage of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than 3 minutes but not more than 60 minutes.

c) Packing group III is assigned to substances that:

1) Cause irreversible damage of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than 60 minutes but not more than 4 hours; or

2) Are judged not to cause irreversible damage of intact skin tissue but which exhibit a corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55 °C when tested on both materials. For the purposes of testing steel, type S235JR+CR (1.0037 resp. St 37-2), S275J2G3+CR (1.0144 resp. St 44-3), ISO 3574 or Unified Numbering System (UNS) G10200 or a similar type or SAE 1020, and for testing aluminium, non-clad, types 7075-T6 or AZ5GU-T6 shall be used. An acceptable test is prescribed in the Manual of Tests and Criteria, Part III, Section 37.

Note: Where an initial test on either steel or aluminium indicates the substance being tested is corrosive the follow up test on the other metal is not required.

Table 2.2.8.1.5.3: Table summarizing the criteria in 2.2.8.1.5.3

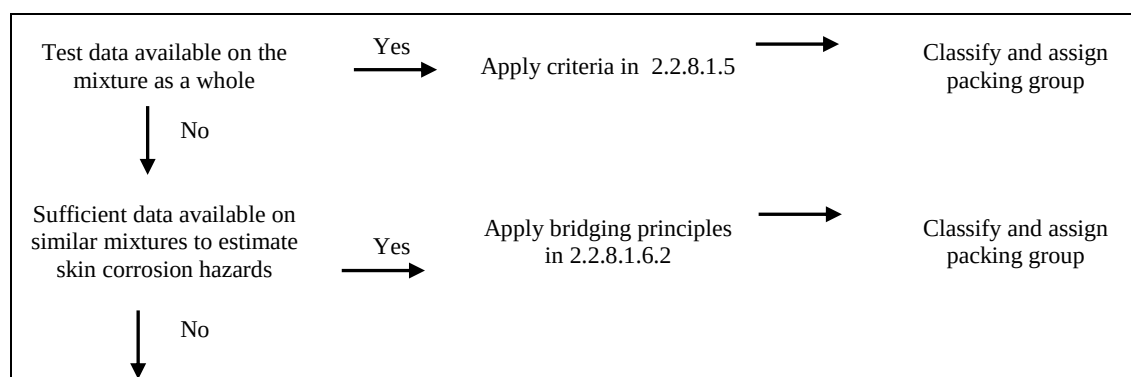
Packing	Exposure	Observation period	Effect
I	≤ 3 min	≤ 60 min	Irreversible damage of intact skin
II	> 3 min. ≤ 1 h	≤ 14 days	Irreversible damage of intact skin
III	> 1 h ≤ 4 h	≤ 14 days	Irreversible damage of intact skin
III	-	-	Corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55 °C when tested on both materials

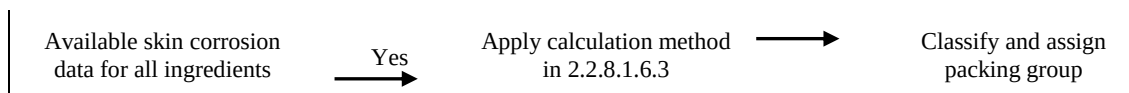
2.2.8.1.6 Alternative packing group assignment methods for mixtures: Step-wise approach

2.2.8.1.6.1 General provisions

For mixtures it is necessary to obtain or derive information that allows the criteria to be applied to the mixture for the purpose of classification and assignment of packing groups. The approach to classification and assignment of packing groups is tiered, and is dependent upon the amount of information available for the mixture itself, for similar mixtures and/or for its ingredients. The flow chart of Figure 2.2.8.1.6.1 below outlines the process to be followed.

Figure 2.2.8.1.6.1: Step-wise approach to classify and assign packing group of corrosive mixtures





2.2.8.1.6.2 Bridging principles

Where a mixture has not been tested to determine its skin corrosion potential, but there are sufficient data on both the individual ingredients and similar tested mixtures to adequately classify and assign a packing group for the mixture, these data will be used in accordance with the following bridging principles. This ensures that the classification process uses the available data to the greatest extent possible in characterizing the hazards of the mixture.

- (a) Dilution: If a tested mixture is diluted with a diluent which does not meet the criteria for Class 8 and does not affect the packing group of other ingredients, then the new diluted mixture may be assigned to the same packing group as the original tested mixture.

Note: In certain cases, diluting a mixture or substance may lead to an increase in the corrosive properties. If this is the case, this bridging principle cannot be used.

- (b) Batching: The skin corrosion potential of a tested production batch of a mixture can be assumed to be substantially equivalent to that of another untested production batch of the same commercial product when produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the skin corrosion potential of the untested batch has changed. If the latter occurs, a new classification is necessary.

- (c) Concentration of mixtures of packing group I: If a tested mixture meeting the criteria for inclusion in packing group I is concentrated, the more concentrated untested mixture may be assigned to packing group I without additional testing.

- (d) Interpolation within one packing group: For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same skin corrosion packing group, and where untested mixture C has the same Class 8 ingredients as mixtures A and B but has concentrations of Class 8 ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same skin corrosion packing group as A and B.

- (e) Substantially similar mixtures: Given the following:

- 1) Two mixtures: (A+B) and (C+B);
- 2) The concentration of ingredient B is the same in both mixtures;
- 3) The concentration of ingredient A in mixture (A+B) equals the concentration of ingredient C in mixture (C+B);
- 4) Data on skin corrosion for ingredients A and C are available and substantially equivalent, i.e. they are the same skin corrosion packing group and do not affect the skin corrosion potential of B.

If mixture (A+B) or (C+B) is already classified based on test data, then the other mixture may be assigned to the same packing group.

2.2.8.1.6.3 Calculation method based on the classification of the substances

- 2.2.8.1.6.3.1** Where a mixture has not been tested to determine its skin corrosion potential, nor is sufficient data available on similar mixtures, the corrosive properties of the substances in the mixture shall be considered to classify and assign a packing group.

Applying the calculation method is only allowed if there are no synergistic effects that make the mixture more corrosive than the sum of its substances. This restriction applies only if packing group II or III would be assigned to the mixture.

- 2.2.8.1.6.3.2** When using the calculation method, all Class 8 ingredients present at a concentration of $\geq 1\%$ shall be taken into account, or $< 1\%$ if these ingredients are still relevant for classifying the mixture to be corrosive to skin.

- 2.2.8.1.6.3.3** To determine whether a mixture containing corrosive substances shall be considered a corrosive mixture and to assign a packing group, the calculation method in the flow chart in Figure 2.2.8.1.6.3 shall be applied. For this calculation method, generic concentration limits apply where 1% is used in the first step for the assessment of the packing group I substances, and where 5% is used for the other steps respective

2.2.8.1.6.3.4 When a specific concentration limit (SCL) is assigned to a substance following its entry in Table A of Chapter 3.2 or in a special provision, this limit shall be used instead of the generic concentration limits (GCL).

2.2.8.1.6.3.5 For this purpose, the summation formula for each step of the calculation method shall be adapted. This means that, where applicable, the generic concentration limit shall be substituted by the specific concentration limit assigned to the substance(s) (SCLi), and the adapted formula is a weighted average of the different concentration limits assigned to the different substances in the mixture:

$$\frac{PGx1}{GCL} + \frac{PGx2}{SCL2} + \dots + \frac{PGxi}{SCLi} \geq 1$$

where:

PG xi = concentration of substance 1, 2 ... i in the mixture, assigned to packing group x (I, II or III)

GCL = generic concentration limit

SCLi = specific concentration limit assigned to substance i

The criterion for a packing group is fulfilled when the result of the calculation is ≥ 1 . The generic concentration limits to be used for the evaluation in each step of the calculation method are those found in Figure 2.2.8.1.6.3.

Examples for the application of the above formula can be found in the note below.

Note: Examples for the application of the above formula

Example 1: A mixture contains one corrosive substance in a concentration of 5% assigned to packing group I without a specific concentration limit:

$$\text{Calculation for packing group I: } \frac{5}{5 (GCL)} = 1$$

→assign to Class 8, packing group I.

Example 2: A mixture contains three substances corrosive to skin; two of them (A and B) have specific concentration limits; for the third one (C) the generic concentration limit applies. The rest of the mixture needs not to be taken into consideration:

Substance X in the mixture and its packing group assignment within Class 8	Concentration (conc) in the mixture in %	Specific con-centration limit (SCL) for packing group I	Specific con-centration limit (SCL) for packing group II	Specific con-centration limit (SCL) for packing group III
A, assigned to packing group I	3	30%	None	None
B, assigned to packing group II	2	20%	10%	None
C, assigned to packing group III	10	None	None	None

$$\text{Calculation for packing group I: } \frac{3 (conc A)}{30 (SCL PGI)} + \frac{2 (conc B)}{20 (SCL PGI)} = 0,2 < 1$$

The criterion for packing group I is not fulfilled.

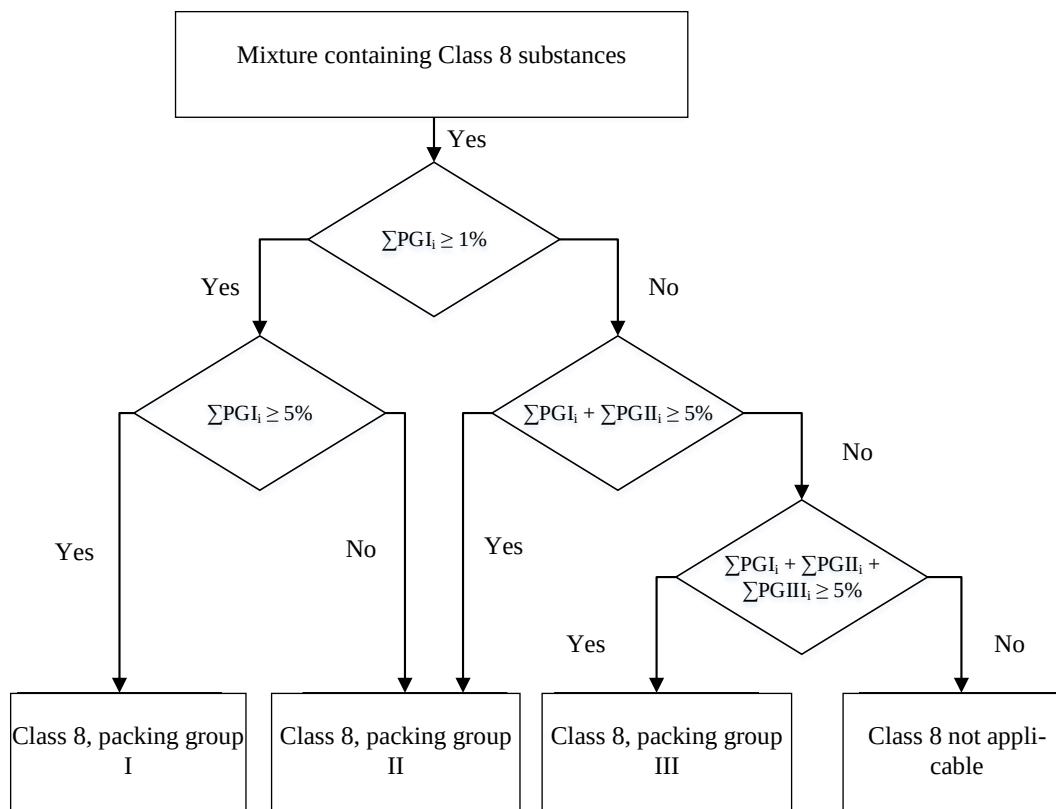
$$\text{Calculation for packing group II: } \frac{3 (conc A)}{5 (GCL PG II)} + \frac{2 (conc B)}{10 (SCL PG II)} = 0,8 < 1$$

The criterion for packing group II is not fulfilled.

Calculation for packing group III: $\frac{3 \text{ (conc A)}}{5 \text{ (GCL PG III)}} + \frac{2 \text{ (conc B)}}{5 \text{ (GCL PG III)}} + \frac{10 \text{ (conc C)}}{5 \text{ GCL PG III}} = 3 \geq 1$

The criterion for packing group III is fulfilled, the mixture shall be assigned to Class 8, packing group III.

Figure 2.2.8.1.6.3: Calculation method



2.2.8.1.7 If substances of Class 8, as a result of admixtures, come into categories of risk different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong, on the basis of their actual degree of danger.

Note: For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.

2.2.8.1.8 On the basis of the criteria set out in paragraph 2.2.8.1.6, it may also be determined whether the nature of a solution or mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the provisions for this class.

Note: UN No. 1910 CALCIUM OXIDE and UN No. 2812 SODIUM ALUMINATE, listed in the UN Model Regulations, are not subject to the provisions of Annex 2 to SMGS.

2.2.8.2 Substances not accepted for carriage

2.2.8.2.1 Chemically unstable substances of Class 8 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions. If temperature control is required to prevent polymerization of a substance the substance shall not be accepted for carriage:

- in a packaging or IBC with an SAPT of 50 °C or less,
- or in a tank with an SAPT of 45 °C or less.

2.2.8.2.2 The following substances shall not be accepted for carriage:

- UN No. 1798 NITROHYDROCHLORIC ACID;
- Chemically unstable mixtures of spent sulphuric acid
- Chemically unstable mixtures of nitrating acid or mixtures of residual sulphuric and nitric acids, not denitrated;
- Perchloric acid aqueous solution with more than 72% pure acid, by mass, or mixtures of perchloric acid with any liquid other than water.

The following substance shall not be accepted for carriage by rail:

- Sulphur trioxide, at least 99.95% pure, without inhibitor (non-stabilized).

2.2.8.3 List of collective entries

Subsidiary risk		Classification code	UN No.	Name of the substance or article
Corrosive substances without subsidiary risk and articles containing such substances				
Acid	Inorganic	Liquid C1	2584	ALKYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid or
			2584	ARYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid
		Solid C2	2693	BISULPHITES, AQUEOUS SOLUTION, N.O.S.
			2837	BISULPHATES, AQUEOUS SOLUTION
Basic substances	Inorganic	Solid C2	3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
			1740	HYDROGENDIFLUORIDES, SOLID, N.O.S.
	Organic	Liquid C3	2583	ALKYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid or
			2583	ARYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid
	Organic	Solid C4	3260	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.
			2586	ALKYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid or
	Organic	Liquid C3	2586	ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid
			2987	CHLOROSILANES, CORROSIVE, N.O.S.
	Organic	Solid C4	3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C2-C12 homologues)
			3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Other corrosive substances	Inorganic	Liquid C5	2430	ALKYLPHENOLS, SOLID, N.O.S. (including C2-C12 homologues)
			2585	ALKYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid or
	Inorganic	Solid C6	2585	ARYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid
			3261	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
	Organic	Liquid C7	1719	CAUSTIC ALKALI LIQUID, N.O.S..
			2797	BATTERY FLUID, ALKALI
	Organic	Solid C8	3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
			3262	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.
	Organic	Liquid C9	2735	AMINES, LIQUID, CORROSIVE, N.O.S. or
			2735	POLYAMINES, SOLID, CORROSIVE, N.O.S
Other corrosive substances	Organic	Solid C8	3267	CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.
			3259	AMINES, LIQUID, CORROSIVE, N.O.S. or
	Organic	Liquid C9	3259	POLYAMINES, LIQUID, CORROSIVE, N.O.S.
			3263	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S
	Organic	Solid C8	1903	DISINFECTANT, LIQUID, CORROSIVE, N.O.S.
			2801	DYE, LIQUID, CORROSIVE, N.O.S. or
	Organic	Liquid C9	2801	DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.
			3066	PAINT (including paint, enamel, stain, shellac, varnish, polish, liquid filler and lacquer base) or
	Organic	Solid C8	3066	PAINT RELATED MATERIAL (including paint thinning or reducing compound)
			1760	CORROSIVE LIQUID, N.O.S

	Solid ^a	C10	3147	DYE, SOLID, CORROSIVE, N.O.S. or
			3147	DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S..
			3244	SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.
			1759	CORROSIVE SOLID, N.O.S
Articles	C11	1774	FIRE EXTINGUISHER CHARGES, corrosive liquid	
		2028	BOMBS, SMOKE, NON-EXPLOSIVE with corrosive, liquid, without initiating device	
		2794	BATTERIES, WET, FILLED WITH ACID, electric storage	
		2795	BATTERIES, WET, FILLED WITH ALKALI, electric storage	
		2800	BATTERIES, WET, NON-SPILLABLE, electric storage	
		3028	BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	
		3477	FUEL CELL CARTRIDGES containing corrosive substances, or	
		3477	FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing corrosive substances, or	
Corrosive substances with subsidiary risk and articles containing such substances		C11	3477	FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing corrosive substances
			3547	ARTICLE CONTAINING CORROSIVE SUBSTANCE, N.O.S.
Flammable ^b	Liquid ^b	CF1	3470	PAINT, CORROSIVE, FLAMMABLE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or
			3470	PAINT RELATED MATERIAL, CORROSIVE, FLAMMABLE (including paint thinning and reducing compound)
			2734	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S or
			2734	POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE , N.O.S.
			2986	CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.
			2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S
CF	Solid	CF2	2921	CORROSIVE SOLID, FLAMMABLE, N.O.S
Self-heating	Liquid	CS1	3301	CORROSIVE LIQUID, SELF-HEATING, N.O.S.
CS	Solid	CS2	3095	CORROSIVE SOLID, SELF-HEATING, N.O.S.
Water-reactive	Liquid ^d	CW1	3094	CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.
CW	Solid	CW2	3096	CORROSIVE SOLID, WATER-REACTIVE, N.O.S.
Oxidizing	Liquid	CO1	3093	CORROSIVE LIQUID, OXIDIZING, N.O.S.
CO	Solid	CO2	3084	CORROSIVE SOLID, OXIDIZING, N.O.S.
Toxic ^d	Liquid ^c	CT1	3471	HYDROGENDIFLUORIDES SOLUTION, N.O.S..
			2922	CORROSIVE LIQUID, TOXIC, N.O.S.
CT	Solid ^e	CT2	2923	CORROSIVE SOLID, TOXIC, N.O.S.
			Articles	CT3
Flammable, liquid, toxic ^d		CFT	(No collective entry with this classification code available, if need be, classification code under collective entry with a classification code to be determined according to table of precedence of hazard in 2.1.3.10)	
Oxidizing, toxic ^{d,e}		COT	(No collective entry with this classification code available, if need be, classification code under collective entry with a classification code to be determined according to table of precedence of hazard in 2.1.3.10)	

- a) Mixtures of solids which are not subject to the provisions of Annex 2 to SMGS and of corrosive liquids may be carried under UN No. 3244 without being subject to the classification criteria of Class 8, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging, wagon or container is closed. Each packaging shall correspond to a design type which has passed the leakproofness test for Packing group II level.
- b) Chlorosilanes which, in contact with water or moist air, emit flammable gases, are substances of Class 4.3.
- c) Chloroformates having predominantly toxic properties are substances of Class 6.1.

- d) Corrosive substances which are highly toxic by inhalation, as defined in 2.2.61.1.4 to 2.2.61.1.9 are substances of Class 6.1.
- e) UN No. 1690 SODIUM FLUORIDE, SOLID, UN No. 1812 POTASSIUM FLUORIDE, SOLID, UN No. 2505 AMMONIUM FLUORIDE, UN No. 2674 SODIUM FLUOROSILICATE, UN No. 2856 FLUOROSILICATES, N.O.S., UN No. 3415 SODIUM FLUORIDE SOLUTION and UN No. 3422 POTASSIUM FLUORIDE SOLUTION are substances of Class 6.1.

2.2.9 CLASS 9 MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES

2.2.9.1 Criteria

2.2.9.1.1 The heading of Class 9 covers substances and articles which, during carriage, present a danger not covered by the heading of other classes.

2.2.9.1.2 The substances and articles of Class 9 are subdivided as follows:

- M1** Substances which, on inhalation as fine dust, may endanger health;
- M2** Substances and articles which, in the event of fire, may form dioxins;
- M3** Substances evolving flammable vapour;
- M4** Lithium batteries and sodium ion batteries;
- M5** Life-saving appliances;
- M6–M8** Environmentally hazardous substances:
 - M6** Pollutant to the aquatic environment, liquid;
 - M7** Pollutant to the aquatic environment, solid;
 - M8** Genetically modified microorganisms and organisms;
- M9–M10** Elevated temperature substances:
 - M9** Liquid;
 - M10** Solid;
- M11** Other substances and articles presenting a danger during carriage, but not meeting the definitions of another class.

2.2.9.1.3 Definitions and classification

Substances and articles classified in Class 9 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of that Table or of 2.2.9.3 shall be done in accordance with 2.2.9.1.4 to 2.2.9.1.8, 2.2.9.1.10, 2.2.9.1.11, 2.2.9.1.13 and 2.2.9.1.14 below.

2.2.9.1.4 Substances which, on inhalation as fine dust, may endanger health
Substances which, on inhalation as fine dust, may endanger health include asbestos and mixtures containing asbestos.

2.2.9.1.5 Substances and apparatus which, in the event of fire, may form dioxins
Substances and articles which, in the event of fire, may form dioxins include polychlorinated biphenyls (PCBs) and terphenyls (PCTs) and polyhalogenated biphenyls and terphenyls and mixtures containing these substances, as well as articles such as transformers, condensers and apparatus containing those substances or mixtures.

Note: Mixtures with a PCB or PCT content of not more than 50 mg/kg are not subject to the provisions of Annex 2 to SMGS.

2.2.9.1.6 Substances evolving flammable vapour
Substances evolving flammable vapour include polymers containing flammable liquids with a flash-point not exceeding 55 °C.

2.2.9.1.7 Lithium batteries and sodium ion batteries

2.2.9.1.7.1 Lithium batteries

Lithium batteries shall meet the following requirements, except when otherwise provided for in Annex 2 to SMGS (e.g. for prototype batteries and small production runs under special provision 310 or damaged batteries under special provision 376).

Note: For UN 3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT, see special provision 389 in Chapter 3.3.

Cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment, containing lithium in any form shall be assigned to UN Nos. 3090, 3091, 3480 or 3481 as appropriate. They may be carried under these entries if they meet the following provisions:

- a) Each cell or battery is of the type proved to meet the requirements of each test of the Manual of Tests and Criteria, Part III, sub-section 38.3;

Note: *Batteries shall be of a type proved to meet the testing requirements of the Manual of Tests and Criteria, part III, sub-section 38.3, irrespective of whether the cells of which they are composed are of a tested type.*

- b) Each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under normal conditions of carriage;
- c) Each cell and battery is equipped with an effective means of preventing external short circuits;
- d) Each battery containing cells or series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g., diodes, fuses, etc.);
- e) Cells and batteries shall be manufactured under a quality management programme that includes:

- I) A description of the organizational structure and responsibilities of personnel with regard to design and product quality;
- II) The relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;
- III) Process controls that should include relevant activities to prevent and detect internal short circuit failure during manufacture of cells;
- IV) Quality records, such as inspection reports, test data, calibration data and certificates. Test data shall be kept and made available to the competent authority upon request;
- V) Management reviews to ensure the effective operation of the quality management programme;
- VI) A process for control of documents and their revision;
- VII) A means for control of cells or batteries that are not conforming to the type tested as mentioned in (a) above;
- VIII) Training programmes and qualification procedures for relevant personnel; and
- IX) Procedures to ensure that there is no damage to the final product.

Note: *In-house quality management programmes may be accepted. Third party certification is not required, but the procedures listed in (i) to (ix) above shall be properly recorded and traceable. A copy of the quality management programme shall be made available to the competent authority upon request.*

- f) Lithium batteries, containing both primary lithium metal cells and rechargeable lithium ion cells, that are not designed to be externally charged (see special provision 387 of Chapter 3.3) shall meet the following conditions:

- 1) The rechargeable lithium ion cells can only be charged from the primary lithium metal cells;
- 2) Overcharge of the rechargeable lithium ion cells is precluded by design;
- 3) The battery has been tested as a lithium primary battery;

4) Component cells of the battery shall be of a type proved to meet the respective testing requirements of the Manual of Tests and Criteria, part III, sub-section 38.3;

- g) Except for button cells installed in equipment (including circuit boards), manufacturers and subsequent distributors of cells or batteries manufactured after 30 June 2003 shall make available the test summary as specified in the Manual of Tests and Criteria, Part III, sub-section 38.3, paragraph 38.3.5.

Note: The term "make available" means that manufacturers and subsequent distributors ensure that the test summary is accessible so that the consignor or other persons in the supply chain can confirm compliance.

Lithium batteries are not subject to the provisions of Annex 2 to SMGS if they meet the requirements of special provision 188 of Chapter 3.3.

2.2.9.1.7.2 Sodium ion batteries cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment containing sodium ion, which are a rechargeable electrochemical system where the positive and negative electrode are both intercalation or insertion compounds, constructed with no metallic sodium (or sodium alloy) in either electrode and with an organic non aqueous compound as electrolyte, shall be assigned to UN Nos. 3551 or 3552, as appropriate.

Note: Intercalated sodium exists in an ionic or quasi-atomic form in the lattice of the electrode material.

They may be carried under these entries if they meet the following provisions:

- (a) Each cell or battery is of the type proved to meet the requirements of applicable tests of the Manual of Tests and Criteria, Part III, sub-section 38.3;

Note: Batteries shall be of a type proved to meet the testing requirements of the Manual of Tests and Criteria, Part III, sub-section 38.3, irrespective of whether the cells of which they are composed are of a tested type.

- (b) Each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under conditions normally encountered during carriage;

- (c) Each cell and battery is equipped with an effective means of preventing external short circuits;

- (d) Each battery containing cells or a series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g. diodes, fuses, etc.);

- (e) Cells and batteries shall be manufactured under a quality management programme as prescribed under 2.2.9.1.7.1 (e) (I) to (IX); 2-126

- (f) Manufacturers and subsequent distributors of cells or batteries shall make available the test summary as specified in the Manual of Tests and Criteria, Part III, sub-section 38.3, paragraph 38.3.5.

Note: The term "make available" means that manufacturers and subsequent distributors ensure that the test summary is accessible so that the consignor or other persons in the supply chain can confirm compliance.

Sodium ion batteries are not subject to the provisions of Annex 2 to SMGS if they meet the requirements of special provisions 188 and 400 of Chapter 3.3.

2.2.9.1.8 Life-saving appliances

Life-saving appliances include life-saving appliances and motor vehicle components which meet the descriptions of special provisions 235 or 296 of Chapter 3.3.

2.2.9.1.8 Environmentally hazardous substances

2.2.9.1.9 (Reserved)

2.2.9.1.10 Environmentally hazardous substances (aquatic environment)

2.2.9.1.10.1 General definitions

2.2.9.1.10.1.1 Environmentally hazardous substances include, inter alia, liquid or solid substances pollutant to the aquatic environment and solutions and mixtures of such substances (such as preparations and wastes).

For the purposes of 2.2.9.1.10,

«**Substance**» means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

«**Ecotoxicity**» means quality of some chemical substances and compounds or natural substances to endanger the aquatic environment.

2.2.9.1.10.1.2 The aquatic environment may be considered in terms of the aquatic organisms that live in the water, and the aquatic ecosystem of which they are part¹⁸. The basis, therefore, of the identification of hazard is the aquatic toxicity of the substance or mixture, although this may be modified by further information on the degradation and bioaccumulation behavior

2.2.9.1.10.1.3 While the following classification procedure is intended to apply to all substances and mixtures, it is recognised that in some cases, e.g. metals or poorly soluble inorganic compounds, special guidance will be necessary¹⁹.

2.2.9.1.10.1.4 The following definitions apply for acronyms or terms used in this section:

- BCF: Bioconcentration Factor;
- BOD: Biochemical Oxygen Demand;
- COD: Chemical Oxygen Demand;
- GLP: Good Laboratory Practices
- EC_x: the concentration associated with x% response;
- EC₅₀: the effective concentration of substance that causes 50% of the maximum response;
- ErC₅₀: EC50 in terms of reduction of growth;
- K_{ow}: octanol/water partition coefficient;
- LC₅₀: the concentration of a substance in water which causes the death of 50% (one half) in a group of test animals;
- L(E)C₅₀: LC₅₀ or EC₅₀;
- NOEC (No Observed Effect Concentration): the test concentration immediately below the lowest tested concentration with statistically significant adverse effect. The NOEC has no statistically significant adverse effect compared to the control;
- OECD Test Guidelines:
Test guidelines published by the Organization for Economic Cooperation and Development (OECD).

2.2.9.1.10.2 Definitions and data requirements

2.2.9.1.10.2.1 The basic elements for classification of environmentally hazardous substances (aquatic environment) are:

- a) Acute aquatic ecotoxicity;
- b) Chronic aquatic ecotoxicity;
- c) Potential for or actual bioaccumulation
- d) Degradation (biotic or abiotic) for organic chemicals.

2.2.9.1.10.2.2 While data from internationally harmonised test methods are preferred, in practice, data from national methods may also be used where they are considered as equivalent. In general, it has been agreed that freshwater and marine species ecotoxicity data can be considered as equivalent data and are preferably to be derived using OECD Test Guidelines

¹⁸ This does not address aquatic pollutants for which there may be a need to consider effects beyond the aquatic environment such as the impacts on human health etc.

¹⁹ This can be found in Annex 10 of the GHS.

or equivalent according to the principles of Good Laboratory Practices (GLP). Where such data are not available, classification shall be based on the best available data.

2.2.9.1.10.2.3 Acute aquatic ecotoxicity means the intrinsic property of a substance to be injurious to an organism in a short-term aquatic exposure to that substance.

Acute (short-term) hazard, for classification purposes, means the hazard of a chemical caused by its acute ecotoxicity to an organism during short-term aquatic exposure to that chemical.

Acute aquatic ecotoxicity shall normally be determined using a fish 96 hour LC50 (OECD Test Guideline 203 or equivalent), a crustacea species 48 hour EC50 (OECD Test Guideline 202 or equivalent) and/or an algal species 72 or 96 hour EC50 (OECD Test Guideline 201 or equivalent). These species are considered as surrogate for all aquatic organisms and data on other species such as Lemna may also be considered if the test methodology is suitable.

2.2.9.1.10.2.4 Chronic aquatic ecotoxicity means the intrinsic property of a substance to cause adverse effects to aquatic organisms during aquatic exposures which are determined in relation to the life-cycle of the organism.

Long-term hazard, for classification purposes, means the hazard of a chemical caused by its chronic toxicity following long-term exposure in the aquatic environment.

Chronic ecotoxicity data are less available than acute data and the range of testing procedures less standardised. Data generated according to the OECD Test Guidelines 210 (Fish Early Life Stage) or 211 (Daphnia Reproduction) and 201 (Algal Growth Inhibition) may be accepted. Other validated and internationally accepted tests may also be used. The NOECs or other equivalent ECx shall be used.

2.2.9.1.10.2.5 Bioaccumulation means net result of uptake, transformation and elimination of a substance in an organism due to all routes of exposure (i.e. air, water, sediment/soil and food).

The potential for bioaccumulation shall normally be determined by using the octanol/water partition coefficient, usually reported as a log Kow determined according to OECD Test Guideline 107, 117 or 123. While this represents a potential to bioaccumulate, an experimentally determined Bioconcentration Factor (BCF) provides a better measure and shall be used in preference when available. A BCF shall be determined according to OECD Test Guideline 305.

2.2.9.1.10.2.6 Degradation means the decomposition of organic molecules to smaller molecules and eventually to carbon dioxide, water and salts.

Environmental degradation may be biotic or abiotic (e.g. hydrolysis) and the criteria used reflect this fact. Ready biodegradation is most easily defined using the biodegradability tests (A-F) of OECD Test Guideline 301. A pass level in these tests may be considered as indicative of rapid degradation in most environments. These are freshwater tests and thus the use of the results from OECD Test Guideline 306, which is more suitable for marine environments, has also been included. Where such data are not available, a BOD5 (5 days)/COD ratio ≥ 0.5 is considered as indicative of rapid degradation.

Abiotic degradation such as hydrolysis, primary degradation, both abiotic and biotic, degradation in non-aquatic media and proven rapid degradation in the environment may all be considered in defining rapid degradability²⁰.

Substances are considered rapidly degradable in the environment if the following criteria are met:

a) In 28-day ready biodegradation studies, the following levels of degradation are achieved:

- 1) Tests based on dissolved organic carbon: 70%;
- 2) Tests based on oxygen depletion or carbon dioxide generation: 60% of theoretical maxima;

These levels of biodegradation shall be achieved within 10 days of the start of degradation which point is taken as the time when 10% of the substance has been degraded, unless the substance is identified as a complex, multi-component substance with structurally similar constituents. In this case, and where there is

²⁰ Special guidance on data interpretation is provided in Chapter 4.1 and Annex 9 of the GHS.

sufficient justification, the 10-day window condition may be waived and the pass level applied at 28 days²¹;

or

b) In those cases where only BOD and COD data are available, when the ratio of BOD5/COD is ≥ 0.5 ; or

c) If other convincing scientific evidence is available to demonstrate that the substance can be degraded (biotically and/or abiotically) in the aquatic environment to a level above 70% within a 28 day period.

2.2.9.1.10.3 Substance classification categories and criteria

Substances shall be classified as "environmentally hazardous substances (aquatic environment)", if they satisfy the criteria for Acute 1, Chronic 1 or Chronic 2, according to Table 2.2.9.1.10.3.1. These criteria describe in detail the classification categories. They are diagrammatically summarized in Table 2.2.9.1.10.3.2.

Table 2.2.9.1.10.3.1: Categories for substances hazardous to the aquatic environment

(see Note 1)

a) Acute (short-term) aquatic hazard

Category Acute 1: (see Note 2)	
96 hr LC ₅₀ (for fish)	≤ 1 mg/l and/or
48 hr EC ₅₀ (for crustacea)	≤ 1 mg/l and/or
72 or 96hr ErC ₅₀ (for algae or other aquatic plants)	≤ 1 mg/l (see Note 3)

b) Long-term aquatic hazard (see also Figure 2.2.9.1.10.3.1)

1) Non-rapidly degradable substances (see Note 4) for which there are adequate chronic ecotoxicity data available

Category Chronic 1: (see Note 2)

Chronic NOEC or EC _x (for fish)	$\leq 0,1$ mg/l and/or
Chronic NOEC or EC _x (for crustacea)	$\leq 0,1$ mg/l and/or
Chronic NOEC or EC _x (for algae or other aquatic plants)	$\leq 0,1$ mg/l

Category Chronic 2:

Chronic NOEC or EC _x (for fish)	≤ 1 mg/l and/or
Chronic NOEC or EC _x (for crustacea)	≤ 1 mg/l and/or
Chronic NOEC or EC _x (for algae or other aquatic plants)	≤ 1 mg/l

2) Rapidly degradable substances for which there are adequate chronic ecotoxicity data available

Category Chronic 1: (see Note 2)

Chronic NOEC or EC _x (for fish)	$\leq 0,01$ mg/l and/or
Chronic NOEC or EC _x (for crustacea)	$\leq 0,01$ mg/l and/or
Chronic NOEC or EC _x (for algae or other aquatic plants)	$\leq 0,01$ mg/l

Category Chronic 2:

Chronic NOEC or EC _x (for fish)	$\leq 0,1$ mg/l and/or

²¹ See Chapter 4.1 and Annex 9, paragraph A9.4.2.2.3 of the GHS.

Chronic NOEC or ECx (for crustacea)	≤ 0.1 mg/l and/or
Chronic NOEC or ECx (for algae or other aquatic plants)	≤ 0,1 mg/l

3) Substances for which adequate chronic ecotoxicity data are not available

Category Chronic 1: (see Note 2)	
96 hr LC ₅₀ (for fish)	≤ 1 mg/l and/or
48 hr EC ₅₀ (for crustacea)	≤ 1 mg/l and/or
72 or 96hr ErC ₅₀ (for algae or other aquatic plants)	≤ 1 mg/l (see Note 3)
and the substance is not rapidly degradable and/or the experimentally determined BCF is ≥500 (or, if absent the log Kow ≥4) (see Notes 4 and 5).	

Category Chronic 2:	
96 hr LC ₅₀ (for fish)	>1, but ≤ 10 mg/l and/or
48 hr EC ₅₀ (for crustacea)	>1, but ≤ 10 mg/l and/or
72 or 96hr ErC ₅₀ (for algae or other aquatic plants)	>1, but ≤ 10 mg/l (see Note 3)
and the substance is not rapidly degradable and/or the experimentally determined BCF is ≥ 500 (or, if absent the log K _{ow} ≥ 4 (see Notes 4 and 5).	

Note 1: *The organisms fish, crustacea and algae are tested as surrogate species covering a range of trophic levels and taxa, and the test methods are highly standardized. Data on other organisms may also be considered, however, provided they represent equivalent species and test end-points.*

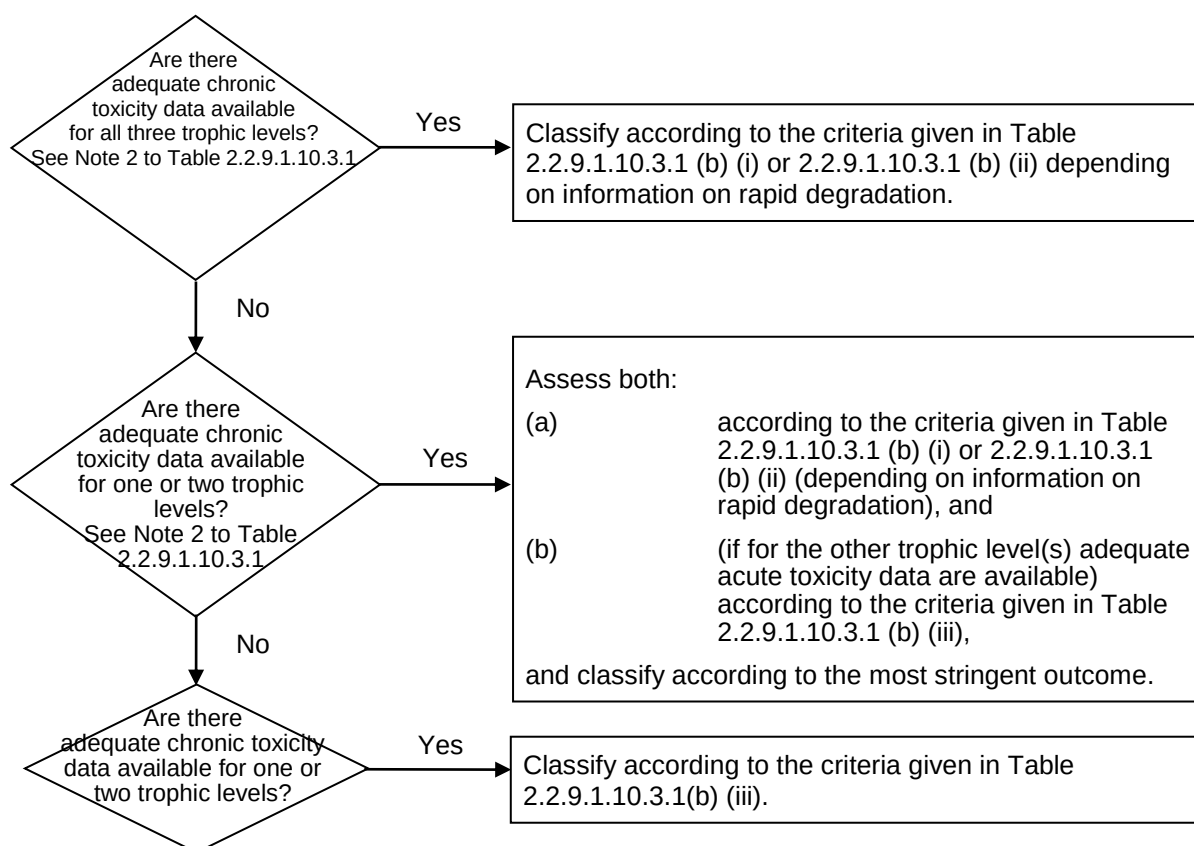
Note 2: *When classifying substances as Acute 1 and/or Chronic 1 it is necessary at the same time to indicate an appropriate M factor (see 2.2.9.1.10.4.6.4) to apply the summation method.*

Note 3: *Where the algal ecotoxicity ErC₅₀ (= EC₅₀ (growth rate)) falls more than 100 times below the next most sensitive species and results in a classification based solely on this effect, consideration shall be given to whether this ecotoxicity is representative of the toxicity to aquatic plants. Where it can be shown that this is not the case, professional judgment shall be used in deciding if classification shall be applied. Classification shall be based on the ErC₅₀. In circumstances where the basis of the EC₅₀ is not specified and no ErC₅₀ is recorded, classification shall be based on the lowest EC₅₀ available.*

Note 4: *Lack of rapid degradability is based on either a lack of ready biodegradability or other evidence of lack of rapid degradation. When no useful data on degradability are available, either experimentally determined or estimated data, the substance shall be regarded as not rapidly degradable.*

Note 5: *Potential to bioaccumulate, based on an experimentally derived BCF ≥ 500 or, if absent, a log K_{ow} ≥ 4 provided log K_{ow} is an appropriate descriptor for the bioaccumulation potential of the substance. Measured log K_{ow} values take precedence over estimated values and measured BCF values take precedence over log K_{ow} values.*

Figure 2.2.9.1.10.3.1: Categories for substances long-term hazardous to the aquatic environment



2.2.9.1.10.3.2 The classification scheme in Table 2.2.9.1.10.3.2 below summarizes the classification criteria for substances.

Table 2.2.9.1.10.3.2: Classification scheme for substances hazardous to the aquatic environment

Classification categories			
Acute hazard (see Note 1)	Long-term hazard (see Note 2)		
	Adequate chronic ecotoxicity data available		Adequate chronic ecotoxicity data not available (see Note 1)
	Non-rapidly degradable substances (see Note 3)	Rapidly degradable substances (see Note 3)	
Category: Acute 1	Category: Chronic 1	Category: Chronic 1	Category: Chronic 1
L(E)C ₅₀ ≤ 1,00	NOEC or EC _x ≤ 0,1	NOEC or EC _x ≤ 0,01	L(E)C ₅₀ ≤ 1,00 and lack of rapid degradability and/or BCF ≥ 500 or, if absent log K _{ow} ≥ 4
	Category: Chronic 2	Category: Chronic 2	Category: Chronic 2
	0,1 < NOEC or EC _x ≤ 1	0,01 < NOEC or EC _x ≤ 0,1	1.00 < L(E)C ₅₀ ≤ 10.0 and lack of rapid degradability and/or BCF ≥ 500 or, if absent log K _{ow} ≥ 4

Note 1: Acute toxicity band based on L(E)C₅₀ values in mg/l for fish, crustacea and/or algae or other aquatic plants (or Quantitative Structure Activity Relationships (QSAR) estimation if no experimental data²²).

Note 2: Substances are classified in the various chronic categories unless there are adequate chronic ecotoxicity data available for all three trophic levels above the water solubility or above 1 mg/l. ("Adequate" means that the data sufficiently cover the endpoint of concern. Generally this would mean measured test data, but in order to avoid unnecessary testing it can on a case by case basis also be estimated data, e.g. (Q)SAR, or for obvious cases expert judgment).

Note 3: Chronic ecotoxicity band based on NOEC or equivalent EC_x values in mg/l for fish or crustacea or other recognized measures for chronic ecotoxicity.

2.2.9.1.10.4 Mixtures classification categories and criteria

2.2.9.1.10.4.1 The classification system for mixtures covers the classification categories which are used for substances, meaning categories Acute 1 and Chronic 1 and 2. In order to make use of all available data for purposes of classifying the aquatic environmental hazards of the mixture, the following assumption is made and is applied where appropriate:

The "relevant ingredients" of a mixture are those which are present in a concentration equal to or greater than 0.1% (by mass) for ingredients classified as Acute and/or Chronic 1 and equal to or greater than 1% for other ingredients, unless there is a presumption (e.g. in the case of highly toxic ingredients) that an ingredient present at less than 0.1% can still be relevant for classifying the mixture for aquatic environmental hazards.

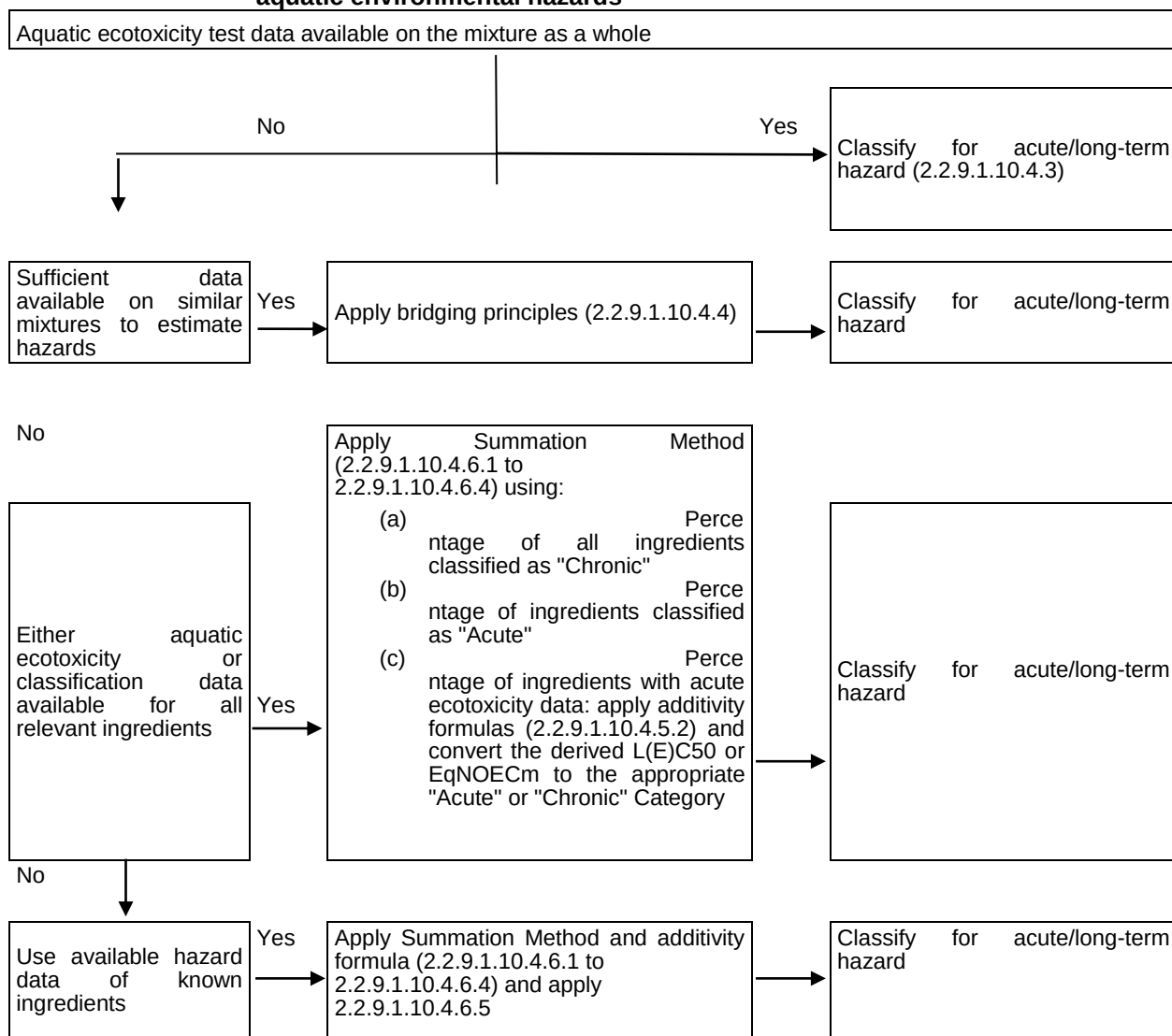
2.2.9.1.10.4.2 The approach for classification of aquatic environmental hazards is tiered, and is dependent upon the type of information available for the mixture itself and for its ingredients. Elements of the tiered approach include:

- Classification based on tested mixtures;
- Classification based on bridging principles;
- The use of "summation of classified ingredients" and/or an "additivity formula".

Figure 2.2.9.1.10.4.2 below outlines the process to be followed.

²² Special guidance is provided in Chapter 4.1, paragraph 4.1.2.13 and Annex 9, Section A9.6 of the GHS.

Figure 2.2.9.1.10.4.2: Tiered approach to classification of mixtures for acute and long-term aquatic environmental hazards



2.2.9.1.10.4.3 Classification of mixtures when ecotoxicity data are available for the complete mixture

2.2.9.1.10.4.3.1 When the mixture as a whole has been tested to determine its aquatic ecotoxicity, this information shall be used for classifying the mixture according to the criteria that have been agreed for substances. The classification is normally based on the data for fish, crustacea and algae/plants (see 2.2.9.1.10.2.3 and 2.2.9.1.10.2.4). When adequate acute or chronic data for the mixture as a whole are lacking, "bridging principles" or "summation method" shall be applied (see 2.2.9.1.10.4.4 to 2.2.9.1.10.4.6).

2.2.9.1.10.4.3.2 The long-term hazard classification of mixtures requires additional information on degradability and in certain cases bioaccumulation. There are no degradability and bioaccumulation data for mixtures as a whole. Degradability and bioaccumulation tests for mixtures are not used as they are usually difficult to interpret, and such tests may be meaningful only for single substances.

2.2.9.1.10.4.3.3 Classification for category Acute 1

a) When there are adequate acute ecotoxicity test data (LC_{50} or EC_{50}) available for the mixture as a whole showing $L(E)C_{50} \leq 1$ mg/l:

Classify the mixture as Acute 1 in accordance with Table 2.2.9.1.10.3.1 (a);

b) When there are acute ecotoxicity test data ($LC_{50(s)}$ or $EC_{50(s)}$) available for the mixture as a whole showing $L(E)C_{50(s)} > 1$ mg/l, or above the water solubility:

No need to classify for acute hazard under Annex 2 to SMGS.

2.2.9.1.10.4.3.4 Classification for categories Chronic 1 and 2

a) When there are adequate chronic ecotoxicity data (EC_x or NOEC) available for the mixture as a whole showing EC_x or NOEC of the tested mixture ≤ 1 mg/l:

1) classify the mixture as Chronic 1 or 2 in accordance with Table 2.2.9.1.10.3.1 (b) (ii) (rapidly degradable) if the available information allows the conclusion that all relevant ingredients of the mixture are rapidly degradable;

Note: In this situation, when EC_x or NOEC of the tested mixture > 0.1 mg/l, there is no need to classify for long-term hazard under Annex 2 to SMGS.

2) classify the mixture as Chronic 1 or 2 in all other cases in accordance with Table 2.2.9.1.10.3.1 (b) (i) (non-rapidly degradable);

b) When there are adequate chronic ecotoxicity data (EC_x or NOEC) available for the mixture as a whole showing $EC_x(s)$ or NOEC(s) of the tested mixture > 1 mg/l or above the water solubility:

No need to classify for long-term hazard under Annex 2 to SMGS.

2.2.9.1.10.4.4 Classification of mixtures when ecotoxicity data are not available for the complete mixture: bridging principles

2.2.9.1.10.4.4.1 Where the mixture itself has not been tested to determine its aquatic environmental hazard, but there are sufficient data on the individual ingredients and similar tested mixtures to adequately characterise the hazards of the mixture, these data shall be used in accordance with the following agreed bridging rules. This ensures that the classification process uses the available data to the greatest extent possible in characterising the hazards of the mixture without the necessity for additional testing in animals.

2.2.9.1.10.4.4.2 Dilution

Where a new mixture is formed by diluting a tested mixture or a substance with a diluent which has an equivalent or lower aquatic hazard classification than the least toxic original ingredient and which is not expected to affect the aquatic hazards of other ingredients, then the resulting mixture shall be classified as equivalent to the original tested mixture or substance. Alternatively, the method explained in 2.2.9.1.10.4.5 may be applied.

2.2.9.1.10.4.4.3 Batching

The aquatic hazard classification of a tested production batch of a mixture shall be assumed to be substantially equivalent to that of another untested production batch of the same commercial product when produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the aquatic hazard classification of the untested batch has changed. If the latter occurs, new classification is necessary.

2.2.9.1.10.4.4.4 Concentration of mixtures which are classified with the most severe classification categories (Chronic 1 and Acute 1)

If a tested mixture is classified as Chronic 1 and/or Acute 1, and the ingredients of the mixture which are classified as Chronic 1 and/or Acute 1 are further concentrated, the more concentrated untested mixture shall be classified with the same classification category as the original tested mixture without additional testing.

2.2.9.1.10.4.4.5 Interpolation within one toxicity category

For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same ecotoxicity category, and where untested mixture C has the same toxicologically active ingredients as mixtures A and B but has concentrations of toxicologically active ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same category as A and B.

2.2.9.1.10.4.4.6 Substantially similar mixtures

Given the following:

a) two mixtures:

1) A + B;

2) C + B;

b) the concentration of ingredient B is essentially the same in both mixtures;

c) the concentration of ingredient A in mixture (1) equals that of ingredient C in mixture (2)

d) data on aquatic hazards for A and C are available and are substantially equivalent, i.e. they are in the same hazard category and are not expected to affect the aquatic toxicity of B,

If mixture (i) or (ii) is already classified based on test data, then the other mixture can be assigned the same hazard category.

2.2.9.1.10.4.5 Classification of mixtures when ecotoxicity data are available for all ingredients or only for some ingredients of the mixture

2.2.9.1.10.4.5.1 The classification of a mixture shall be based on summation of the concentrations of its classified ingredients. The percentage of ingredients classified as "Acute" or "Chronic" will feed straight into the summation method. Details of the summation method are described in 2.2.9.1.10.4.6.1 to 2.2.9.1.10.4.6.4.

2.2.9.1.10.4.5.2 Mixtures may be made of a combination of both ingredients that are classified (as Acute 1 and/or Chronic 1, 2) and those for which adequate toxicity test data are available. When adequate ecotoxicity data are available for more than one ingredient in the mixture, the combined ecotoxicity of those ingredients shall be calculated using the following additivity formulas (a) or (b), depending on the nature of the ecotoxicity data:

a) Based on acute aquatic toxicity:

$$\frac{\sum C_i}{L(E)C_{50m}} = \sum_n \frac{C_i}{L(E)C_{50i}},$$

where:

C_i - concentration of ingredient i (mass percentage);

$L(E)C_{50i}$ - LC_{50} or EC_{50} for ingredient i (mg/l);

n - number of ingredients, and i is running from 1 to n;

$L(E)C_{50m}$ - $L(E)C_{50}$ of the part of the mixture with test data;

The calculated ecotoxicity shall be used to assign that portion of the mixture an acute hazard category which is then subsequently used in applying the summation method;

b) Based on chronic aquatic ecotoxicity:

$$\frac{\sum C_i + \sum C_j}{EqNOEC_m} = \sum_n \frac{C_i}{NOEC_i} + \sum_n \frac{C_j}{0,1 \times NOEC_j}$$

where:

C_i - concentration of ingredient i (mass percentage) covering the rapidly degradable ingredients;

C_j - concentration of ingredient j (mass percentage) covering the non-rapidly degradable ingredients;

$NOEC_i$ - NOEC (or other recognized measures for chronic ecotoxicity) for ingredient i covering the rapidly degradable ingredients, in mg/l;

$NOEC_j$ - NOEC (or other recognized measures for chronic toxicity) for ingredient j covering the non-rapidly degradable ingredients, in mg/l;

n - number of ingredients, and i and j are running from 1 to n ;

$EqNOEC_m$ - equivalent NOEC of the part of the mixture with test data;

The equivalent ecotoxicity thus reflects the fact that non-rapidly degradable substances are classified one hazard category level more "severe" than rapidly degradable substances.

The calculated equivalent ecotoxicity shall be used to assign that portion of the mixture a long-term hazard category, in accordance with the criteria for rapidly degradable substances (Table 2.2.9.1.10.3.1 (b) (2)), which is then subsequently used in applying the summation method.

2.2.9.1.10.4.5.3 When applying the additivity formula for part of the mixture, it is preferable to calculate the ecotoxicity of this part of the mixture using for each ingredient ecotoxicity values that relate to the same taxonomic group (i.e. fish, crustacea or algae) and then to use the highest ecotoxicity (lowest value) obtained (i.e. use the most sensitive of the three groups). However, when ecotoxicity data for each ingredient are not available in the same taxonomic group, the ecotoxicity value of each ingredient shall be selected in the same manner that ecotoxicity values are selected for the classification of substances, i.e. the higher ecotoxicity (from the most sensitive test organism) is used. The calculated acute and chronic ecotoxicity shall then be used to classify this part of the mixture as Acute 1 and/or Chronic 1 or 2 using the same criteria described for substances.

2.2.9.1.10.4.5.4 If a mixture is classified in more than one way, the method yielding the more conservative result shall be used.

2.2.9.1.10.4.6 Summation method

2.2.9.1.10.4.6.1 Classification procedure

In general a more severe classification for mixtures overrides a less severe classification, e.g. a classification with Chronic 1 overrides a classification with Chronic 2. As a consequence the classification procedure is already completed if the result of the classification is Chronic 1. A more severe classification than Chronic 1 is not possible; therefore, it is not necessary to pursue the classification procedure further.

2.2.9.1.10.4.6.2 Classification for category Acute 1

2.2.9.1.10.4.6.2.1 First, all ingredients classified as Acute 1 are considered. If the sum of the concentrations (in %) of these ingredients is greater than or equal to 25% the whole mixture shall be classified as Acute 1. If the result of the calculation is a classification of the mixture as Acute 1, the classification process is completed.

2.2.9.1.10.4.6.2.2 The classification of mixtures for acute hazards based on this summation of the concentrations of classified ingredients is summarized in Table 2.2.9.1.10.4.6.2.2 below.

Table 2.2.9.1.10.4.6.2.2: Classification of a mixture for acute hazards based on summation of the concentrations of classified ingredients

Sum of the concentrations (in %) of ingredients classified as:	Mixture classified as:

Acute 1 $\times$ Ma $\geq$ 25%	Acute 1

^a For explanation of the M factor, see 2.2.9.1.10.4.6.4.

2.2.9.1.10.4.6.3 Classification for categories Chronic 1 and 2

2.2.9.1.10.4.6.3.1 First, all ingredients classified as Chronic 1 are considered. If the sum of the concentrations (in %) of these ingredients is greater than or equal to 25% the mixture shall be classified as Chronic 1. If the result of the calculation is a classification of the mixture as Chronic 1 the classification procedure is completed.

2.2.9.1.10.4.6.3.2 In cases where the mixture is not classified as Chronic 1, classification of the mixture as Chronic 2 is considered. A mixture shall be classified as Chronic 2 if 10 times the sum of the concentrations (in %) of all ingredients classified as Chronic 1 plus the sum of the concentrations (in %) of all ingredients classified as Chronic 2 is greater than or equal to 25%. If the result of the calculation is classification of the mixture as Chronic 2, the classification process is completed.

2.2.9.1.10.4.6.3.3 The classification of mixtures for long-term hazards based on this summation of the concentrations of classified ingredients is summarized in Table 2.2.9.1.10.4.6.3.3 below.

Table 2.2.9.1.10.4.6.3.3: Classification of a mixture for long-term hazards based on summation of the concentrations of classified ingredients

Sum of the concentrations (in %) of ingredients classified as:	Mixture classified as:
Chronic 1 $\times$ Ma $\geq$ 25 %	Chronic 1
((M $\times$ 10 $\times$ Chronic 1) + Chronic 2 $\geq$ 25 %	Chronic 2

^a For explanation of the M factor, see 2.2.9.1.10.4.6.4.

2.2.9.1.10.4.6.4 Mixtures with highly toxic ingredients

Acute 1 or Chronic 1 ingredients with acute ecotoxicities well below 1 mg/l and/or chronic toxicities well below 0.1 mg/l (if non-rapidly degradable) and 0.01 mg/l (if rapidly degradable) may influence the ecotoxicity of the mixture and are given increased weight in applying the summation method. When a mixture contains ingredients classified as Acute 1 or Chronic 1, the tiered approach described in 2.2.9.1.10.4.6.2 and 2.2.9.1.10.4.6.3 shall be applied using a weighted sum by multiplying the concentrations of Acute 1 and Chronic 1 ingredients by a factor, instead of merely adding up the percentages. This means that the concentration of "Acute 1" in the left column of Table 2.2.9.1.10.4.6.2.2 and the concentration of "Chronic 1" in the left column of Table 2.2.9.1.10.4.6.3.3 are multiplied by the appropriate multiplying factor.

The multiplying factors to be applied to these ingredients are defined using the ecotoxicity value, as summarised in Table 2.2.9.1.10.4.6.4 below. Therefore, in order to classify a mixture containing Acute 1 and/or Chronic 1 ingredients, the classifier needs to be informed of the value of the M factor in order to apply the summation method. Alternatively, the additivity formula (see 2.2.9.1.10.4.5.2) may be used when ecotoxicity data are available for all highly toxic ingredients in the mixture and there is convincing evidence that all other ingredients, including those for which specific and/or chronic acute toxicity data are not available, are of low or no ecotoxicity and do not significantly contribute to the environmental hazard of the mixture.

Table 2.2.9.1.10.4.6.4: Multiplying factors for highly toxic ingredients of mixtures

Acute ecotoxicity	M factor	Chronic Toxicity	M factor	
L(E)C ₅₀ value		NOEC value	NRD ^a	RD ^b
0,1 < L(E)C ₅₀ ≤ 1	1	0,01 < NOEC ≤ 0,1	1	-
0,01 < L(E)C ₅₀ ≤ 0,1	10	0,001 < NOEC ≤ 0,01	10	1

$0,001 < L(E)C_{50} \leq 0,01$	100	$0,0001 < NOEC \leq 0,001$	100	10
$0,0001 < L(E)C_{50} \leq 0,001$	1 000	$0,00001 < NOEC \leq 0,0001$	1 000	100
$0,00001 < L(E)C_{50} \leq 0,0001$	10 000	$0,000001 < NOEC \leq 0,00001$	10 000	1 000
(continue in factor 10 intervals)		(continue in factor 10 intervals)		

^a *Non-rapidly degradable*

^b *Rapidly degradable*

2.2.9.1.10.4.6.5 Classification of mixtures with ingredients without any useable information

In the event that no useable information on acute and/or chronic aquatic toxicity is available for one or more relevant ingredients, it is concluded that the mixture cannot be attributed (a) definitive hazard category(ies). In this situation the mixture shall be classified based on the known ingredients only.

2.2.9.1.10.5 Substances or mixtures classified as environmentally hazardous substances (aquatic environment) on the basis of GHS or document No. 9 of *the List*.

If data for classification according to the criteria of 2.2.9.1.10.3 and 2.2.9.1.10.4 are not available, a substance or mixture:

a) Shall be classified as an environmentally hazardous substance (aquatic environment) if it has to be assigned category(ies) Aquatic Acute 1, Aquatic Chronic 1 or Aquatic Chronic 2 according to GHS or document No. 9 of *the List*;

b) May be regarded as not being an environmentally hazardous substance (aquatic environment) if it does not have to be assigned such a category according to GHS or document No. 9 of *the List*.

2.2.9.1.10.6 Assignment of substances or mixtures classified as environmentally hazardous substances (aquatic environment) according to the provisions in 2.2.9.1.10.3, 2.2.9.1.10.4 or 2.2.9.1.10.5

Substances or mixtures classified as environmentally hazardous substances (aquatic environment) that do not meet the classification criteria of any other class or another substance within Class 9 shall be designated:

UN No. 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.; or

UN No. 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

They shall be assigned to packing group III.

2.2.9.1.11 Genetically modified microorganisms or organisms

Genetically modified microorganisms (GMMOs) and genetically modified organisms (GMOs) are microorganisms and organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally. They are assigned to Class 9 (UN No. 3245) if they do not meet the definition of toxic substances or of infectious substances, but are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction.

Note 1: *GMMOs and GMOs which are infectious are substances of Class 6.2, UN Nos. 2814, 2900 or 3373.*

Note 2: *GMMOs or GMOs are not subject to the provisions of Annex 2 to SMGS when authorized for use by the competent authorities of the countries of origin, transit and destination²³.*

Note 3: *Pharmaceutical products (such as vaccines) that are packed in a form ready to be administered, including those in clinical trials, and that contain GMMOs or GMOs are not subject to the provisions of Annex 2 to SMGS.*

Note 4: *Genetically modified live animals which, in accordance with the current state of scientific knowledge, have no known pathogenic effect on humans, animals and*

²³ See also the List, documents Nos. 11 and 12.

plants and are carried in receptacles that are suitable for safely preventing both the escape of the animals and unauthorized access to them, are not subject to the provisions of Annex 2 to SMGS. The provisions specified by the International Air Transport Association (IATA) for air transport "Live Animals Regulations, LAR" can be drawn on as guidelines for suitable receptacles for the transport of live animals.

Note 5: Live animals shall not be used to carry genetically modified microorganisms classified in Class 9 unless the substance can be carried no other way. Genetically modified live animals shall be carried under terms and conditions of the competent authorities of the countries of origin and destination.

2.2.9.1.12 (Reserved)

2.2.9.1.13 Elevated temperature substances

Elevated temperature substances include substances which are carried or handed over for carriage in the liquid state at or above 100 °C and, in the case of those with a flash-point, below their flash-point. They also include solids which are carried or handed over for carriage at or above 240 °C.

Note: Elevated temperature substances may be assigned to Class 9 only if they do not meet the criteria of any other class.

2.2.9.1.14 Other substances or articles presenting a danger during carriage but not meeting the definitions of another class.

The following other miscellaneous substances and articles not meeting the definitions of another class are assigned to Class 9:

Solid ammonia compounds having a flash-point below 60 °C;

Low hazard dithionites;

Highly volatile liquids;

Substances emitting noxious fumes;

Substances containing allergens;

Chemical kits and first aid kits;

Electric double layer capacitors (with an energy storage capacity greater than 0.3 Wh);

Vehicles, engines and machinery, internal combustion;

Articles containing miscellaneous dangerous goods.

Note: The below-mentioned goods listed in UN Model Regulations, are not subject to the provisions of Annex 2 to SMGS:

UN No. 1845 CARBON DIOXIDE, SOLID (DRY ICE)²⁴,

UN No. 2216 FISH MEAL (FISH SCRAP), STABILIZED,

UN No. 2807 MAGNETIZED MATERIAL,

UN No. 3334 AVIATION REGULATED LIQUID, N.O.S.,

UN No. 3335 AVIATION REGULATED SOLID, N.O.S.,

,

Assignment of the packing groups

2.2.9.1.15 When indicated in column (4) of Table A of Chapter 3.2, substances and articles of Class 9 are assigned to one of the following packing groups according to their degree of danger:

Packing group II: substances presenting medium danger;

Packing group III: substances presenting low danger.

²⁴ For UN No. 1845 carbon dioxide, solid (dry ice), see 5.5.3.

2.2.9.2 Substances and articles not accepted for carriage

The following substances and articles shall not be accepted for carriage:

- Lithium batteries and sodium ion batteries which do not meet the relevant conditions of special provisions 188, 230, 310, 636 or 670 of Chapter 3.3.
- Uncleaned empty containment vessels for apparatus such as transformers, condensers and hydraulic apparatus containing substances assigned to UN Nos. 2315, 3151, 3152 or 3432.

2.2.9.3 List of entries

Subsidiary risk	Classification code	UN No.	Name of the substance or article
Substances which, on inhalation as fine dust, may endanger health	M1	2212 ASBESTOS, AMPHIBOLE (amosite, tremolite, actinolite, anthophyllite, crocidolite) 2590 ASBESTOS, CHRYSOTILE	
Substances and articles which, in the event of fire, may form dioxins	M2	2315 POLYCHLORINATED BIPHENYLS, LIQUID 3432 POLYCHLORINATED BIPHENYLS, SOLID 3151 POLYHALOGENATED BIPHENYLS, LIQUID or 3151 HALOGENATED MONOMETHYLDIPHENYLMETHANES, LIQUID or 3151 POLYHALOGENATED TERPHENYLS, LIQUID 3152 POLYHALOGENATED BIPHENYLS, SOLID or 3152 HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or 3152 POLYHALOGENATED TERPHENYLS, SOLID	
Substances evolving flammable vapour	M3	2211 POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour 3314 PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour	
Lithium batteries and sodium ion batteries	M4	3090 LITHIUM METAL BATTERIES (including lithium alloy batteries) 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including lithium alloy batteries) 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries) 3480 LITHIUM ION BATTERIES (including lithium ion polymer batteries) 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including lithium ion polymer batteries) or 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries) 3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries 3551 SODIUM ION BATTERIES WITH ORGANIC ELECTROLYTE 3552 SODIUM ION BATTERIES CONTAINED IN EQUIPMENT or SODIUM ION BATTERIES PACKED WITH EQUIPMENT, with organic electrolyte	
Live-saving appliances	M5	2990 LIFE-SAVING APPLIANCES, SELF-INFLATING 3072 LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment 3268 SAFETY DEVICES, electrically initiated 3559 FIRE SUPPRESSANT DISPERSING DEVICES	
Environmentally hazardous substance	pollutant to the aquatic environment liquid M6	3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	
	pollutant to the aquatic environment solid M7	3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	
Elevated temperature substances	genetically modified microorganisms M8	3245 GENETICALLY MODIFIED MICROORGANISMS or 3245 GENETICALLY MODIFIED ORGANISMS	
	liquid M9	3257 ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100 °C and below its flash-point (including molten metal, molten salts, etc.)	
	solid M10	3258 ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C	
Other substances and articles presenting a danger during carriage, but not meeting the definitions of another class	M11	Only substances and articles listed in Table A of Chapter 3.2 are subject to the provisions of Class 9 under this classification code, as follows:	

1841 ACETALDEHYDE AMMONIA
 1931 ZINC DITHIONITE (ZINC HYDROSULPHITE)
 1941 DIBROMODIFLUOROMETHANE
 1990 BENZALDEHYDE
 2071 AMMONIUM NITRATE BASED FERTILIZER
 2969 CASTOR BEANS or
 2969 CASTOR MEAL or
 2969 CASTOR POMACE or
 2969 CASTOR FLAKE
 3166 VEHICLE, FLAMMABLE GAS POWERED or
 3166 VEHICLE, FLAMMABLE LIQUID POWERED or
 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or
 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED
 3171 BATTERY POWERED VEHICLE or
 3171 BATTERY POWERED EQUIPMENT
 3316 CHEMICAL KIT or
 3316 FIRST AID KIT
 3359 FUMIGATED CARGO TRANSPORT UNIT
 3363 DANGEROUS GOODS IN MACHINERY or
 3363 DANGEROUS GOODS IN APPARATUS
 3499 CAPACITOR, ELECTRIC DOUBLE LAYER
 (with an energy storage capacity greater than 0.3Wh)
 3508 CAPACITOR, ASYMMETRIC (with an energy storage capacity greater than 0.3Wh)
 3509 PACKAGINGS, DISCARDED, EMPTY, UNCLEANED
 3363 DANGEROUS GOODS IN ARTICLES or
 3363 DANGEROUS GOODS IN MACHINERY or
 3363 DANGEROUS GOODS IN APPARATUS
 3530 ENGINE, INTERNAL COMBUSTION or
 3530 MACHINERY, INTERNAL COMBUSTION
 3556 VEHICLE, LITHIUM ION BATTERY POWERED
 3557 VEHICLE, LITHIUM METAL BATTERY POWERED
 3558 VEHICLE, SODIUM ION BATTERY POWERED
 3548 ARTICLES CONTAINING MISCELLANEOUS DANGEROUS GOODS N.O.S.

CHAPTER 2.3 TEST METHODS

2.3.0 GENERAL PROVISIONS

Unless otherwise provided for in Chapter 2.2 or in this Chapter, the test methods to be used for the classification of dangerous goods are those described in the Manual of Tests and Criteria.

2.3.1 EXUDATION TEST FOR BLASTING EXPLOSIVES OF TYPE A

2.3.1.1 Blasting explosives of type A (UN No. 0081) shall, if they contain more than 40% liquid nitric ester, in addition to the testing specified in the Manual of Tests and Criteria, satisfy the following exudation test.

2.3.1.2 The apparatus for testing blasting explosive for exudation (figs. 1 to 3) consists of a hollow bronze cylinder. This cylinder, which is closed at one end by a plate of the same metal, has an internal diameter of 15.7 mm and a depth of 40 mm. It is pierced by 20 holes 0.5 mm in diameter (four sets of five holes) on the circumference. A bronze piston, cylindrically fashioned over a length of 48 mm and having a total length of 52 mm, slides into the vertically placed cylinder. The piston, whose diameter is 15.6 mm, is loaded with a mass of 2 220 g so that a pressure of 120 kPa (1.20 bar) is exerted on the base of the cylinder.

2.3.1.3 A small plug of blasting explosive weighing 5 to 8 g, 30 mm long and 15 mm in diameter, is wrapped in very fine gauze and placed in the cylinder; the piston and its loading mass are then placed on it so that the blasting explosive is subjected to a pressure of 120 kPa (1.20 bar). The time taken for the appearance of the first signs of oily droplets (nitroglycerine) at the outer orifices of the cylinder holes is noted.

2.3.1.4 The blasting explosive is considered satisfactory if the time elapsing before the appearance of the liquid exudations is more than five minutes, the test having been carried out at a temperature of 15 °C to 25 °C.

Test of blasting explosive for exudation

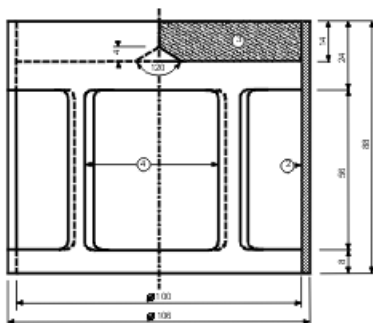


Fig. 2.1.

Bell-form charge; mass 2220 g; capable of being suspended from a bronze piston, dimensions in mm

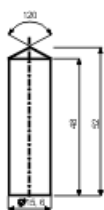


Fig. 2.2. Cylindrical bronze piston; dimensions in mm

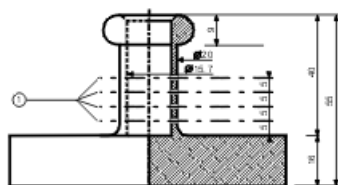


Fig. 2.3. Hollow bronze cylinder, dimensions in mm

Fig. 1 to 3:

- 1) 4 series of 5 holes at 0.5 Ø
- 2) copper
- 3) iron plate with centre cone at the inferior face
- 4) 4 openings, approximately 46 x 56, set at even intervals on the periphery

2.3.2 Tests relating to nitrated cellulose mixtures of Class 1 and Class 4.1

2.3.2.1 In order to determine the criteria of the nitrocellulose, the Bergmann-Junk test or the methyl violet paper test in the Manual of Tests and Criteria Appendix 10 shall be performed (see Chapter 3.3, special provisions 393 and 394). If there is doubt that the ignition temperature of the nitrocellulose is considerably higher than 132 °C in the case of the Bergmann-Junk test or higher than 134.5 °C in the case of the methyl violet paper test, the ignition temperature test described in 2.3.2.5 should be carried out before these tests are performed. If the ignition temperature of nitrocellulose mixtures is higher than 180 °C or the ignition temperature of plasticized nitrocellulose is higher than 170 °C, the Bergmann-Junk test or the methyl violet paper test can be carried out safely.

2.3.2.2 Before undergoing the tests in 2.3.2.5, the samples shall be dried for not less than 15 hours at the ambient temperature in a vacuum desiccator containing fused and granulated calcium chloride, the sample substance being spread in a thin layer; for this purpose, substances which are neither in powder form nor fibrous shall be ground, or grated, or cut into small pieces. The pressure in the desiccator shall be brought below 6.5 kPa (0.065 bar).

2.3.2.3 Before being dried as prescribed in 2.3.2.2 above, plasticized nitrocellulose shall undergo preliminary drying in a well-ventilated oven, with its temperature set at 70 °C, until the loss of mass per quarter-hour is less than 0.3% of the original mass.

2.3.2.4 Weakly nitrated nitrocellulose shall first undergo preliminary drying as prescribed in 2.3.2.3 above; drying shall then be completed by keeping the nitrocellulose for at least 15 hours over concentrated sulphuric acid in a desiccator.

2.3.2.5 Ignition temperature (see 2.3.2.1)

- a) The ignition temperature is determined by heating 0.2 g of substance enclosed in a glass test tube immersed in a Wood's alloy bath. The test tube is placed in the bath when the latter has reached 100 °C. The temperature of the bath is then progressively increased by 5 °C per minute;
- b) The test tubes must have the following dimensions (length – 125 mm, internal diameter – 15mm, thickness of wall – 0,5 mm) and shall be immersed to a depth of 20 mm;
- c) The test shall be repeated three times, the temperature at which ignition of the substance occurs, i.e., slow or rapid combustion, deflagration or detonation, being noted each time;
- d) The lowest temperature recorded in the three tests is the ignition temperature.

2.3.3 TESTS RELATING TO FLAMMABLE LIQUIDS OF CLASSES 3, 6.1 AND 8

2.3.3.1 Determination of flash-point

2.3.3.1.1 The following methods for determining the flash-point of flammable liquids may be used:

International standards:

ISO 1516 (Determination of flash/no flash – Closed cup equilibrium method)

ISO 1523 (Determination of flash point – Closed cup equilibrium method)

ISO 2719 (Determination of flash point – Pensky-Martens closed cup method)

ISO 13736 (Determination of flash point – Abel closed-cup method)

ISO 3679 (Determination of flash point – Rapid equilibrium closed cup method)

ISO 3680 (Determination of flash/no flash – Rapid equilibrium closed cup method)

National standards:

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959:

Standard ASTM D3828-07a,

Standard ASTM D56-05,

Standard ASTM D3278-96(2004)e1,

Standard ASTM D93-08.

Association française de normalisation, AFNOR, 11, rue de Pressensé, F-93571
Plaine Saint-Denis Cedex:

La

Standard NF M 07 - 019

Standards NF M 07 - 011 / NF T 30 - 050 / NF T 66 - 009

Standard NF M 07 - 036

Deutsches Institut für Normung, Burggrafenstr. 6, D-10787 Berlin:

Standard DIN 51755 (flash-points below 65°C)

Federal agency for technical regulation and metrology, Russia 119991, GSP-1, Moscow, B-49, Lenin Prospect 9;

GOST 12.1.044-89 Occupational safety standards system. Fire and explosion hazard of substances and materials.

2.3.3.1.2 To determine the flash-point of paints, gums and similar viscous products containing solvents, only apparatus and test methods suitable for determining the flash-point for viscous liquids shall be used, in accordance with the following standards:

- a) international standard ISO 3679: 1983;

- b) international standard ISO 3680: 1983;
- c) international standard ISO 1523: 1983;
- d) international standards EN ISO 13736 and EN ISO 2719, method B.

2.3.3.1.3 The standards listed in 2.3.3.1.1 shall only be used for flash-point ranges which are specified therein. The possibility of chemical reactions between the substance and the sample holder shall be considered when selecting the standard to be used. The apparatus shall, as far as is consistent with safety, be placed in a draught-free position. For safety, a method utilizing a small sample size, around 2 ml, shall be used for organic peroxides and self-reactive substances (also known as "energetic" substances), or for toxic substances.

2.3.3.1.4 When the flash-point, determined by a non-equilibrium method is found to be $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ or $60\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, it shall be confirmed for each temperature range by an equilibrium method.

2.3.3.1.5 In the event of a dispute as to the classification of a flammable liquid, the classification proposed by the consignor shall be accepted if a check-test of the flash-point, yields a result not differing by more than $2\text{ }^{\circ}\text{C}$ from the limits ($23\text{ }^{\circ}\text{C}$ and $60\text{ }^{\circ}\text{C}$ respectively) stated in 2.2.3.1. If the difference is more than $2\text{ }^{\circ}\text{C}$, a second check-test shall be carried out, and the lowest figure of the flash-points obtained in either check-test shall be adopted.

2.3.3.2 Determination of initial boiling point

The following methods for determining the initial boiling point of flammable liquids may be used:

International standards:

ISO 3924 (*Petroleum products – Determination of boiling range distribution – Gas chromatography method*)

ISO 4626 (*Volatile organic liquids – Determination of boiling range of organic solvents used as raw materials*)

ISO 3405 (*Petroleum products – Determination of distillation characteristics at atmospheric pressure*)

National standards:

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959:

Standard ASTM D86-07a,

Standard ASTM D1078-05.

Further acceptable methods:

Method A.2 as described in Document No. 12A of *the List*.

2.3.3.3 Test for determining peroxide content

To determine the peroxide content of a liquid, the procedure is as follows:

A quantity p (about 5 g, weighed to the nearest 0.01 g) of the liquid to be titrated is placed in an Erlenmeyer flask; 20 cm^3 of acetic anhydride and about 1 g of powdered solid potassium iodide are added; the flask is shaken and, after 10 minutes, heated for 3 minutes to about $60\text{ }^{\circ}\text{C}$. When it has been left to cool for 5 minutes, 25 cm^3 of water are added. After this, it is left standing for half an hour, then the liberated iodine is titrated with a decinormal solution of sodium thiosulphate, no indicator being added; complete dis- coloration indicates the end of the reaction. If n is the number of cm^3 of thiosulphate solution required, the percentage of peroxide (calculated as H_2O_2) present in the sample is obtained by the formula:

$$\frac{17n}{100p},$$

where:

n – a quantity of solution of sodium thiosulphate, cm^3 ;
 p – a quantity of the liquid to be titrated, g.

2.3.4 TEST FOR DETERMINING FLUIDITY

To determine the fluidity of liquid, viscous or pasty substances and mixtures, the following test method shall be used.

2.3.4.1 Test apparatus

Commercial penetrometer conforming to ISO 2137:1985, with a guide rod of 47,5 g + 0,05 g; sieve disc of duralumin with conical bores and a mass of 102.5 g ± 0.05 g (see Figure 2.4); penetration vessel with an inside diameter of 72 mm to 80 mm for reception of the sample.

2.3.4.2 Test procedure

The sample is poured into the penetration vessel not less than half an hour before the measurement. The vessel is then hermetically closed and left standing until the measurement. The sample in the hermetically closed penetration vessel is heated to 35 °C ± 0.5 °C and is placed on the penetrometer table immediately prior to measurement (not more than two minutes). The point S of the sieve disc is then brought into contact with the surface of the liquid and the rate of penetration is measured.

2.3.4.3 Evaluation of test results

A substance is pasty if, after the centre S has been brought into contact with the surface of the sample, the penetration indicated by the dial gauge:

- a) after a loading time of 5 s ± 0.1 s, is less than 15.0 mm ± 0.3 mm; or
- b) after a loading time of 5 s ± 0.1 s, is greater than 15.0 mm ± 0.3 mm, but the additional penetration after another 55 s ± 0.5 s is less than 5.0 mm ± 0.5 mm.

Note: In the case of samples having a flow point, it is often impossible to produce a steady level surface in the penetration vessel and, hence, to establish satisfactory initial measuring conditions for the contact of the point S. Furthermore, with some samples, the impact of the sieve disc can cause an elastic deformation of the surface and, in the first few seconds, simulate a deeper penetration. In all these cases, it may be appropriate to make the evaluation in paragraph (b) above.

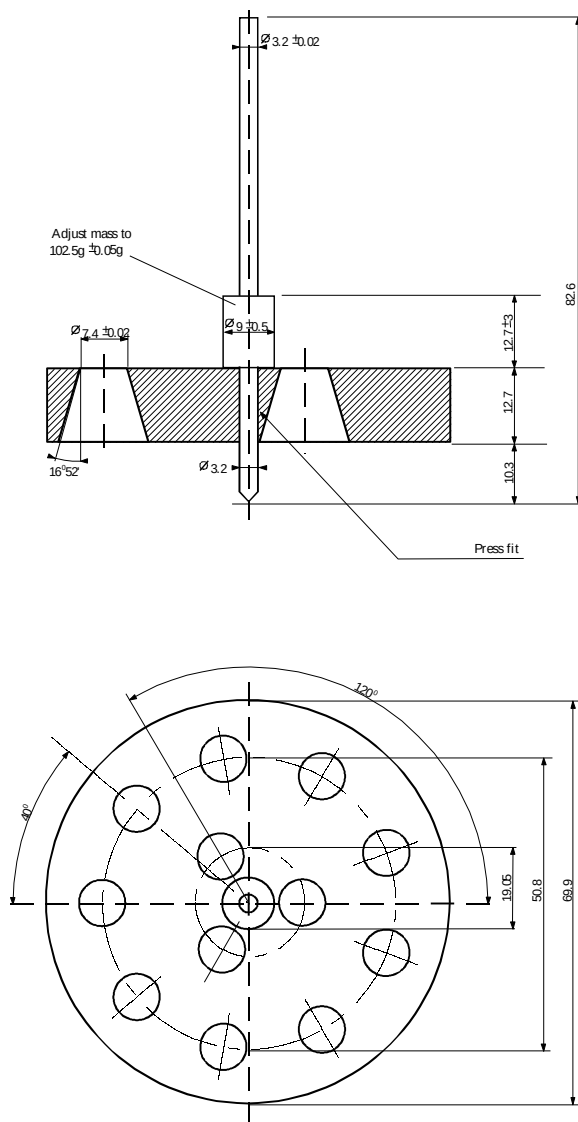


Figure. 2.4. Penetrometer

Adjust mass to 102,5 $\pm$ 0,05 g

Press fit

Tolerances not specified are $\pm 0,1$ mm

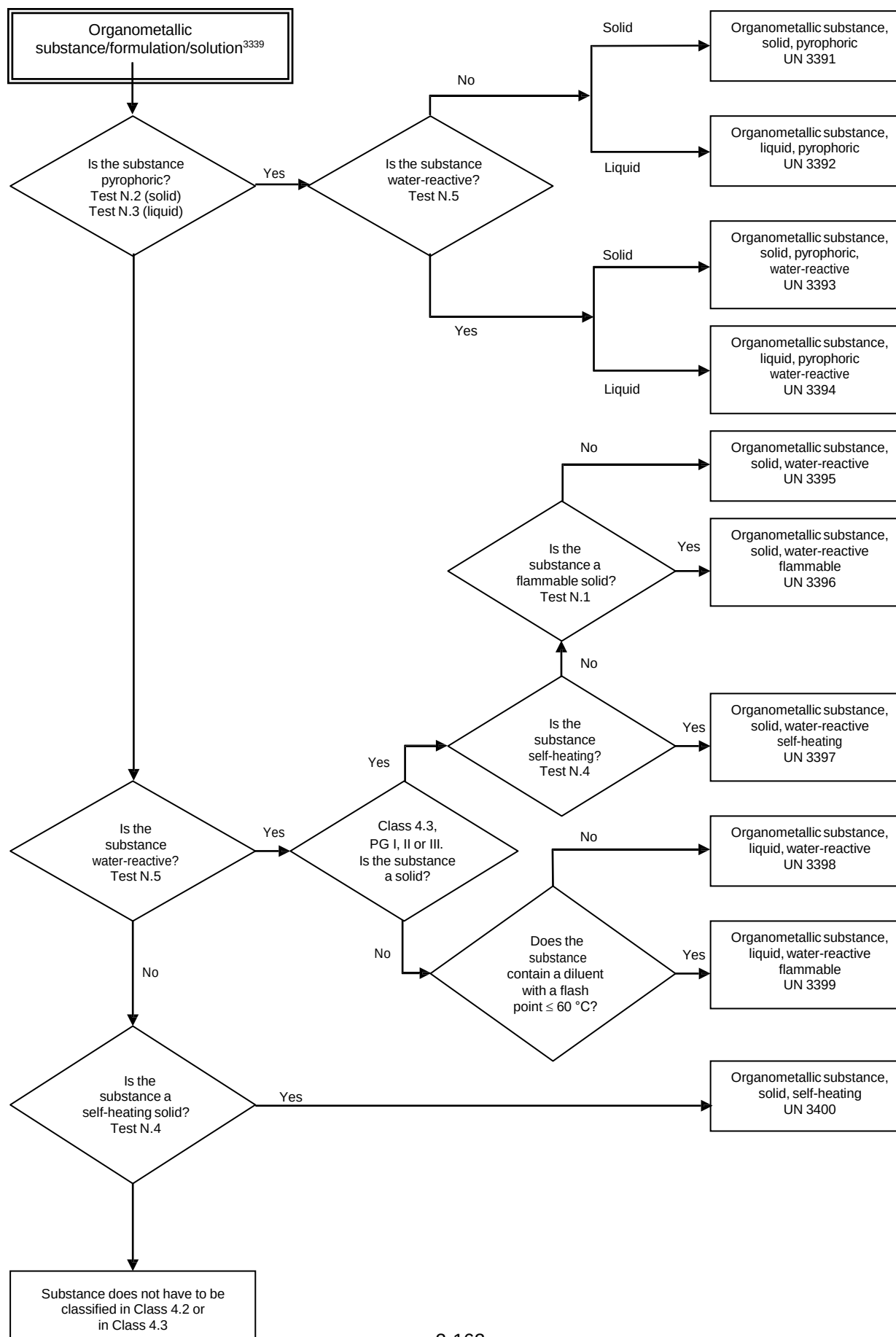
2.3.5 CLASSIFICATION OF ORGANOMETALLIC SUBSTANCES IN CLASSES 4.2 AND 4.3

Depending on their properties as determined in accordance with tests N.1 to N.5 of the Manual of Tests and Criteria, Part III, section 33, organometallic substances may be classified in Class 4.2 or 4.3, as appropriate, in accordance with the flowchart scheme given in Figure 2.3.5.

Note 1: *Depending on their other properties and on the precedence of hazard table (see 2.1.3.10), organometallic substances may have to be classified in other classes as appropriate.*

Note 2: *Flammable solutions with organometallic compounds in concentrations which are not liable to spontaneous combustion or, in contact with water, do not emit flammable gases in dangerous quantities, are substances of Class 3.*

Figure 2.3.5. Flowchart scheme for the classification of organometallic substances in 4.2 and 4.3 ^a



- ^a *Test methods N.1 to N.5 can be found in the Manual of Tests and Criteria, Part III, Section 33.*
- ^b *If applicable and testing is relevant, taking into account reactivity properties, Class 6.1 and 8 properties should be considered according to the table of precedence of hazards in 2.1.3.10.*

PART 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND EXEMPTIONS RELATED TO LIMITED AND EXCEPTED QUANTITIES

CHAPTER 3.1

GENERAL PROVISIONS

3.1.1 INTRODUCTION

In addition to the provisions referred to or given in the tables of this Part, the general requirements of each Part, Chapter and/or Section are to be observed. These general requirements are not given in the tables. When a general requirement is contradictory to a special provision, the special provision prevails.

3.1.2 PROPER SHIPPING NAME

Note: For proper shipping names used for the carriage of samples, see 2.1.4.1.

3.1.2.1 The proper shipping name is that portion of the entry most accurately describing the goods in Table A in Chapter 3.2, which is shown in upper case characters (plus any numbers, Greek letters, "sec", "tert", and the letters "m", "n", "o", "p", which form an integral part of the name). An alternative proper shipping name may be shown in brackets following the main proper shipping name [e.g., ETHANOL (ETHYL ALCOHOL)]. Portions of an entry appearing in lower case need not be considered as part of the proper shipping name.

3.1.2.2 When a combination of several distinct proper shipping names are listed under a single UN number, and these are separated by "or" in lower case or are punctuated by commas, only the most appropriate shall be shown in the transport document and package marks.. Examples illustrating the selection of the proper shipping name for such entries are:

a) UN 1057 LIGHTERS or LIGHTER REFILLS - The proper shipping name is the most appropriate of the following possible combinations:

LIGHTERS;

LIGHTER REFILLS;

b) UN 2793 FERROUS METAL BORINGS, SHAVINGS or CUTTINGS in a form liable to self- heating. The proper shipping name is the most appropriate of the following combinations:

FERROUS METAL BORINGS

FERROUS METAL SHAVINGS

FERROUS METAL CUTTINGS

3.1.2.3 Proper shipping names may be used in the singular or plural as appropriate. In addition, when qualifying words are used as part of the proper shipping name, their sequence on the transport document or package markings is optional. For instance, "DIMETHYLAMINE AQUEOUS SOLUTION" may alternatively be shown "AQUEOUS SOLUTION OF DIMETHYLAMINE". In Tables A and B of Chapter 3.2, the name of the dangerous goods is indicated as follows: at the beginning the noun is indicated, then the adjective and other additional information. Commercial or military names for goods of Class 1 which contain the proper shipping name supplemented by additional descriptive text may be used.

3.1.2.4 Many substances have an entry for both the liquid and solid state (see definitions for "Liquid" and "Solid" in 1.2.1), or for the solid and solution.

These are allocated separate UN numbers which are not necessarily adjacent to each other¹.

- 3.1.2.5** Unless it is already included in capital letters in the name indicated in Table A in Chapter 3.2, the qualifying word "MOLTEN" shall be added as part of the proper shipping name when a substance, which is a solid in accordance with the definition in 1.2.1, is offered for carriage in the molten state (e.g. ALKYLPHENOL, SOLID, N.O.S., MOLTEN).
- 3.1.2.6** Except for self-reactive substances and organic peroxides and unless it is already included in capital letters in the name indicated in Column (2) of Table A of Chapter 3.2, the word "STABILIZED" shall be added as part of the proper shipping name of a substance which without stabilization would be forbidden from carriage in accordance with paragraphs 2.2.x.2 due to it being liable to dangerously react under conditions normally encountered in carriage (e.g.: "TOXIC LIQUID, ORGANIC, N.O.S., STABILIZED").
When temperature control is used to stabilize such substances to prevent the development of any dangerous excess pressure, or the evolution of excessive heat, or when chemical stabilization is used in combination with temperature control, then:
(a) For liquids and solids: liquids and solids requiring temperature control² shall not be accepted for carriage by rail;
(b) (Reserved)
(c) For gases: the conditions of carriage shall be approved by the competent authority.
- 3.1.2.7** Hydrates may be carried under the proper shipping name for the anhydrous substance.
- 3.1.2.8 Generic or "not otherwise specified" (n.o.s.) names**
- 3.1.2.8.1** Generic and "not otherwise specified" proper shipping names that are assigned to special provision 274 or 318 in Column (6) of Table A in Chapter 3.2 shall be supplemented with the technical name of the goods unless a national law or international convention prohibits its disclosure if it is a controlled substance. For explosives of Class 1, the dangerous goods description may be supplemented by additional descriptive text to indicate commercial or military names. Technical names shall be entered in brackets immediately following the proper shipping name. An appropriate modifier, such as "contains" or "containing" or other qualifying words such as "mixture", "solution", etc. and the percentage of the technical constituent may also be used. For example: "UN 1993 FLAMMABLE LIQUID, N.O.S. (CONTAINS XYLENE AND BENZENE), 3, II".
- 3.1.2.8.1.1** The technical name shall be a recognized chemical name or biological name, or other name currently used in scientific and technical handbooks, journals and texts. Trade names shall not be used for this purpose. In the case of pesticides, only ISO common name(s), other name(s) in the World Health Organization (WHO) Recommended Classification of Pesticides by Hazard and Guidelines to Classification, or the name(s) of the active substance(s) may be used.
- 3.1.2.8.1.2** When a mixture of dangerous goods or articles containing dangerous goods are described by one of the "N.O.S." or "generic" entries to which special

¹ Details are provided in the alphabetical index (Table B of Chapter 3.2), e.g.: NITROXYLENES, LIQUID 6.1 1665 NITROXYLENES, SOLID 6.1 3447.

² This includes all substances (including substances stabilized by chemical inhibitors) whose self-accelerating decomposition temperature (SADT) or self-accelerating polymerization temperature (SAPT) in the containment used for carriage is not more than 50 °C.

provision 274 has been allocated in Column (6) of Table A in Chapter 3.2, not more than the two constituents which most predominantly contribute to the hazard or hazards of the mixture or of the articles need to be shown, excluding controlled substances when their disclosure is prohibited by national law or international convention. If a package containing a mixture is labelled with any subsidiary risk label, one of the two technical names shown in parentheses shall be the name of the constituent which compels the use of the subsidiary risk label.

Note: See 5.4.1.2.2.

- 3.1.2.8.1.3** Examples illustrating the selection of the proper shipping name supplemented with the technical name of goods for such n.o.s. entries are:
 UN 3394 ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE (trimethylgallium)
 UN 2902 PESTICIDE, LIQUID, TOXIC, N.O.S. (drazoxolon).
 UN 3540 ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S. (pyrrolidine).
- 3.1.2.8.1.4** For UN Nos. 3077 and 3082 only, the technical name may be a name shown in capital letters in column 2 of Table A of Chapter 3.2, provided that this name does not include "N.O.S." and that special provision 274 is not assigned. The name which most appropriately describes the substance or mixture shall be used, e.g.:
 UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PAINT)
 UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PERFUMERY PRODUCTS).

3.1.3 SOLUTIONS AND MIXTURES

Note: Where a substance is specifically mentioned by name in Table A of Chapter 3.2, it shall be identified in carriage by the proper shipping name in Column (2) of Table A of Chapter 3.2. Such substances may contain technical impurities (for example those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance mentioned by name containing technical impurities or additives for stability or other purposes affecting its classification shall be considered a solution or mixture (see 2.1.3.3).

- 3.1.3.1** A solution or mixture is not subject to Annex 2 to SMGS if the characteristics, properties, form or physical state of the solution or mixture are such that it does not meet the criteria, including human experience criteria, for inclusion in any class.
- 3.1.3.2** A solution or mixture meeting the classification criteria of Annex 2 to SMGS composed of a single predominant substance mentioned by name in Table A of Chapter 3.2 and one or more substances not subject to Annex 2 to SMGS or traces of one or more substances mentioned by name in Table A of Chapter 3.2, shall be assigned the UN number and proper shipping name of the predominant substance mentioned by name in Table A of Chapter 3.2 unless:
- (a) The solution or mixture is mentioned by name in Table A of Chapter 3.2;
 - (b) The name and description of the substance mentioned by name in Table A of Chapter 3.2 specifically indicate that they apply only to the pure substance;
 - (c) The class, classification code, packing group, or physical state of the solution or mixture is different from that of the substance mentioned by name in Table A of Chapter 3.2; or
 - (d) The hazard characteristics and properties of the solution or mixture necessitate emergency response measures that are different from those

required for the substance mentioned by name in Table A of Chapter 3.2.

Qualifying words such as "SOLUTION" or "MIXTURE", as appropriate, shall be added as part of the proper shipping name, for example, "ACETONE SOLUTION". In addition, the concentration of the mixture or solution may also be indicated after the basic description of the mixture or solution, for example, "ACETONE SOLUTION, 75%" or "ACETONE 75% - SOLUTION".

- 3.1.3.3** A solution or mixture meeting the classification criteria of Annex 2 to SMGS that is not mentioned by name in Table A of Chapter 3.2 and that is composed of two or more dangerous goods shall be assigned to an entry that has the proper shipping name, description, class, classification code and packing group that most precisely de- scribe the solution or mixture.

CHAPTER 3.2

LISTS OF DANGEROUS GOODS

3.2.1 TABLE A. LIST OF DANGEROUS GOODS

As a rule, each row of Table A of this Chapter deals with the substance(s) or article(s) covered by a specific UN number. However, when substances or articles belonging to the same UN number have different chemical properties, physical properties and/or carriage conditions, several consecutive rows may be used for that UN number. Each column of Table A is dedicated to a specific subject as indicated in the explanatory notes below. The intersection of columns and rows (cell) contains information concerning the subject treated in that column, for the substance(s) or article(s) of that row:

- The first four cells identify the substance(s) or article(s) belonging to that row (additional information in that respect may be given by the special provisions referred to in Column 6;
- The following cells give the applicable special provisions, either in the form of complete information or in coded form. The codes cross-refer to detailed information that is to be found in the Part, Chapter, Section and/or Sub-section indicated in the explanatory notes below. An empty cell means either that there is no special provision and that only the general requirements apply, or that the carriage restriction indicated in the explanatory notes is in force. When used in this Table, an alphanumeric code starting with the letters "SP" designates a special provision of Chapter 3.3.

It shall be taken into account that the applicable general requirements are not referred to in the corresponding cells. The explanatory notes below indicate for every column the Part(s), Chapter(s), Section(s) and/or Sub-section(s) where these are to be found.

Explanatory notes for each column:

Column 1 "UN No."

Contains the UN number:

- of the dangerous substance or article if the substance or article has been assigned its own specific UN number, or
- of the generic or n.o.s. entry to which the dangerous substances or articles not mentioned by name shall be assigned in accordance with the criteria ("decision trees") of Part 2.

Column 2 "Name and description"

Contains, in upper case characters, the name of the substance or article, if the substance or article has been assigned its own specific UN number, or of the generic or n.o.s. entry to which it has been assigned in accordance with the criteria ("decision trees") of Part 2. This name shall be used as the proper shipping name or, when applicable, as part of the proper shipping name (see 3.1.2 for further details on the proper shipping name).

A descriptive text in lower case characters is added after the proper shipping name to clarify the scope of the entry if the classification and/or carriage conditions of the substance or article may be different under certain conditions, for instance, "oil-saturated", "received when cleaning coal gas", "with the proportion of crystallization water less than 30%" etc.

Column 3a "Class"

Contains the number of the class, whose heading covers the dangerous substance or article. This class number is assigned in accordance with the procedures and criteria of Part 2.

Column 3b "Classification code"

Contains the classification code of the dangerous substance or article.

- For dangerous substances or articles of Class 1, the code consists of a division number and compatibility group letter, which are assigned in accordance with the procedures and criteria of 2.2.1.1.4.
- For dangerous substances or articles of Class 2, the code consists of a number and hazardous property group, which are explained in 2.2.2.1.2 and 2.2.2.1.3.
- For dangerous substances or articles of Classes 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, and 9, the codes are explained in 2.2.x.1.2¹.
- For dangerous substances or articles of Class 8, the codes are explained in 2.2.8.1.4.1.

Column 4 "Packing group"

Contains the packing group number(s) (I, II or III) assigned to the dangerous substance. These packing group numbers are assigned on the basis of the procedures and criteria of Part 2. Articles and certain substances are not assigned to packing groups. Packing groups may also be assigned via special provisions in Chapter 3.3 as indicated in column 6.

Column 5 "Labels"

Contains the model number of the labels/placards (see 5.2.2.2 and 5.3.1.7) that have to be affixed to packages, containers, tank-containers, portable tanks, MEGCs, tank-wagons, wagons with demountable tanks, battery-wagons and wagons.

The shunting labels in accordance with models Nos. 13 or 15 (see 5.3.4) indicated in brackets for some substances shall only be affixed in the following cases:

- Class 1: on both sides of wagons which comprise a wagon load
- Class 2: on both sides of tank-wagons, battery-wagons, wagons with demountable tanks and wagons carrying tank-containers, MEGCs and portable tanks.

for substances or articles of Class 7, 7X means label model No.7A, 7B or 7C as appropriate according to the category (see 5.1.5.3.4 and 5.2.2.1.11.1) or placard No. 7D (see 5.3.1.1.3 and 5.3.1.7.2);

The general provisions on labelling/placarding (e.g. number of labels, their location) are to be found in 5.2.2.1 for packages and small containers, and in 5.3.1, for large containers, tank-containers, MEGCs, portable tanks, tank-wagons, battery-wagons, wagons with demountable tanks.

Note: *Special provisions, indicated in Column 6, may change the above labelling provisions.*

Column 6 "Special provisions"

Contains the numeric codes of special provisions that have to be met. These provisions concern a wide array of subjects, mainly connected with the contents of Columns 1 to 5 (e.g. carriage prohibitions, exemptions from requirements, explanations concerning the classification of certain forms of the dangerous goods concerned and additional labelling or marking provisions), and are listed in Chapter 3.3 in numerical order. If Column 6 is empty, no special provisions apply to the contents of Columns 1 to 5 for the dangerous goods concerned.

Column 7a "Limited quantities"

Provides the maximum quantity per inner packaging or article for carrying dangerous goods as limited quantities in accordance with Chapter 3.4.

Column 7b "Excepted Quantities"

Contains an alphanumeric code with the following meaning:

- "E0" signifies that no exemption from the provisions of Annex 2 to SMGS exists for the dangerous goods packed in excepted quantities;

¹ x = the class number of the dangerous substance or article, without dividing point if applicable

- All the other alphanumeric codes starting with the letter "E" signify that the provisions of Annex 2 to SMGS are not applicable if the conditions indicated in Chapter 3.5 are fulfilled.

Column 8 "Packing instructions"

Contains the alphanumeric codes of the applicable packing instructions:

- Alphanumeric codes starting with the letter "P", which refers to packing instructions for packagings and receptacles (except IBCs and large packagings), or "R", which refers to packing instructions for light gauge metal packagings. These are listed in 4.1.4.1 in numerical order, and specify the packagings and receptacles that are authorized. They also indicate which of the general packing provisions of 4.1.1, 4.1.2 and 4.1.3, and which of the special packing provisions of 4.1.5, 4.1.6, 4.1.7, 4.1.8 and 4.1.9 have to be met. If Column 8 does not contain a code starting with the letters "P" or "R", the dangerous goods concerned may not be carried in packagings;
- Alphanumeric codes starting with the letters "IBC" refer to packing instructions for IBCs. These are listed in 4.1.4.2 in numerical order, and specify the IBCs that are authorized. They also indicate which of the general packing provisions of 4.1.1, 4.1.2 and 4.1.3, and which of the special packing provisions of 4.1.5, 4.1.6, 4.1.7, 4.1.8 and 4.1.9 have to be met. If Column 8 does not contain a code starting with the letters "IBC", the dangerous goods concerned may not be carried in IBCs;
- Alphanumeric codes starting with the letters "LP" refer to packing instructions for large packagings. These are listed in 4.1.4.3 in numerical order, and specify the large packagings that are authorized. They also indicate which of the general packing provisions of 4.1.1, 4.1.2 and 4.1.3, and which of the special packing provisions of 4.1.5, 4.1.6, 4.1.7, 4.1.8 and 4.1.9 have to be met. If Column 8 does not contain a code starting with the letters "LP", the dangerous goods concerned cannot be carried in large packagings.

Note: *Special packing provisions, indicated in Column 9a, may change the above packing instructions.*

Column 9a "Special packing provisions"

Contains the alphanumeric codes of the applicable special packing provisions:

Alphanumeric codes starting with the letters "PP" or "RR" refer to special packing provisions for packagings and receptacles (except IBCs and large packagings) that have additionally to be met. These are to be found in 4.1.4.1, at the end of the relevant packing instruction (with the letter "P" or "R") referred to in Column 8. If Column 9a does not contain a code starting with the letters "PP" or "RR", none of the special packing provisions listed at the end of the relevant packing instruction apply;

Alphanumeric codes starting with the letter "B" or the letters "BB" refer to special packing provisions for IBCs that have additionally to be met. These are to be found in 4.1.4.2, at the end of the relevant packing instruction (with the letters "IBC") referred to in Column 8. If Column (9a) does not contain a code starting with the letter "B" or the letters "BB", none of the special packing provisions listed at the end of the relevant packing instruction apply;

Alphanumeric codes starting with the letter "L" or the letters "LL" refer to special packing provisions for large packagings that have additionally to be met. These are to be found in 4.1.4.3, at the end of the relevant packing instruction (with the letters "LP") referred to in Column 8. If Column 9a does not contain a code starting with the letter "L", none of the special packing provisions listed at the end of the relevant packing instruction apply.

Column 9b "Mixed packing provisions"

Contains the alphanumeric codes starting with the letters "MP" of the applicable mixed packing provisions. These are listed in 4.1.10 in numerical order. If Column 9b does not contain a code starting with the letters "MP", only the general requirements apply (see 4.1.1.5 and 4.1.1.6).

Column 10 "Portable tank and bulk container instructions"

Contains an alphanumeric code assigned to a portable tank instruction, in accordance with

4.2.5.2.1 to 4.2.5.2.4 and 4.2.5.2.6. This portable tank instruction corresponds to the least stringent provisions that are acceptable for the carriage of the substance in portable tanks. The codes identifying the other portable tank instructions that are also permitted for the carriage of the substance are to be found in 4.2.5.2.5. If no code is given, carriage in portable tanks is not permitted unless a competent authority approval is granted as detailed in 6.7.1.3.

The general requirements for the design, construction, equipment, type approval, testing and marking of portable tanks are to be found in Chapter 6.7. The general requirements for the use (e.g. filling) are to be found in 4.2.1 to 4.2.4.

For portable tanks with shells made of fibre-reinforced plastics (FRP) materials, see Chapter 6.9.

The indication of an "(M)" means that the substance may be carried in UN MEGCs.

Note: *Special provisions, indicated in Column 11, may change the above requirements.*

May also contain alphanumeric codes starting with the letters "BK" referring to types of bulk containers described in Chapter 6.11 which may be used for the carriage of bulk goods in accordance with 7.3.1.1 (a) and 7.3.2.

Column 11 "Portable tank and bulk container special provisions"

Contains the alphanumeric codes of the portable tank special provisions that have additionally to be met. These codes, starting with the letters "TP" refer to special provisions for the construction or use of these portable tanks. They are to be found in 4.2.5.3.

Note: *If technically relevant, these special provisions are not only applicable to the portable tanks specified in column (10), but also to the portable tanks that may be used according to the table in 4.2.5.2.5.*

Column 12 "Tank code"

Contains an alphanumeric code describing a tank type, in accordance with 4.3.3.1.1 (for gases of Class 2) or 4.3.4.1.1 (for substances of Classes 3 to 9). This tank type corresponds to the least stringent tank provisions that are acceptable for the carriage of the relevant substance in Annex 2 to SMGS tanks. The codes describing the other permitted tank types are to be found in 4.3.3.1.2 (for gases of Class 2) or 4.3.4.1.2 (for substances of Classes 3 to 9). If no code is given, carriage in Annex 2 to SMGS tanks is not permitted.

Note: *As a separator for the numerical value of the calculated pressure in the tank code, both the dot "." and the comma "," can be used. "*

If in this column a tank code for solids (S) and for liquids (L) is indicated, this means that this substance may be offered for carriage in tanks in the solid or the liquid (molten) state. In general this provision is applicable to substances having melting points from 20 °C to 180 °C.

If for a solid, only a tank code for liquids (L) is indicated in this column, this means that this substance is only offered for carriage in tanks in the liquid (molten) state.

The general requirements for the construction, equipment, type approval, testing and marking that are not indicated in the tank code are to be found in 6.8.1, 6.8.2, 6.8.3 and 6.8.5. The general requirements for the use (e.g. maximum degree of filling, minimum test pressure) are to be found in 4.3.1 to 4.3.4.

The indication of a "(M)" after the tank code means that the substance can also be carried in battery-wagons or MEGCs.

The indication of a "(+)" after the tank code means that the alternative use of the tanks is permitted only where this is specified in the certificate of type approval, provided for in 6.8.2.3.1 or 6.20.2.3.1.

For vacuum-operated waste tanks, see 4.5.1 and Chapter 6.10.

Note: *Special provisions, indicated in Column 13, may change the above requirements.*

Column 13 "Special provisions for Annex 2 to SMGS tanks"

Contains the alphanumeric codes of the special provisions for Annex 2 to SMGS tanks that have additionally to be met:

- Alphanumeric codes starting with the letters "TU" refer to special provisions for the use of these tanks. These are to be found in 4.3.5;
- Alphanumeric codes starting with the letters "TC" refer to special provisions for the construction of these tanks. These are to be found in 6.8.4 a) or 6.20.4 a);
- Alphanumeric codes starting with the letters "TE" refer to special provisions concerning the items of equipment of these tanks. These are to be found in 6.8.4 b) or 6.20.4 b);
- Alphanumeric codes starting with the letters "TA" refer to special provisions for the type approval of these tanks. These are to be found in 6.8.4 c) or 6.20.4 c);

Note: *As a separator for the numerical value of the calculated pressure in the tank code, both the dot "." and the comma "," can be used. "*

- Alphanumeric codes starting with the letters "TT" refer to special provisions for the testing of these tanks. These are to be found in 6.8.4 d);
- Alphanumeric codes starting with the letters "TM" refer to special provisions for the marking of these tanks. These are to be found in 6.8.4 e).

Note: *If technically relevant, these special provisions are not only applicable to the tanks specified in column 12, but also to the tanks that may be used according to the hierarchies in 4.3.3.1.2 and 4.3.4.1.2.*

Column 14 (Reserved)

Column 15 "Transport category"

Contains a figure indicating the transport category to which the substance or article is assigned. The transport category is used to determine the amount of cargo in packages transported in a single wagon or a large-tonnage container to which certain requirements or exceptions of Annex 2 to SMGS (s. 1.1.3.6) apply. When no transport category has been assigned, this is indicated by the mention "—".

Column 16 "Special provisions for carriage – Packages"

Contains the alphanumeric code(s), starting with letter "W", of the applicable special provisions (if any) for carriage in packages. These are listed in 7.2.4. General provisions concerning the carriage in packages are to be found in Chapters 7.1 and 7.2.

Note: *In addition, special provisions indicated in Column (18), concerning loading, unloading and handling,*

"Special provisions for carriage – Bulk" (see title of 7.3.3.)

Contains the alphanumeric code(s), starting with letters "VC", as well as the alphanumeric code(s) starting with letters "AP", of the applicable provisions for carriage in bulk. These are listed in 7.3.3. If no special provision, identified by the code "VC" or a reference to a specific paragraph, explicitly authorizing this mode of carriage is indicated in this column, and no special provision, identified by the code "BK" or a reference to a specific paragraph, explicitly authorizing this mode of carriage is indicated in column (10), carriage in bulk is not permitted. General and additional provisions concerning carriage in bulk are to be found in Chapters 7.1 and 7.3.

Note: *In addition, special provisions indicated in Column 18, concerning loading, unloading and handling, shall be observed.*

Column 18 "Special provisions for loading, unloading and handling"

Contains the alphanumeric code(s), starting with letters "CW", of the applicable special provisions for loading, unloading and handling. These are listed in 7.5.11. If no code is given, only the general provisions apply (see 7.5.1 to 7.5.4 and 7.5.8).

Column 19 (Reserved)**Column 20 "Hazard identification number"**

Contains a two or three figure number (preceded in certain cases by the letter "X") for substances and articles of classes 2 to 9, and for substances and articles of Class 1, the classification code (see column 3b)). In the cases described in 5.3.2.1, this number shall appear in the upper half of the orange-coloured marking. The meaning of the hazard identification numbers is explained in 5.3.2.3.

Column 21a) "Emergency card number"⁴

Contains the number of the emergency card, which the consigner shall put in column 15 "Name of the cargo" of the consignment note. The indication procedure in the consignment note is provided in section 5.4.1.

If in column 21a) there is no information on the emergency card, this indicates that for this cargo the emergency card is not currently developed and the consigner must prepare it in advance and attach it to the shipping documents.

General provisions regarding emergency cards are contained in p. 5.4.3.11 and 5.4.3.12.

Column 21b) "Minimum protection norms"⁴

Contains the minimum norms for protection, which the consigner shall indicate in column 15 of the consignment note "Name of cargo". The indication procedure in the consignment note is given in Section 5.4.1. If there is a fraction in this column, then the numerator indicates the minimum protection norms for the carriage of dangerous goods in packages or in bulk. The denominator indicates the minimum protection norms for the carriage of dangerous goods in tanks.

The "-" sign (dash) in column 21b means that no protection is required when transporting this dangerous good.

The absence of information in column 21b) means that the minimum protection norms are not developed when transporting this dangerous good.

Protection norms are provided in p. 7.5.3.2.

Column 21c) "Conditions for humping in a gravity yard"⁴

Contains a sign of security measures for shunting operations and humping as well as marks that the consigner shall put in column 15 of the consignment note "Name of Cargo". The listed measures and marks in the consignment note are provided in section 7.5.6. The indication procedure in the consignment note is provided in section 5.4.1.

If there is a fraction in this column, then:

the numerator shall indicate the conditions for humping when transporting dangerous goods in packages or in bulk;

the denominator specifies the conditions for humping when transporting dangerous goods in tanks.

The "-" sign (dash) in column 21c means that when transporting this dangerous good there are no restrictions on humping.

The absence of information in column 21c) means that when transporting this dangerous good, the conditions for humping are not developed.

Note: *If in column 5 for certain substances the signs of shunting operation are indicated according to model No. 13 or 15 and they contradict the requirements provided in column 21c), then it is necessary to be guided by the requirements provided in column 21c).*

⁴ The requirements set forth in the explanatory notes for columns 21a), 21b), 21b) do not apply when shipping goods from Hungary, the Republic of Poland and the Slovak Republic or when re-issuing a consignment note in the indicated countries.

TABLE 3.2 A.

LIST OF DANGEROUS GOODS

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0004	AMMONIUM PICRATE dry or wetted with less than 10% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c	PP26	MP20					1	W2 W3		CW1	1.1D			
0005	CARTRIDGES FOR WEAPONS with bursting charge	1	1.1F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.1F			
0006	CARTRIDGES FOR WEAPONS with bursting charge	1	1.1E		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1E			
0007	CARTRIDGES FOR WEAPONS with bursting charge	1	1.2F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.2F			
0009	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	1	1.2G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.2G			
0010	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	1	1.3G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.3G			
0012	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1	1.4S		1.4	364	5kg	E0	P130 LP101		MP23 MP24					4	W2		CW1	1.4S			
0014	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK or CARTRIDGES FOR TOOLS, BLANK	1	1.4S		1.4	364	5kg	E0	P130 LP101		MP23 MP24					4	W2		CW1	1.4S			
0015	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	1	1.2G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.2G			
0015	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing corrosive substances	1	1.2G		1+8		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.2G			
0016	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	1	1.3G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.3G			
0016	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing corrosive substances	1	1.3G		1+8		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.3G			
0018	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	1	1.2G		1+6.1+8		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1 CW28	1.2G			
0019	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	1	1.3G		1+6.1+8		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1 CW28	1.3G			
0020	AMMUNITION, TOXIC with burster, expelling charge or propelling charge	1	1.2K	CARRIAGE PROHIBITED																			
0021	AMMUNITION, TOXIC with burster, expelling charge or propelling charge	1	1.3K	CARRIAGE PROHIBITED																			
0027	BLACK POWDER (GUNPOWDER), granular or as a meal	1	1.1D		1 (+13)		0	E0	P113	PP50	MP20 MP24					1	W2 W3		CW1	1.1D			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note			
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping	
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3		4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)	
0028	BLACK POWDER (GUNPOWDER), COMPRESSED or BLACK POWDER (GUNPOWDER), IN PELLETS	1	1.1D		1 (+13)		0	E0	P113	PP51	MP20 MP24					1	W2		CW1	1.1D				
0029	DETONATORS, NON-ELECTRIC for blasting	1	1.1B		1 (+13)		0	E0	P131	PP68	MP23					1	W2		CW1	1.1B	191			
0030	DETONATORS, ELECTRIC for blasting	1	1.1B		1 (+13)		0	E0	P131		MP23					1	W2		CW1	1.1B	191			
0033	BOMBS with bursting charge	1	1.1F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.1F				
0034	BOMBS with bursting charge	1	1.1D		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1D				
0035	BOMBS with bursting charge	1	1.2D		1		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.2D				
0037	BOMBS, PHOTO-FLASH	1	1.1F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.1F				
0038	BOMBS, PHOTO-FLASH	1	1.1D		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1D				
0039	BOMBS, PHOTO-FLASH	1	1.2G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.2G				
0042	AUXILIARY BOOSTERS without detonator	1	1.1D		1 (+13)		0	E0	P132a P132b		MP21					1	W2		CW1	1.1D				
0043	BURSTERS, explosive	1	1.1D		1 (+13)		0	E0	P133	PP69	MP21					1	W2		CW1	1.1D				
0044	PRIMERS, CAP TYPE	1	1.4S		1.4		0	E0	P133		MP23 MP24					4	W2		CW1	1.4S				
0048	CHARGES, DEMOLITION	1	1.1D		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1D				
0049	CARTRIDGES, FLASH	1	1.1G		1 (+13)		0	E0	P135		MP23					1	W2		CW1	1.1G				
0050	CARTRIDGES, FLASH	1	1.3G		1		0	E0	P135		MP23					1	W2		CW1	1.3G				
0054	CARTRIDGES, SIGNAL	1	1.3G		1		0	E0	P135		MP23 MP24					1	W2		CW1	1.3G				
0055	CASES, CARTRIDGE, EMPTY, WITH PRIMER	1	1.4S		1.4	364	5kg	E0	P136		MP23					4	W2		CW1	1.4S				
0056	CHARGES, DEPTH	1	1.1D		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1D				
0059	CHARGES, SHAPED, without detonator	1	1.1D		1 (+13)		0	E0	P137	PP70	MP21					1	W2		CW1	1.1D	192			
0060	CHARGES, SUPPLEMENTARY, EXPLOSIVE	1	1.1D		1 (+13)		0	E0	P132a P132b		MP21					1	W2		CW1	1.1D				
0065	CORD, DETONATING, flexible	1	1.1D		1 (+13)		0	E0	P139	PP71 PP72	MP21					1	W2		CW1	1.1D	192			
0066	CORD, IGNITER	1	1.4G		1.4		0	E0	P140		MP23					2	W2		CW1	1.4G				
0070	CUTTERS, CABLE, EXPLOSIVE	1	1.4S		1.4		0	E0	P134 LP102		MP23					4	W2		CW1	1.4S				
0072	CYCLOTRIMETHYLENETRINITRAMINE (CYCLONITE; HEXOGEN; RDX), WETTED with not less than 15% water, by mass	1	1.1D		1 (+15)	266	0	E0	P112a	PP45	MP20					1	W2		CW1	1.1D				
0073	DETONATORS FOR AMMUNITION	1	1.1B		1 (+13)		0	E0	P133		MP23					1	W2		CW1	1.1B				
0074	DIAZODINITROPHENOL, WETTED with not less than 40% water, or mixture of alcohol and water, by mass	1	1.1A						CARRIAGE PROHIBITED															

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0075	DIETHYLENEGLYCOL DINITRATE, DESENSITIZED with not less than 25% non-volatile, water-insoluble phlegmatizer, by mass	1	1.1D		1 (+15)	266	0	E0	P115	PP53 PP54 PP57 PP58	MP20					1	W2		CW1	1.1D			
0076	DINITROPHENOL, dry or wetted with less than 15% water, by mass	1	1.1D		1+6.1 (+13)		0	E0	P112a P112b P112c	PP26	MP20					1	W2 W3		CW1 CW28	1.1D			
0077	DINITROPHENOLATES, alkali metals, dry or wetted with less than 15% water, by mass	1	1.3C		1+6.1 (+13)		0	E0	P114a P114b	PP26	MP20					1	W2 W3		CW1 CW28	1.3C			
0078	DINITRORESORCINOL, dry or wetted with less than 15% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c	PP26	MP20					1	W2 W3		CW1	1.1D			
0079	HEXANITRODIPHENYLAMINE (DIPICRYLAMINE; HEXYL)	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0081	EXPLOSIVE, BLASTING, TYPE A	1	1.1D		1 (+13)	616 617	0	E0	P116	PP63 PP66	MP20					1	W2 W3		CW1	1.1D			
0082	EXPLOSIVE, BLASTING, TYPE B	1	1.1D		1 (+13)	617	0	E0	P116	PP61 PP62 B9	MP20					1	W2 W3 W12		CW1	1.1D			
0083	EXPLOSIVE, BLASTING, TYPE C	1	1.1D		1 (+15)	267 617	0	E0	P116		MP20					1	W2 W3		CW1	1.1D			
0084	EXPLOSIVE, BLASTING, TYPE D	1	1.1D		1 (+13)	617	0	E0	P116		MP20					1	W2		CW1	1.1D			
0092	FLARES, SURFACE	1	1.3G		1		0	E0	P135		MP23					1	W2		CW1	1.3G			
0093	FLARES, AERIAL	1	1.3G		1		0	E0	P135		MP23					1	W2		CW1	1.3G			
0094	FLASH POWDER	1	1.1G		1 (+13)		0	E0	P113	PP49	MP20					1	W2 W3		CW1	1.1G			
0099	FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells	1	1.1D		1 (+13)		0	E0	P134 LP102		MP21					1	W2		CW1	1.1D	192		
0101	FUSE, NON-DETONATING	1	1.3G		1		0	E0	P140	PP74 PP75	MP23					1	W2		CW1	1.3G			
0102	CORD (FUSE), DETONATING, metal	1	1.2D		1		0	E0	P139	PP71	MP21					1	W2		CW1	1.2D			
0103	FUSE, IGNITER, tubular, metal clad	1	1.4G		1.4		0	E0	P140		MP23					2	W2		CW1	1.4G			
0104	CORD (FUSE), DETONATING, MILD EFFECT, metal clad	1	1.4D		1.4		0	E0	P139	PP71	MP21					2	W2		CW1	1.4D			
0105	FUSE, SAFETY	1	1.4S		1.4		0	E0	P140	PP73	MP23					4	W2		CW1	1.4S			
0106	FUZES, DETONATING, hand or rifle	1	1.1B		1 (+13)		0	E0	P141		MP23					1	W2		CW1	1.1B			
0107	FUZES, DETONATING	1	1.2B		1 (+13)		0	E0	P141		MP23					1	W2		CW1	1.2B			
0110	GRENADES, PRACTICE, hand or rifle	1	1.4S		1.4		0	E0	P141		MP23					4	W2		CW1	1.4S			
0113	GUANYLNITROSAMINO GUANYLIDENE HYDRAZINE, WETTED with not less than 30% water, by mass	1	1.1A																				
0114	GUANYLNITROSAMINO GUANYL-TETRAZENE (TETRAZENE), WETTED with not less than 30% water, or mixture of alcohol and water, by mass	1	1.1A																				

CARRIAGE PROHIBITED

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UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0118	HEXOLITE (HEXOTOL), dry or wetted with less than 15% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0121	IGNITERS	1	1.1G		1 (+13)		0	E0	P142		MP23					1	W2		CW1	1.1G			
0124	JET PERFORATING GUNS, CHARGED, oil well, without detonator	1	1.1D		1 (+13)		0	E0	P101		MP21					1	W2		CW1	1.1D	192		
0129	LEAD AZIDE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1A	CARRIAGE PROHIBITED																			
0130	LEAD STYPHNATE (LEAD TRINITRORESORCINATE), WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1A	CARRIAGE PROHIBITED																			
0131	LIGHTERS, FUSE	1	1.4S		1.4		0	E0	P142		MP23					4	W2		CW1	1.4S			
0132	DEFLAGRATING METAL SALTS OF AROMATIC NITRODERIVATIVES	1	1.3C		1 (+13)	274	0	E0	P114a P114b	PP26	MP2					1	W2 W3		CW1	1.3C			
0133	MANNITOL HEXANITRATE (NITROMANNITE), WETTED with not less than 40% water, or mixture of alcohol and water, by mass	1	1.1D		1 (+15)	266	0	E0	P112a		MP20					1	W2		CW1	1.1D			
0135	MERCURY FULMINATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1A	CARRIAGE PROHIBITED																			
0136	MINES with bursting charge	1	1.1F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.1F			
0137	MINES with bursting charge	1	1.1D		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1D			
0138	MINES with bursting charge	1	1.2D		1		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.2D			
0143	NITROGLYCERIN, DESENSITIZED with not less than 40% non-volatile water-insoluble phlegmatizer, by mass	1	1.1D		1+6.1 (+15)	266 271	0	E0	P115	PP53 PP54 PP57 PP58	MP20					1	W2		CW1 CW28	1.1D			
0144	NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 10% nitroglycerin	1	1.1D		1 (+13)	358	0	E0	P115	PP45 PP55 PP56 PP59 PP60	MP20					1	W2		CW1	1.1D			
0146	NITROSTARCH, dry or wetted with less than 20% water, by mass	1	1.1D		1 (+15)		0	E0	P112a P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0147	NITRO UREA	1	1.1D		1 (+13)		0	E0	P112b		MP20					1	W2 W3		CW1	1.1D			

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0150	PENTAERYTHRITOL TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), WETTED with not less than 25% water, by mass, or DESENSITIZED with not less than 15% phlegmatizer, by mass	1	1.1D		1 (+15)	266	0	E0	P112a P112b		MP20					1	W2 W3		CW1	1.1D			
0151	PENTOLITE, dry or wetted with less than 15% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0153	TRINITROANILINE (PICRAMIDE)	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0154	TRINITROPHENOL (PICRIC ACID), dry or wetted with less than 30% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c	PP26	MP20					1	W2 W3		CW1	1.1D			
0155	TRINITROCHLOROBENZENE (PICRYL CHLORIDE)	1	1.1D		1(+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0159	POWDER CAKE (POWDER PASTE), WETTED with not less than 25% water, by mass	1	1.3C		1 (+13)	266	0	E0	P111	PP43	MP20					1	W2		CW1	1.3C			
0160	POWDER, SMOKELESS	1	1.1C		1 (+15)		0	E0	P114b	PP50 PP52	MP20 MP24					1	W2 W3		CW1	1.1C			
0161	POWDER, SMOKELESS	1	1.3C		1 (+13)		0	E0	P114b	PP50 PP52	MP20 MP24					1	W2 W3		CW1	1.3C	190		
0167	PROJECTILES with bursting charge	1	1.1F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.1F			
0168	PROJECTILES with bursting charge	1	1.1D		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1D			
0169	PROJECTILES with bursting charge	1	1.2D		1		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.2D			
0171	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	1	1.2G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.2G			
0173	RELEASE DEVICES, EXPLOSIVE	1	1.4S		1.4		0	E0	P134 LP102		MP23					4	W2		CW1	1.4S			
0174	RIVETS, EXPLOSIVE	1	1.4S		1.4		0	E0	P134 LP102		MP23					4	W2		CW1	1.4S			
0180	ROCKETS with bursting charge	1	1.1F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.1F			
0181	ROCKETS with bursting charge	1	1.1E		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1E			
0182	ROCKETS with bursting charge	1	1.2E		1		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.2E			
0183	ROCKETS with inert head	1	1.3C		1		0	E0	P130 LP101	PP67 L1	MP22					1	W2		CW1	1.3C			
0186	ROCKET MOTORS	1	1.3C		1		0	E0	P130 LP101	PP67 L1	MP22 MP24					1	W2		CW1	1.3C			

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0190	SAMPLES, EXPLOSIVE, other than initiating explosive	1				16 274	0	E0	P101		MP2					0	W2		CW1				
0191	SIGNAL DEVICES, HAND	1	1.4G		1.4		0	E0	P135		MP23 MP24					2	W2		CW1	1.4G			
0192	SIGNALS, RAILWAY TRACK,	1	1.1G		1 (+13)		0	E0	P135		MP23					1	W2		CW1	1.1G			
0193	SIGNALS, RAILWAY TRACK,	1	1.4S		1.4		0	E0	P135		MP23					4	W2		CW1	1.4S			
0194	SIGNALS, DISTRESS, ship	1	1.1G		1 (+13)		0	E0	P135		MP23 MP24					1	W2		CW1	1.1G			
0195	SIGNALS, DISTRESS, ship	1	1.3G		1		0	E0	P135		MP23 MP24					1	W2		CW1	1.3G			
0196	SIGNALS, SMOKE	1	1.1G		1 (+13)		0	E0	P135		MP23					1	W2		CW1	1.1G			
0197	SIGNALS, SMOKE	1	1.4G		1.4		0	E0	P135		MP23 MP24					2	W2		CW1	1.4G			
0204	SOUNDING DEVICES, EXPLOSIVE	1	1.2F		1 (+13)		0	E0	P134 LP102		MP23					1	W2		CW1	1.2F			
0207	TETRANITROANILINE	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0208	TRINITROPHENYLMETHYLNITRAMINE (TETRYL)	1	1.1D		1 (+15)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0209	TRINITROTOLUENE (TNT), dry or wetted with less than 30% water, by mass	1	1.1D		1 (+13)		0	E0	P112b P112c	PP46	MP20					1	W2 W3		CW1	1.1D			
0212	TRACERS FOR AMMUNITION	1	1.3G		1		0	E0	P133	PP69	MP23					1	W2		CW1	1.3G			
0213	TRINITROANISOLE	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0214	TRINITROBENZENE, dry or wetted with less than 30% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0215	TRINITROBENZOIC ACID, dry or wetted with less than 30% water, by mass	1	1.1D		1(+13)		0	E0	P112a P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0216	TRINITRO-m-CRESOL	1	1.1D		1 (+13)		0	E0	P112b P112c	PP26	MP20					1	W2 W3		CW1	1.1D			
0217	TRINITRONAPHTHALENE	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0218	TRINITROPHENETOLE	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0219	TRINITRORESORCINOL (STYPHNIC ACID), dry or wetted with less than 20% water, or mixture of alcohol and water, by mass	1	1.1D		1 (+15)		0	E0	P112a P112b P112c	PP26	MP20					1	W2 W3		CW1	1.1D			
0220	UREA NITRATE, dry or wetted with less than 20% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c		MP20					1	W2 W3		CW1	1.1D			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0221	WARHEADS, TORPEDO with bursting charge	1	1.1D		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1D			
0222	AMMONIUM NITRATE	1	1.1D		1 (+13)	370	0	E0	P112b P112c IBC100	PP47 B3 B17	MP20					1	W2 W3		CW1	1.1D			
0224	BARIUM AZIDE, dry or wetted with less than 50% water, by mass	1	1.1A	CARRIAGE PROHIBITED																			
0225	AUXILIARY BOOSTERS WITH DETONATOR	1	1.1B		1 (+13)		0	E0	P133	PP69	MP23					1	W2		CW1	1.1B			
0226	CYCLOTETRAMETHYLENETETRA-NITRAMINE (HMX; OCTOGEN), WETTED with not less than 15% water, by mass	1	1.1D		1 (+15)	266	0	E0	P112a	PP45	MP20					1	W2		CW1	1.1D			
0234	SODIUM DINITRO-o-CRESOLATE, dry or wetted with less than 15% water, by mass	1	1.3C		1 (+13)		0	E0	P114a P114b	PP26	MP20					1	W2 W3		CW1	1.3C			
0235	SODIUM PICRAMATE, dry or wetted with less than 20% water, by mass	1	1.3C		1 (+13)		0	E0	P114a P114b	PP26	MP20					1	W2 W3		CW1	1.3C			
0236	ZIRCONIUM PICRAMATE, dry or wetted with less than 20% water, by mass	1	1.3C		1 (+13)		0	E0	P114a P114b	PP26	MP20					1	W2 W3		CW1	1.3C			
0237	CHARGES, SHAPED, FLEXIBLE, LINEAR	1	1.4D		1.4		0	E0	P138		MP21					2	W2		CW1	1.4D			
0238	ROCKETS, LINE-THROWING	1	1.2G		1		0	E0	P130 LP101		MP23 MP24					1	W2		CW1	1.2G			
0240	ROCKETS, LINE-THROWING	1	1.3G		1		0	E0	P130 LP101		MP23 MP24					1	W2		CW1	1.3G			
0241	EXPLOSIVE, BLASTING, TYPE E	1	1.1D		1 (+13)	617	0	E0	P116 PP62 IBC100	MP20						1	W2 W12		CW1	1.1D			
0242	CHARGES, PROPELLING, FOR CANNON	1	1.3C		1		0	E0	P130 LP101		MP22					1	W2		CW1	1.3C			
0243	AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.2H		1 (+13)		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.2H			
0244	AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.3H		1 (+13)		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.3H			
0245	AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.2H		1 (+13)		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.2H			
0246	AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	1	1.3H		1 (+13)		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.3H			
0247	AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge	1	1.3J		1 (+13)		0	E0	P101		MP23					1	W2		CW1	1.3J			
0248	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	1	1.2L		1 (+13)	274	0	E0	P144	PP77	MP1					0	W2		CW1 CW4	1.2L			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0249	CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	1	1.3L		1 (+13)	274	0	E0	P144	PP77	MP1					0	W2		CW1 CW4	1.3L			
0250	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	1	1.3L		1 (+13)		0	E0	P101		MP1					0	W2		CW1 CW4	1.3L			
0254	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	1	1.3G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.3G			
0255	DETONATORS, ELECTRIC for blasting	1	1.4B		1.4		0	E0	P131		MP23					2	W2		CW1	1.4B			
0257	FUZES, DETONATING	1	1.4B		1.4		0	E0	P141		MP23					2	W2		CW1	1.4B			
0266	OCTOLITE (OCTOL), dry or wetted with less than 15% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0267	DETONATORS, NON-ELECTRIC for blasting	1	1.4B		1.4		0	E0	P131	PP68	MP23					2	W2		CW1	1.4B			
0268	AUXILIARY BOOSTERS WITH PRIMARY DETONATOR	1	1.2B		1 (+13)		0	E0	P133	PP69	MP23					1	W2		CW1	1.2B			
0271	CHARGES, PROPELLING	1	1.1C		1 (+13)		0	E0	P143	PP76	MP22					1	W2		CW1	1.1C			
0272	CHARGES, PROPELLING	1	1.3C		1		0	E0	P143	PP76	MP22					1	W2		CW1	1.3C			
0275	CARTRIDGES, POWER DEVICE	1	1.3C		1		0	E0	P134 LP102		MP22					1	W2		CW1	1.3C			
0276	CARTRIDGES, POWER DEVICE	1	1.4C		1.4		0	E0	P134 LP102		MP22					2	W2		CW1	1.4C			
0277	CARTRIDGES, OIL WELL	1	1.3C		1		0	E0	P134 LP102		MP22					1	W2		CW1	1.3C			
0278	CARTRIDGES, OIL WELL	1	1.4C		1.4		0	E0	P134 LP102		MP22					2	W2		CW1	1.4C	190		
0279	CHARGES, PROPELLING, FOR CANNON	1	1.1C		1 (+13)		0	E0	P130 LP101		MP22					1	W2		CW1	1.1C			
0280	ROCKET MOTORS	1	1.1C		1 (+13)		0	E0	P130 LP101	PP67 L1	MP22					1	W2		CW1	1.1C			
0281	ROCKET MOTORS	1	1.2C		1		0	E0	P130 LP101	PP67 L1	MP22					1	W2		CW1	1.2C			
0282	NITROGUANIDINE (PICRITE), dry or wetted with less than 20% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0283	AUXILIARY BOOSTERS without primary detonator	1	1.2D		1		0	E0	P132a P132b		MP21					1	W2		CW1	1.2D			
0284	GRENADES, hand or rifle, with bursting charge	1	1.1D		1 (+13)		0	E0	P141		MP21					1	W2		CW1	1.1D			
0285	GRENADES, hand or rifle, with bursting charge	1	1.2D		1		0	E0	P141		MP21					1	W2		CW1	1.2D			
0286	WARHEADS, ROCKET with bursting charge	1	1.1D		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1D			
0287	WARHEADS, ROCKET with bursting charge	1	1.2D		1		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.2D			
0288	CHARGES, SHAPED, FLEXIBLE, LINEAR	1	1.1D		1 (+13)		0	E0	P138		MP21					1	W2		CW1	1.1D			
0289	CORD, DETONATING, flexible	1	1.4D		1.4		0	E0	P139	PP71 PP72	MP21					2	W2		CW1	1.4D			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0290	CORD (FUSE), DETONATING, metal	1	1.1D		1 (+13)		0	E0	P139	PP71	MP21					1	W2		CW1	1.1D	192		
0291	BOMBS with bursting charge	1	1.2F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.2F			
0292	GRENADES, hand or rifle, with bursting charge	1	1.1F		1 (+13)		0	E0	P141		MP23					1	W2		CW1	1.1F			
0293	GRENADES, hand or rifle, with bursting charge	1	1.2F		1 (+13)		0	E0	P141		MP23					1	W2		CW1	1.2F			
0294	MINES with bursting charge	1	1.2F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.2F			
0295	ROCKETS with bursting charge	1	1.2F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.2F			
0296	SOUNDING DEVICES, EXPLOSIVE	1	1.1F		1 (+13)		0	E0	P134 LP102		MP23					1	W2		CW1	1.1F			
0297	AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	1	1.4G		1.4		0	E0	P130 LP101	PP67 L1	MP23					2	W2		CW1	1.4G			
0299	BOMBS, PHOTO-FLASH	1	1.3G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.3G			
0300	AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	1	1.4G		1.4		0	E0	P130 LP101	PP67 L1	MP23					2	W2		CW1	1.4G			
0301	AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	1	1.4G		1.4+6.1+ 8		0	E0	P130 LP101	PP67 L1	MP23					2	W2		CW1 CW28	1.4G			
0303	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	1	1.4G		1.4		0	E0	P130 LP101	PP67 L1	MP23					2	W2		CW1	1.4G			
0303	AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge, containing corrosive substances	1	1.4G		1.4+8		0	E0	P130 LP101	PP67 L1	MP23					2	W2		CW1	1.4G			
0305	FLASH POWDER	1	1.3G		1		0	E0	P113	PP49	MP20					1	W2 W3		CW1	1.3G			
0306	TRACERS FOR AMMUNITION	1	1.4G		1.4		0	E0	P133	PP69	MP23					2	W2		CW1	1.4G			
0312	CARTRIDGES, SIGNAL	1	1.4G		1.4		0	E0	P135		MP23 MP24					2	W2		CW1	1.4G			
0313	SIGNALS, SMOKE	1	1.2G		1		0	E0	P135		MP23					1	W2		CW1	1.2G			
0314	IGNITERS	1	1.2G		1		0	E0	P142		MP23					1	W2		CW1	1.2G			
0315	IGNITERS	1	1.3G		1		0	E0	P142		MP23					1	W2		CW1	1.3G			
0316	FUZES, IGNITING	1	1.3G		1		0	E0	P141		MP23					1	W2		CW1	1.3G			
0317	FUZES, IGNITING	1	1.4G		1.4		0	E0	P141		MP23					2	W2		CW1	1.4G			
0318	GRENADES, PRACTICE, hand or rifle	1	1.3G		1		0	E0	P141		MP23					1	W2		CW1	1.3G			
0319	PRIMERS, TUBULAR	1	1.3G		1		0	E0	P133		MP23					1	W2		CW1	1.3G			
0320	PRIMERS, TUBULAR	1	1.4G		1.4		0	E0	P133		MP23					2	W2		CW1	1.4G			
0321	CARTRIDGES FOR WEAPONS with bursting charge	1	1.2E		1		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.2E			
0322	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	1	1.2L		1 (+13)		0	E0	P101		MP1					0	W2		CW1 CW4	1.2L			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0323	CARTRIDGES, POWER DEVICEB	1	1.4S		1.4	347	0	E0	P134 LP102		MP23					4	W2		CW1	1.4S			
0324	PROJECTILES with bursting charge	1	1.2F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.2F			
0325	IGNITERS	1	1.4G		1.4		0	E0	P142		MP23					2	W2		CW1	1.4G			
0326	CARTRIDGES FOR WEAPONS, BLANK	1	1.1C		1 (+13)		0	E0	P130 LP101		MP22					1	W2		CW1	1.1C			
0327	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK	1	1.3C		1		0	E0	P130 LP101		MP22					1	W2		CW1	1.3C			
0328	CARTRIDGES FOR WEAPONS, INERT PROJECTILE	1	1.2C		1		0	E0	P130 LP101	PP67 L1	MP22					1	W2		CW1	1.2C			
0329	TORPEDOES with bursting charge	1	1.1E		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1E			
0330	TORPEDOES with bursting charge	1	1.1F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.1F			
0331	EXPLOSIVE, BLASTING, TYPE B (AGENT, BLASTING, TYPE B)	1	1.5D		1.5	617	0	E0	P116 IBC100	PP61 PP62 PP64	MP20	T1	TP1 TP17 TP32			1	W2 W12		CW1	1.5D			
0332	EXPLOSIVE, BLASTING, TYPE E (AGENT, BLASTING, TYPE E)	1	1.5D		1.5	617	0	E0	P116 IBC100	PP61 PP62	MP20	T1	TP1 TP17 TP32			1	W2 W12		CW1	1.5D			
0333	FIREWORKS	1	1.1G		1 (+13)	645	0	E0	P135		MP23 MP24					1	W2 W3		CW1	1.1G			
0334	FIREWORKS	1	1.2G		1	645	0	E0	P135		MP23 MP24					1	W2 W3		CW1	1.2G			
0335	FIREWORKS	1	1.3G		1	645	0	E0	P135		MP23 MP24					1	W2 W3		CW1	1.3G			
0336	FIREWORKS	1	1.4G		1.4	645	0	E0	P135		MP23 MP24					2	W2		CW1	1.4G			
0337	FIREWORKS	1	1.4S		1.4	645	0	E0	P135		MP23 MP24					4	W2		CW1	1.4S			
0338	CARTRIDGES FOR WEAPONS, BLANK or CARTRIDGES, SMALL ARMS, BLANK	1	1.4C		1.4		0	E0	P130 LP101		MP22					2	W2		CW1	1.4C			
0339	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1	1.4C		1.4		0	E0	P130 LP101		MP22					2	W2		CW1	1.4C			
0340	NITROCELLULOSE, dry or wetted with less than 25% water (or alcohol), by mass	1	1.1D		1 (+15)	393	0	E0	P112a P112b		MP20					1	W2 W3		CW1	1.1D			
0341	NITROCELLULOSE, unmodified or plasticized with less than 18% plasticizing substance, by mass	1	1.1D		1 (+15)	393	0	E0	P112b		MP20					1	W2 W3		CW1	1.1D			
0342	NITROCELLULOSE, WETTED with not less than 25% alcohol, by mass	1	1.3C		1 (+13)	105 393	0	E0	P114a	PP43	MP20					1	W2		CW1	1.3C			
0343	NITROCELLULOSE, PLASTICIZED with not less than 18% plasticizing substance, by mass	1	1.3C		1 (+13)	105 393	0	E0	P111		MP20					1	W2		CW1	1.3C			
0344	PROJECTILES with bursting charge	1	1.4D		1.4		0	E0	P130 LP101	PP67 L1	MP21					2	W2		CW1	1.4D			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0345	PROJECTILES, inert with tracer	1	1.4S		1.4		0	E0	P130 LP101	PP67 L1	MP23					4	W2		CW1	1.4S			
0346	PROJECTILES with burster or expelling charge	1	1.2D		1		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.2D			
0347	PROJECTILES with burster or expelling charge	1	1.4D		1.4		0	E0	P130 LP101	PP67 L1	MP21					2	W2		CW1	1.4D			
0348	CARTRIDGES FOR WEAPONS with bursting charge	1	1.4F		1.4		0	E0	P130 LP101		MP23					2	W2		CW1	1.4F			
0349	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4S		1.4	178 274	0	E0	P101		MP2					4	W2		CW1	1.4S			
0350	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4B		1.4	178 274	0	E0	P101		MP2					2	W2		CW1	1.4B			
0351	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4C		1.4	178 274	0	E0	P101		MP2					2	W2		CW1	1.4C			
0352	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4D		1.4	178 274	0	E0	P101		MP2					2	W2		CW1	1.4D			
0353	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4G		1.4	178 274	0	E0	P101		MP2					2	W2		CW1	1.4G			
0354	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1L		1 (+13)	178 274	0	E0	P101		MP1					0	W2		CW1 CW4	1.1L			
0355	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2L		1 (+13)	178 274	0	E0	P101		MP1					0	W2		CW1 CW4	1.2L			
0356	ARTICLES, EXPLOSIVE, N.O.S.	1	1.3L		1 (+13)	178 274	0	E0	P101		MP1					0	W2		CW1 CW4	1.3L			
0357	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1L		1 (+13)	178 274	0	E0	P101		MP1					0	W2		CW1 CW4	1.1L			
0358	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.2L		1 (+13)	178 274	0	E0	P101		MP1					0	W2		CW1 CW4	1.2L			
0359	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.3L		1 (+13)	178 274	0	E0	P101		MP1					0	W2		CW1 CW4	1.3L			
0360	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1	1.1B		1 (+13)		0	E0	P131		MP23					1	W2		CW1	1.1B			
0361	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1	1.4B		1.4		0	E0	P131		MP23					2	W2		CW1	1.4B			
0362	AMMUNITION, PRACTICE	1	1.4G		1.4		0	E0	P130 LP101	PP67 L1	MP23					2	W2		CW1	1.4G			
0363	AMMUNITION, PROOF	1	1.4G		1.4		0	E0	P130 LP101	PP67 L1	MP23					2	W2		CW1	1.4G			
0364	DETONATORS FOR AMMUNITION	1	1.2B		1 (+13)		0	E0	P133		MP23					1	W2		CW1	1.2B			
0365	DETONATORS FOR AMMUNITION	1	1.4B		1.4		0	E0	P133		MP23					2	W2		CW1	1.4B			
0366	DETONATORS FOR AMMUNITION	1	1.4S		1.4	347	0	E0	P133		MP23					4	W2		CW1	1.4S			
0367	FUZES, DETONATING	1	1.4S		1.4		0	E0	P141		MP23					4	W2		CW1	1.4S			
0368	FUZES, IGNITING	1	1.4S		1.4		0	E0	P141		MP23					4	W2		CW1	1.4S			
0369	WARHEADS, ROCKET with bursting charge	1	1.1F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.1F			
0370	WARHEADS, ROCKET with burster or expelling charge	1	1.4D		1.4		0	E0	P130 LP101	PP67 L1	MP21					2	W2		CW1	1.4D			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0371	WARHEADS, ROCKET with burster or expelling charge	1	1.4F		1.4		0	E0	P130 LP101		MP23					2	W2		CW1	1.4F			
0372	GRENADERS, PRACTICE, hand or rifle	1	1.2G		1		0	E0	P141		MP23					1	W2		CW1	1.2G			
0373	SIGNAL DEVICES, HAND	1	1.4S		1.4		0	E0	P135		MP23 MP24					4	W2		CW1	1.4S			
0374	SOUNDING DEVICES, EXPLOSIVE	1	1.1D		1 (+13)		0	E0	P134 LP102		MP21					1	W2		CW1	1.1D			
0375	SOUNDING DEVICES, EXPLOSIVE	1	1.2D		1		0	E0	P134 LP102		MP21					1	W2		CW1	1.2D			
0376	PRIMERS, TUBULAR	1	1.4S		1.4		0	E0	P133		MP23					4	W2		CW1	1.4S			
0377	PRIMERS, CAP TYPE	1	1.1B		1 (+13)		0	E0	P133		MP23					1	W2		CW1	1.1B	191		
0378	PRIMERS, CAP TYPE	1	1.4B		1.4		0	E0	P133		MP23					2	W2		CW1	1.4B			
0379	CASES, CARTRIDGE, EMPTY, WITH PRIMER	1	1.4C		1.4		0	E0	P136		MP22					2	W2		CW1	1.4C			
0380	ARTICLES, PYROPHORIC	1	1.2L		1 (+13)		0	E0	P101		MP1					0	W2		CW1 CW4	1.2L			
0381	CARTRIDGES, POWER DEVICES	1	1.2C		1		0	E0	P134 LP102		MP22					1	W2		CW1	1.2C	189		
0382	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.2B		1 (+13)	178 274	0	E0	P101		MP2					1	W2		CW1	1.2B			
0383	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1	1.4B		1.4	178 274	0	E0	P101		MP2					2	W2		CW1	1.4B			
0384	COMPONENTS, EXPLOSIVE TRAIN, N.O.S..	1	1.4S		1.4	178 274	0	E0	P101		MP2					4	W2		CW1	1.4S			
0385	5-NITROBENZOTRIAZOL	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0386	TRINITROBENZENESULPHONIC ACID	1	1.1D		1 (+13)		0	E0	P112b P112c	PP26	MP20					1	W2 W3		CW1	1.1D			
0387	TRINITROFLUORENONE	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0388	TRINITROTOLUENE (TNT) AND TRINITROBENZENE MIXTURE or TRINITROTOLUENE (TNT) AND HEXANITROSTILBENE MIXTURE	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0389	TRINITROTOLUENE (TNT) MIXTURE CONTAINING TRINITROBENZENE AND HEXANITROSTILBENE	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0390	TRITONAL+B912	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humpin g 5.4.1 7.5.6
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0391	CYCLOTETRAMETHYLENETRINITRAMINE (CYCLONITE; HEXOGEN; RDX) AND CYCLOTETRAMETHYLENETRINITRAMINE (HMX; OCTOGEN) MIXTURE, WETTED with not less than 15% water, by mass or DESENSITIZED with not less than 10% phlegmatizer by mass	1	1.1D		1 (+15)	266	0	E0	P112a P112b		MP20					1	W2 W3		CW1	1.1D			
0392	HEXANITROSTILBENE	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0393	HEXOTONAL	1	1.1D		1 (+13)		0	E0	P112b		MP20					1	W2 W3		CW1	1.1D			
0394	TRINITRORESORCINOL (STYPHNIC ACID), WETTED with not less than 20% water, or mixture of alcohol and water, by mass	1	1.1D		1 (+15)		0	E0	P112a	PP26	MP20					1	W2		CW1	1.1D			
0395	ROCKET MOTORS, LIQUID FUELLED	1	1.2J		1 (+13)		0	E0	P101		MP23					1	W2		CW1	1.2J			
0396	ROCKET MOTORS, LIQUID FUELLED	1	1.3J		1 (+13)		0	E0	P101		MP23					1	W2		CW1	1.3J			
0397	ROCKETS, LIQUID FUELLED with bursting charge	1	1.1J		1 (+13)		0	E0	P101		MP23					1	W2		CW1	1.1J			
0398	ROCKETS, LIQUID FUELLED with bursting charge	1	1.2J		1 (+13)		0	E0	P101		MP23					1	W2		CW1	1.2J			
0399	BOMBS WITH FLAMMABLE LIQUID with bursting charge	1	1.1J		1 (+13)		0	E0	P101		MP23					1	W2		CW1	1.1J			
0400	BOMBS WITH FLAMMABLE LIQUID with bursting charge	1	1.2J		1 (+13)		0	E0	P101		MP23					1	W2		CW1	1.2J			
0401	DIPICRYL SULPHIDE, dry or wetted with less than 10% water, by mass	1	1.1D		1 (+13)		0	E0	P112a P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0402	AMMONIUM PERCHLORATE	1	1.1D		1 (+13)	152	0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0403	FLARES, AERIAL	1	1.4G		1.4		0	E0	P135		MP23					2	W2		CW1	1.4G			
0404	FLARES, AERIAL	1	1.4S		1.4		0	E0	P135		MP23					4	W2		CW1	1.4S			
0405	CARTRIDGES, SIGNAL	1	1.4S		1.4		0	E0	P135		MP23 MP24					4	W2		CW1	1.4S			
0406	DINITROBENZENE	1	1.3C		1 (+13)		0	E0	P114b		MP20					1	W2 W3		CW1	1.3C			
0407	TETRAZOL-1-ACETIC ACID	1	1.4C		1.4		0	E0	P114b		MP20					2	W2		CW1	1.4C			
0408	FUZES, DETONATING with protective features	1	1.1D		1 (+13)		0	E0	P141		MP21					1	W2		CW1	1.1D			
0409	FUZES, DETONATING with protective features	1	1.2D		1		0	E0	P141		MP21					1	W2		CW1	1.2D	189		
0410	FUZES, DETONATING with protective features	1	1.4D		1.4		0	E0	P141		MP21					2	W2		CW1	1.4D			
0411	PENTAERYTHRITOL TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN) with not less than 7% wax, by mass	1	1.1D		1 (+15)	131	0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0412	CARTRIDGES FOR WEAPONS with bursting charge	1	1.4E		1.4		0	E0	P130 LP101	PP67 L1	MP21					2	W2		CW1	1.4E			
0413	CARTRIDGES FOR WEAPONS, BLANK	1	1.2C		1		0	E0	P130 LP101		MP22					1	W2		CW1	1.2C			
0414	CHARGES, PROPELLING, FOR CANNON	1	1.2C		1		0	E0	P130 LP101		MP22					1	W2		CW1	1.2C			
0415	CHARGES, PROPELLING	1	1.2C		1		0	E0	P143	PP76	MP22					1	W2		CW1	1.2C			
0417	CARTRIDGES FOR WEAPONS, INERT PROJECTILE or CARTRIDGES, SMALL ARMS	1	1.3C		1		0	E0	P130 LP101		MP22					1	W2		CW1	1.3C			
0418	FLARES, SURFACE	1	1.1G		1 (+13)		0	E0	P135		MP23					1	W2		CW1	1.1G			
0419	FLARES, SURFACE	1	1.2G		1		0	E0	P135		MP23					1	W2		CW1	1.2G			
0420	FLARES, AERIAL	1	1.1G		1 (+13)		0	E0	P135		MP23					1	W2		CW1	1.1G			
0421	FLARES, AERIAL	1	1.2G		1		0	E0	P135		MP23					1	W2		CW1	1.2G			
0424	PROJECTILES, inert with tracer	1	1.3G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.3G			
0425	PROJECTILES, inert with tracer	1	1.4G		1.4		0	E0	P130 LP101	PP67 L1	MP23					2	W2		CW1	1.4G			
0426	PROJECTILES with burster or expelling charge	1	1.2F		1 (+13)		0	E0	P130 LP101		MP23					1	W2		CW1	1.2F			
0427	PROJECTILES with burster or expelling charge	1	1.4F		1.4		0	E0	P130 LP101		MP23					2	W2		CW1	1.4F			
0428	ARTICLES, PYROTECHNIC for technical purposes	1	1.1G		1 (+13)		0	E0	P135		MP23 MP24					1	W2		CW1	1.1G			
0429	ARTICLES, PYROTECHNIC for technical purposes	1	1.2G		1		0	E0	P135		MP23 MP24					1	W2		CW1	1.2G			
0430	ARTICLES, PYROTECHNIC for technical purposes	1	1.3G		1		0	E0	P135		MP23 MP24					1	W2		CW1	1.3G			
0431	ARTICLES, PYROTECHNIC for technical purposes	1	1.4G		1.4		0	E0	P135		MP23 MP24					2	W2		CW1	1.4G			
0432	ARTICLES, PYROTECHNIC for technical purposes	1	1.4S		1.4		0	E0	P135		MP23 MP24					4	W2		CW1	1.4S			
0433	POWDER CAKE (POWDER PASTE), WETTED with not less than 17% alcohol, by mass	1	1.1C		1 (+13)	266	0	E0	P111		MP20					1	W2		CW1	1.1C			
0434	PROJECTILES with burster or expelling charge	1	1.2G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.2G			
0435	PROJECTILES with burster or expelling charge	1	1.4G		1.4		0	E0	P130 LP101	PP67 L1	MP23					2	W2		CW1	1.4G			
0436	ROCKETS with expelling charge	1	1.2C		1		0	E0	P130 LP101	PP67 L1	MP22					1	W2		CW1	1.2C			
0437	ROCKETS with expelling charge	1	1.3C		1		0	E0	P130 LP101	PP67 L1	MP22					1	W2		CW1	1.3C			
0438	ROCKETS with expelling charge	1	1.4C		1.4		0	E0	P130 LP101	PP67 L1	MP22					2	W2		CW1	1.4C			
0439	CHARGES, SHAPED, without detonator	1	1.2D		1		0	E0	P137	PP70	MP21					1	W2		CW1	1.2D	189		
0440	CHARGES, SHAPED, without detonator	1	1.4D		1.4		0	E0	P137	PP70	MP21					2	W2		CW1	1.4D			
0441	CHARGES, SHAPED, without detonator	1	1.4S		1.4	347	0	E0	P137	PP70	MP23					4	W2		CW1	1.4S			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0442	CHARGES, EXPLOSIVE, COMMERCIAL without detonator	1	1.1D		1 (+13)		0	E0	P137		MP21					1	W2		CW1	1.1D	192		
0443	CHARGES, EXPLOSIVE, COMMERCIAL without detonator	1	1.2D		1		0	E0	P137		MP21					1	W2		CW1	1.2D			
0444	CHARGES, EXPLOSIVE, COMMERCIAL without detonator	1	1.4D		1.4		0	E0	P137		MP21					2	W2		CW1	1.4D			
0445	CHARGES, EXPLOSIVE, COMMERCIAL without detonator	1	1.4S		1.4	347	0	E0	P137		MP23					4	W2		CW1	1.4S			
0446	CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	1	1.4C		1.4		0	E0	P136		MP22					2	W2		CW1	1.4C			
0447	CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	1	1.3C		1		0	E0	P136		MP22					1	W2		CW1	1.3C			
0448	5-MERCAPTOTETRAZOL-1-ACETIC ACID	1	1.4C		1.4		0	E0	P114b		MP20					2	W2		CW1	1.4C			
0449	TORPEDOES, LIQUID FUELLED with or without bursting charge	1	1.1J		1 (+13)		0	E0	P101		MP23					1	W2		CW1	1.1J			
0450	TORPEDOES, LIQUID FUELLED with inert head	1	1.3J		1 (+13)		0	E0	P101		MP23					1	W2		CW1	1.3J			
0451	TORPEDOES with bursting charge	1	1.1D		1 (+13)		0	E0	P130 LP101	PP67 L1	MP21					1	W2		CW1	1.1D			
0452	GRENADES, PRACTICE, hand or rifle	1	1.4G		1.4		0	E0	P141		MP23					2	W2		CW1	1.4G			
0453	ROCKETS, LINE-THROWING	1	1.4G		1.4		0	E0	P130 LP101		MP23					2	W2		CW1	1.4G			
0454	IGNITERS	1	1.4S		1.4		0	E0	P142		MP23					4	W2		CW1	1.4S			
0455	DETONATORS, NON-ELECTRIC for blasting	1	1.4S		1.4	347	0	E0	P131	PP68	MP23					4	W2		CW1	1.4S			
0456	DETONATORS, ELECTRIC for blasting	1	1.4S		1.4	347	0	E0	P131		MP23					4	W2		CW1	1.4S			
0457	CHARGES, BURSTING, PLASTICS BONDED	1	1.1D		1 (+13)		0	E0	P130 LP101		MP21					1	W2		CW1	1.1D			
0458	CHARGES, BURSTING, PLASTICS BONDED	1	1.2D		1		0	E0	P130		MP21					1	W2		CW1	1.2D			
0459	CHARGES, BURSTING, PLASTICS BONDED	1	1.4D		1.4		0	E0	P130 LP101		MP21					2	W2		CW1	1.4D			
0460	CHARGES, BURSTING, PLASTICS BONDED	1	1.4S		1.4	347	0	E0	P130 LP101		MP23					4	W2		CW1	1.4S			
0461	COMPONENTS, EXPLOSIVE TRAIN, N.O.S..	1	1.1B		1 (+13)	178 274	0	E0	P101		MP2					1	W2		CW1	1.1B			
0462	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1C		1 (+13)	178 274	0	E0	P101		MP2					1	W2		CW1	1.1C			
0463	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1D		1 (+13)	178 274	0	E0	P101		MP2					1	W2		CW1	1.1D			
0464	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1E		1 (+13)	178 274	0	E0	P101		MP2					1	W2		CW1	1.1E			
0465	ARTICLES, EXPLOSIVE, N.O.S.	1	1.1F		1 (+13)	178 274	0	E0	P101		MP2					1	W2		CW1	1.1F			
0466	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2C		1	178 274	0	E0	P101		MP2					1	W2		CW1	1.2C			
0467	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2D		1	178 274	0	E0	P101		MP2					1	W2		CW1	1.2D			
0468	ARTICLES, EXPLOSIVE, N.O.S..	1	1.2E		1	178 274	0	E0	P101		MP2					1	W2		CW1	1.2E			

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0469	ARTICLES, EXPLOSIVE, N.O.S.	1	1.2F		1 (+13)	178 274	0	E0	P101		MP2					1	W2		CW1	1.2F			
0470	ARTICLES, EXPLOSIVE, N.O.S.	1	1.3C		1	178 274	0	E0	P101		MP2					1	W2		CW1	1.3C			
0471	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4E		1.4	178 274	0	E0	P101		MP2					2	W2		CW1	1.4E			
0472	ARTICLES, EXPLOSIVE, N.O.S.	1	1.4F		1.4	178 274	0	E0	P101		MP2					2	W2		CW1	1.4F			
0473	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1A	CARRIAGE PROHIBITED																			
0474	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1C		1 (+13)	178 274	0	E0	P101		MP2					1	W2 W3		CW1	1.1C			
0475	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1D		1 (+13)	178 274	0	E0	P101		MP2					1	W2 W3		CW1	1.1D			
0476	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.1G		1 (+13)	178 274	0	E0	P101		MP2					1	W2 W3		CW1	1.1G			
0477	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.3C		1 (+13)	178 274	0	E0	P101		MP2					1	W2 W3		CW1	1.3C			
0478	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.3G		1	178 274	0	E0	P101		MP2					1	W2 W3		CW1	1.3G			
0479	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4C		1.4	178 274	0	E0	P101		MP2					2	W2		CW1	1.4C			
0480	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4D		1.4	178 274	0	E0	P101		MP2					2	W2		CW1	1.4D			
0481	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4S		1.4	178 274	0	E0	P101		MP2					1	W2		CW1	1.4S			
0482	SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (SUBSTANCES, EVI),	1	1.5D		1.5	178 274	0	E0	P101		MP2					1	W2		CW1	1.5D			
0483	CYCLOTTRIMETHYLENETRINITRAMINE (CYCLONITE; HEXOGEN; RDX), DESENSITIZED	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0484	CYCLOTETRAMETHYLENE-TETRANITRAMINE (HMX; OCTOGEN), DESENSITIZED	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0485	SUBSTANCES, EXPLOSIVE, N.O.S.	1	1.4G		1.4	178 274	0	E0	P101		MP2					2	W2 W3		CW1	1.4G			
0486	ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI)	1	1.6N		1.6		0	E0	P101		MP23					2	W2		CW1	1.6N			
0487	SIGNALS, SMOKE	1	1.3G		1		0	E0	P135		MP23					1	W2		CW1	1.3G			
0488	AMMUNITION, PRACTICE	1	1.3G		1		0	E0	P130 LP101	PP67 L1	MP23					1	W2		CW1	1.3G			
0489	DINITROGLYCULURIL (DINGU)	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0490	NITROTRIAZOLONE (NTO)	1	1.1D		1 (+13)		0	E0	P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0491	CHARGES, PROPELLING	1	1.4C		1.4		0	E0	P143	PP76	MP22					2	W2		CW1	1.4C			

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0492	SIGNALS, RAILWAY TRACK,EXPLOSIVE	1	1.3G		1	0	E0		P135		MP23					1	W2		CW1	1.3G			
0493	SIGNALS, RAILWAY TRACK,EXPLOSIVE	1	1.4G		1.4	0	E0		P135		MP23					2	W2		CW1	1.4G			
0494	JET PERFORATING GUNS, CHARGED, oil well, without detonator	1	1.4D		1.4	0	E0		P101		MP21					2	W2		CW1	1.4D			
0495	EXPLOSIVE SUBSTANCES, PROPELLANT, LIQUID	1	1.3C		1 (+13)	224	0	E0	P115	PP53 PP54 PP57 PP58	MP20					1	W2		CW1	1.3C			
0496	OCTONAL	1	1.1D		1 (+13)	0	E0		P112b P112c		MP20					1	W2 W3		CW1	1.1D			
0497	EXPLOSIVE SUBSTANCES, PROPELLANT, LIQUID	1	1.1C		1 (+13)	224	0	E0	P115	PP53 PP54 PP57 PP58	MP20					1	W2		CW1	1.1C			
0498	EXPLOSIVE SUBSTANCES, PROPELLANT, SOLID	1	1.1C		1 (+13)	0	E0		P114b		MP20					1	W2		CW1	1.1C			
0499	EXPLOSIVE SUBSTANCES, PROPELLANT, SOLID	1	1.3C		1 (+13)	0	E0		P114b		MP20					1	W2		CW1	1.3C			
0500	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1	1.4S		1.4	347	0	E0	P131		MP23					4	W2		CW1	1.4S			
0501	EXPLOSIVE SUBSTANCES, PROPELLANT, SOLID	1	1.4C		1.4	0	E0		P114b		MP20					2	W2		CW1	1.4C			
0502	ROCKETS with inert head	1	1.2C		1	0	E0		P130 LP101	PP67 L1	MP22					1	W2		CW1	1.2C			
0503	SAFETY DEVICES, PYROTECHNIC	1	1.4G		1.4	235 289	0	E0	P135		MP23					2	W2		CW1	1.4G			
0504	1H-TETRAZOLE	1	1.1D		1 (+13)	0	E0		P112c	PP48	MP20					1	W2		CW1	1.1D			
0505	SIGNALS, DISTRESS, ship	1	1.4G		1.4	0	E0		P135		MP23 MP24					2	W2		CW1	1.4G			
0506	SIGNALS, DISTRESS, ship	1	1.4S		1.4	0	E0		P135		MP23 MP24					4	W2		CW1	1.4S			
0507	SIGNALS, SMOKE	1	1.4S		1.4	0	E0		P135		MP23 MP24					4	W2		CW1	1.4S			
0508	1-HYDROXY-BENZOTRIAZOLE, ANHYDROUS, dry or wetted with less than 20% water, by mass	1	1.3C		1 (+13)	0	E0		P114b	PP48 PP50	MP20					1	W2 W3		CW1	1.3C			
0509	POWDER, SMOKELESS	1	1.4C		1.4	0	E0		P114b	PP48	MP20					2	W2		CW1	1.4C			

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
0510	ROCKET MOTORS	1	1.4C		1.4		0	E0	P130 LP101	PP67 L1	MP22					2	W2		CW1	1.4C			
0511	DETONATORS, ELECTRONIC programmable for blasting	1	1.1B		1.4		0	E0	P131		MP23					1	W2		CW1	1.1B			
0512	DETONATORS, ELECTRONIC programmable for blasting	1	1.4B		1.4		0	E0	P131		MP23					2	W2		CW1	1.4B			
0513	DETONATORS, ELECTRONIC programmable for blasting	1	1.4S		1.4	347	0	E0	P131		MP23					4	W2		CW1	1.4S			
0514	FIRE SUPPRESSANT DISPERSING DEVICES	1	1.4S		1.4	407	0	E0	P135		MP23						4 (E)		W2		CV1 CV2 CV3	CW1	S1
1001	ACETYLENE, DISSOLVED	2	4F		2.1(+13)	662	0	E0	P200		MP9			PxBN(M)	TU17 TU38 TE22 TA4 TT9	2			CW9 CW10 CW36	239	204	3/0-0-1-0 3/1-1*-3-1	M2 M1
1002	AIR, COMPRESSED	2	1A		2.2(+13)	392 397 655 662	120 ml	E1	P200		MP9	(M)		CxBN(M)	TU50 TA4 TT9	3			CW9 CW10	20	201	0-0-1-0 0-0-3-0	M2 M1
1003	AIR, REFRIGERATED LIQUID	2	3O		2.2+ 5.1 (+13)		0	E0	P203		MP9	T75 TP5 TP22		RxBN	TU7 TU19 TA4 TT9 TM6	3	W5		CW9 CW11 CW30 CW36	225	202	0-0-1-0 0-0-3-0	M2 M1
1005	AMMONIA, ANHYDROUS	2	2TC		2.3+8(+13)	23	0	E0	P200		MP9	T50 (M)		PxBH(M)	TU38 TE22 TE25 TA4 TT8 TT9 TM6	1			CW9 CW10 CW36	268	208	0-0-1-0 0-0-3-0	M2 M1
1006	ARGON, COMPRESSED	2	1A		2.2(+13)	378	120 ml	E1	P200		MP9	(M)		CxBN(M)	TU50	3			CW9	20	201	0-0-1-0	M2

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21b)
						392 406 662									TA4 TT9				CW10 CW36			0-0-3-0	M1
1008	BORON TRIFLUORIDE	2	2TC		2.3+8 (+13)	373	0	E0	P200		MP9	(M)		PxBH(M)	TU38 TU50 TE22 TE25 TA4 TT9 TT10 TM6	1			CW9 CW10 CW36	268	203	0-0-1-0	M2
																						0-0-3-0	M1
1009	BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)	TP60	PxBN(M)	TM6 TA4 TT9 TU50	3			CW9 CW10 CW36	20	201	0-0-1-0	M2
																						0-0-3-0	M1
1010	BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 20% butadienes	2	2F		2.1 (+13)	386 402 618 662 676	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	239	206	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1011	BUTANE	2	2F		2.1 (+13)		0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1012	BUTYLENE	2	2F		2.1 (+13)	398 662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1013	CARBON DIOXIDE	2	2A		2.2 (+13)	378 392 406 662	120 ml	E1	P200		MP9	(M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0	M2
																						0-0-3-0	M1
1016	CARBON MONOXIDE, COMPRESSED	2	1TF		2.3+ 2.1 (+13)		0	E0	P200		MP9	(M)		CxBH(M)	TU38 TU50 TE22 TE25 TA4 TT9	1			CW9 CW10 CW36	263	207	3/1-1*-1-1 3/1-1*-3-1	M2 M1
1017	CHLORINE	2	2TOC		2.3+8		0	E0	P200		MP9	T50	TP19	P22DH(M)	TU38	1			CW9	265	203	1-1*-1-1	M1

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
					+5.1 (+13)							(M)			TE22 TE25 TA4 TT9 TT10 TM6				CW10 CW36 CW55 CW69			1-1*-3-1	M1
1018	CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1020	CHLOROPENTAFLUOROETHANE (REFRIGERANT GAS R 115)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1021	1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1022	CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1023	COAL GAS, COMPRESSED	2	1TF		2.3+ 2.1 (+13)		0	E0	P200		MP9	(M)		CxBH(M)	TU38 TU50 TE22 TE25 TA4 TT9	1			CW9 CW10 CW36	263	207	3/0-0-1-0 3/0-0-3-0	M2 M1
1026	CYANOGEN	2	2TF		2.3+ 2.1 (+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TU50 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	263	208	3/1-1-3-1	M1
1027	ЦандКЛОПРОПАН	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0 3/0-0-3-0	M2 M1
1028	DICHLORODIFLUOROMETHANE (REFRIGERANT GAS R 12)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1029	DICHLOROFLUOROMETHANE (REFRIGERANT GAS R 10)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
	GAS R 21)											(M)			TM6				CW10 CW36			0-0-3-0	M1
1030	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	205	3/0-0-1-0 3/0-0-3-0	M2 M1
1032	DIMETHYLAMINE, ANHYDROUS	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	208	3/0-0-1-0 3/0-0-3-0	M2 M1
1033	DIMETHYL ETHER	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0 3/0-0-3-0	M2 M1
1035	ETHANE	2	2F		2.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TU50 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0 3/0-0-3-0	M2 M1
1036	ETHYLAMINE	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	208	3/0-0-1-0 3/0-0-3-0	M2 M1
1037	ETHYL CHLORIDE	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	205	3/0-0-1-0 3/0-0-3-0	M2 M1
1038	ETHYLENE, REFRIGERATED LIQUID	2	3F		2.1 (+13)	TU18 TU38 TE22 TE26 TA4 TT9	0	E0	P203		MP9	T75	TP5	RxBN	TU18 TU38 TE22 TA4 TT9 TM6	2	W5		CW9 CW11 CW30 CW36 CW55 CW69	223	204	3/0-0-1-0 3/0-0-3-0	M2 M1
1039	ETHYL METHYL ETHER	2	2F		2.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0 3/0-0-3-0	M2 M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humpling
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21b)
1040	ETHYLENE OXIDE	2	2TF		2.3+ 2.1	342	0	E0	P200		MP9	(M)				1			CW9 CW10 CW36	263	207	3/0-0-1-0	M2
1040	ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at50 °C	2	2TF		2.3+ 2.1 (+13)	342	0	E0	P200		MP9	T50 (M)	TP20	PxBH(M)	TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	263	207	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1041	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% but not more than 87% ethylene oxide	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	239	206	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1043	FERTILIZER AMMONIATING SOLUTION with free ammonia	2	4A		2.2	642															208	0-0-3-0	M1
1044	FIRE EXTINGUISHERS with compressed or liquefied gas3	2	6A		2.2	225 594	120 ml	E0	P003	PP91	MP9					3			CW9	20	213	0-0-1-0	M2
1045	FLUORINE, COMPRESSED	2	1TOC		2.3+ 5.1+8		0	E0	P200		MP9					1			CW9 CW10 CW36	265	211	1-1*-1-1	M2
1046	HELIUM, COMPRESSED	2	1A		2.2(+13)	378 392 406 662	120 ml	E1	P200		MP9	(M)		CxBN(M)	TU50 TA4 TT9	3			CW9 CW10 CW36	20	201	0-0-1-0	M2
																						0-0-3-0	M1
1048	HYDROGEN BROMIDE, ANHYDROUSИ	2	2TC		2.3+8(+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TU50 TE22 TE25 TA4 TT9 TT10 TM6	1			CW9 CW10 CW36	268	203	0-0-1-0	M2
																						0-0-3-0	M1
1049	HYDROGEN, COMPRESSED	2	1F		2.1 (+13)	660 662	0	E0	P200		MP9	(M)		CxBN(M)	TU38 TU50 TE22 TT4 TT9	2			CW9 CW10 CW36	23	204	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1050	HYDROGEN CHLORIDE, ANHYDROUS	2	2TC		2.3+8(+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TU50	1			CW9 CW10	268	203	0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
															TE22 TE25 TA4 TT9 TT10 TM6				CW36			0-0-3-0	M1
1051	HYDROGEN CYANIDE, STABILIZED containing less than 3% water	6.1	TF1	I	6.1+3	386 603 676	0	E0	P200		MP2					0			CW13 CW28 CW31 CW47	663	602	3/0-0-3-0	M1
1052	HYDROGEN FLUORIDE, ANHYDROUS	8	CT1	I	8+6.1		0	E0	P200		MP2	T10	TP2	L21DH(+)	TU14 TU34 TU38 TC1 TE17 TE21 TE22 TE25 TA4 TT4 TT9 TM3	1			CW13 CW28 CW34	886	837	0-0-1-0 0-0-3-0	M2 M1
1053	HYDROGEN SULPHIDE	2	2TF		2.3+ 2.1 (+13)		0	E0	P200		MP9	(M)		PxDH(M)	TU38 TU50 TE22 TE25 TA4 TT9 TT10 TM6	1			CW9 CW10 CW36	263	209	0-0-1-0 0-0-3-0	M2 M1
1055	and3ObYTandIEH	2	2F		2.1(+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0 3/0-0-3-0	M2 M1
1056	KRYPTON, COMPRESSED	2	1A		2.2(+13)	662 392	120 ml	E1	P200		MP9	(M)		CxBN(M)	TU50 TA4 TT9	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1057	LIGHTERS or LIGHTER REFILLS containing flammable gas	2	6F		2.1	201 654 658	0	E0	P002	PP84 RR5	MP9					2			CW9	23	214	-	-
1058	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	2	2A		2.2(+13)	662 392	120 ml	E1	P200		MP9	(M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED such as mixture P1 or mixture P2	2	2F		2.1(+13)	386 581 662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9	2			CW9 CW10 CW36	239	206	3/0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
						602 676									TM6							3/0-0-3-0	M1
1061	METHYLAMINE, ANHYDROUS	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	208	3/0-0-1-0 3/0-0-3-0	M2 M1
1062	METHYL BROMIDE with not more than 2% chloropicrin	2	2T		2.3 (+13)	23	0	E0	P200		MP9	T50 (M)		PxBH(M)	TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	26	209	3/0-0-1-0 3/0-0-3-0	M2 M1
1063	METHYL CHLORIDE (REFRIGERANT GAS R 40)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	209	3/0-0-1-0 3/0-0-3-0	M2 M1
1064	METHYL MERCAPTAN	2	2TF		2.3+ 2.1 (+13)		0	E0	P200		MP9	T50 (M)		PxDH(M)	TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	263	209	3/1-1*-1-1 3/1-1*-3-1	M2 M1
1065	NEON, COMPRESSED	2	1A		2.2 (+13)	662 392	120 ml	E1	P200		MP9	(M)		CxBN(M)	TU50 TA4 TT9	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1066	NITROGEN, COMPRESSED	2	1A		2.2 (+13)	378 392 406 662	120 ml	E1	P200		MP9	(M)		CxBN(M)	TU50 TA4 TT9	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1067	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)	2	2TOC		2.3+ 5.1+8 (+13)		0	E0	P200		MP9	T50	TP21	PxBH(M)	TU17 TU38 TE22 TA4 TT9	1			CW9 CW10 CW36 CW47 CW55 CW69	265	211	1-1*-1-1 1-1*-3-1	M2 M1
1069	NITROSYL CHLORIDE	2	2TC		2.3+8		0	E0	P200		MP9					1			CW9 CW10 CW36	268	203	1-1-1-1	M1
1070	NITROUS OXIDE	2	2O		2.2+ 5.1 (+13)	584 662	0	E0	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9 TM6	3			CW9 CW10 CW36	25	202	0-0-1-0 0-0-3-0	M2 M1
1071	OIL GAS, COMPRESSED	2	1TF		2.3+ 2.1 (+13)		0	E0	P200		MP9	(M)		CxBH(M)	TU38 TU50	1			CW9 CW10	263	207	3/0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
															TE22 TE25 TA4 TT9				CW36			3/0-0-3-0	M1
1072	OXYGEN, COMPRESSED	2	1O		2.2+ 5.1 (+13)	355 655 662	0	E0	P200		MP9	(M)		CxBN(M)	TU50 TA4 TT9	3			CW9 CW10 CW36	25	202	0-0-1-0	M2
																					0-0-3-0	M1	
1073	OXYGEN, REFRIGERATED LIQUID	2	3O		2.2+ 5.1 (+13)		0	E0	P203		MP9	T75	TP5 TP22	RxBN	TU7 TU19 TA4 TT9 TM6	3	W5		CW9 CW11 CW30 CW36	225	202	0-0-1-0	M2
																					0-0-3-0	M1	
1075	PETROLEUM GASES, LIQUEFIED	2	2F		2.1 (+13)	274 583 639 660 662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0	M2
																					3/0-0-3-0	M1	
1076	PHOSGENE	2	2TC		2.3+8(+13)		0	E0	P200		MP9			P22DH (M)	TU17 TU38 TE22 TA4 TT9	1			CW9 CW10 CW36 CW47 CW55 CW58 CW69	268	203	1-1*-1-1	M1
																					1-1*-3-1	M1	
1077	PROPYLENE	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0	M2
																					3/0-0-3-0	M1	
1078	REFRIGERANT GAS, N.O.S., such as mixture F1, mixture F2 or mixture F3	2	2A		2.2 (+13)	274 582 662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	215	0-0-1-0	M2
																					0-0-3-0	M1	
1079	SULPHUR DIOXIDE	2	2TC		2.3+8 (+13)		0	E0	P200		MP9	T50 (M)	TP19	PxDH(M)	TU38 TE22 TE25 TA4 TT9 TT10 TM6	1			CW9 CW10 CW36	268	203	0-0-1-0	M2
																					0-0-3-0	M1	

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1080	SULPHUR HEXAFLUORIDE	2	2A		2.2 (+13)	662 392	120 ml	E1	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0	M2
																						0-0-3-0	M1
1081	TETRAFLUOROETHYLENE, STABILIZED	2	2F		2.1	386 662 676	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TU40 TE22 TA4 TT9	2			CW9 CW10 CW36	239	205	3/0-0-1-0	M2
1082	TRIFLUOROCHELOETHYLENE, STABILIZED (REFRIGERANT GAS R 1113)	2	2TF		2.3+ 2.1 (+13)	386 676	0	E0	P200		MP9	T50 (M)		PxBH(M)	TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	263	209	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1083	TRIMETHYLAMINE, ANHYDROUS	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	208	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1085	VINYL BROMIDE, STABILIZED	2	2F		2.1 (+13)	386 662 676	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	239	205	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1086	VINYL CHLORIDE, STABILIZED	2	2F		2.1 (+13)	386 662 676	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	239	205	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1087	VINYL METHYL ETHER, STABILIZED	2	2F		2.1 (+13)	386 662 676	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	239	206	3/1-1*-1-1	M2
																						3/1-1*-3-1	M1
1088	ACETAL	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1089	ACETALDEHYDE	3	F1	I	3		0	E0	P001		MP7 MP17	T11	TP2 TP7	L4BN	TU8	1				33	301	3/1-1*-1-1	M1
1090	ACETONE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1091	ACETONE OILS	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	307	3/0-0-1-0	M3
1092	ACROLEIN, STABILIZED	6.1	TF1	I	6.1+3	354 386 676	0	E0	P601		MP8 MP17	T22	TP2 TP7 TP35	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW55	663	650	3/0-0-1-0	-
1093	ACRYLONITRILE, STABILIZED	3	FT1	I	3+6.1	386 676	0	E0	P001		MP7 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	310	3/0-0-1-0	M3
1098	ALLYL ALCOHOL	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48 CW55	663	607	3/1-1*-1-1	M1
1099	ALLYL BROMIDE	3	FT1	I	3+6.1		0	E0	P001		MP7 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	312	3/0-0-1-0	M3
1100	ALLYL CHLORIDE	3	FT1	I	3+6.1		0	E0	P001		MP7 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	312	3/0-0-1-0	M3
1104	AMYL ACETATES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1105	PENTANOLS	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1 TP29	LGBF		2				33	306	3/0-0-1-0	M3
1105	PENTANOLS	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	306	3/0-0-1-0	M3
1106	AMYLAMINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
1106	AMandAMandH	3	FC	III	3+8		5I	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		3	W12			38	311	3/0-0-1-0	M3

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1107	AMYL CHLORIDE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
1108	1-PENTENE (n-AMYLENE)	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				33	301	3/0-0-1-0	M3
1109	AMYL FORMATES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1110	n-AMYL METHYL KETONE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1111	AMYL MERCAPTAN	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	304	3/0-0-1-0	M3
1112	AMYL NITRATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	326	3/0-0-1-0	M3
1113	AMYL NITRITE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	310	3/0-0-1-0	M3
1114	BENZENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	314	3/0-0-1-0	M3
1120	BUTANOLS	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1 TP29	LGBF		2				33	306	3/0-0-1-0	M3
1120	BUTANOLS	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	306	3/0-0-1-0	M3
1123	BUTYL ACETATES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1123	BUTYL ACETATES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	306	3/0-0-1-0	M3
1125	n-BUTYLAMINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
1126	1-BROMBUTANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1127	CHLOROBUTANES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
1128	n-BUTYL FORMATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1129	BUTYRALDEHYDE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1130	CAMPOR OIL	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
1131	CARBON DISULPHIDE	3	FT1	I	3+6.1		0	E0	P001	PP31	MP7 MP17	T14	TP2 TP7	L10CH	TU2 TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	304	3/1-1*-1-1 3/1-1*-3-1	M3 M1
1133	ADHESIVES containing flammable liquid	3	F1	I	3		500 ml	E3	P001		MP7 MP17	T11	TP1 TP8 TP27	L4BN		1				33	305	3/0-0-1-0	M3
1133	ADHESIVES containing flammable liquid (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5I	E2	P001	PP1	MP19	T4	TP1 TP8	L1,5BN		2				33	305	3/0-0-1-0	M3
1133	ADHESIVES containing flammable liquid (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	5I	E2	P001 IBC02 R001	PP1	MP19	T4	TP1 TP8	LGBF		2				33	305	3/0-0-1-0	M3
1133	ADHESIVES containing flammable liquid	3	F1	III	3	640E	5I	E1	P001 IBC03 LP01 R001	PP1	MP19	T2	TP1	LGBF		3	W12			30	305	3/0-0-1-0	M3
1133	ADHESIVES containing flammable liquid (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3		5I	E1	P001 R001	PP1	MP19					3				33	305	3/0-0-1-0	M3
1133	ADHESIVES containing flammable liquid (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5I	E1	P001 IBC02 R001	PP1 BB4	MP19					3				33	305	3/0-0-1-0	M3
1134	CHLOROBENZENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	318	3/0-0-1-0	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1135	ETHYLENE CHLOROHYDRIN	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	647	3/0-0-1-0	M2
1136	COAL TAR DISTILLATES, FLAMMABLE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
1136	COAL TAR DISTILLATES, FLAMMABLE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	305	3/0-0-1-0	M3
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining)	3	F1	I	3		500 ml	E3	P001		MP7 MP17	T11	TP1 TP8 TP27	L4BN		1				33	328	3/0-0-1-0	M3
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining) (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5I	E2	P001		MP19	T4	TP1 TP8	L1,5BN		2				33	328	3/0-0-1-0	M3
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	5I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	328	3/0-0-1-0	M3
1139	OATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining)	3	F1	III	3	640E	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	328	3/0-0-1-0	M3
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining) (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3		5I	E1	P001 R001		MP19					3				33	328	3/0-0-1-0	M3

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1139	COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining) (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5I	E1	P001 IBC02 R001	BB4	MP19					3				33	328	3/0-0-1-0	M3
1143	CROTONALDEHYDE or CROTONALDEHYDE, STABILIZED	6.1	TF1	I	6.1+3	324 354 386 676	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	663	650	3/1-1*-1-1	M2
1144	CROTONYLENE	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		2				339	301	3/1-1*-1-1	M3
1145	CYCLOHEXANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
1146	CYCLOPENTANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T7	TP1	LGBF		2				33	305	3/0-0-1-0	M3
1147	DECAHYDRO-NAPHTHALENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3
1148	DIACETONE ALCOHOL	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		3				33	316	3/0-0-1-0	M3
1148	DIACETONE ALCOHOL	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1149	DIBUTYL ETHERS	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1150	1,2-DICHLOROETHYLENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T7	TP2	LGBF		2				33	312	3/0-0-1-0	M3
1152	DICHLOROPENTANES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	324	3/0-0-1-0	M3
1153	ETHYLENE GLYCOL DIETHYL ETHER	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	316	3/0-0-1-0	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1153	ETHYLENE GLYCOL DIETHYL ETHER	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1154	DIETHYLAMINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	303	3/0-0-1-0	M3
1155	DIETHYL ETHER (ETHYL ETHER)	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				33	301	3/1-1*-1-1	M1
1156	DIETHYL KETONE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1157	DIISOBUTYL KETONE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1158	DIISOPROPYLAMINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
1159	DIISOPROPYL ETHER	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1160	DIMETHYLAMINE AQUEOUS SOLUTION	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
1161	DIMETHYL CARBONATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1162	DIMETHYLDICHLOROSILANE	3	FC	II	3+8		0	E0	P010		MP19	T10	TP2 TP7	L4BH		2			CW48	X338	321	3/1-1*-1-1	M3
1163	DIMETHYLHYDRAZINE, UNSYMMETRICAL	6.1	TFC	I	6.1+3+8	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW46 CW47 CW55 CW69	663	648	3/1-1*-1-1	M2/M1
1164	DIMETHYL SULPHIDE	3	F1	II	3		1I	E2	P001 IBC02	B8	MP19	T7	TP2	L1,5BN		2				33	304	3/0-0-1-0	M3
1165	DIOXANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1166	DIOXOLANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	320	3/0-0-1-0	M3
1167	DIVINYL ETHER, STABILIZED	3	F1	I	3	386 676	0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				339	301	3/1-1*-1-1	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1169	EXTRACTS, AROMATIC, LIQUID (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	601 640C	5I	E2	P001		MP19	T4	TP1 TP8	L1,5BN		2				33	328	3/0-0-1-0	M3
1169	EXTRACTS, AROMATIC, LIQUID (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	601 640D	5I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	328	3/0-0-1-0	M3
1169	EXTRACTS, AROMATIC, LIQUID	3	F1	III	3	601 640E	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	328	3/0-0-1-0	M3
1169	EXTRACTS, AROMATIC, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	601	5I	E1	P001 R001		MP19					3				33	328	3/0-0-1-0	M3
1169	EXTRACTS, AROMATIC, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	601	5I	E1	P001 IBC02 R001	BB4	MP19					3				33	328	3/0-0-1-0	M3
1170	ETHANOL (ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)	3	F1	II	3	144 601	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	308	3/0-0-1-0	M3
1170	ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)	3	F1	III	3	144 601	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	308	3/0-0-1-0	M3
1171	ETHYLENE GLYCOL MONOETHYL ETHER	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1172	ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1173	ETHYL ACETATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1175	ETHYLBENZENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	314	3/0-0-1-0	M3
1176	ETHYL BORATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1177	2-ETHYLBUTYL ACETATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humming 5.4.1 7.5.6
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1178	2-ETHYLBUTYRALDEHYDE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1179	ETHYL BUTYL ETHER	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1180	ETHYL BUTYRATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1181	ETHYL CHLOROACETATE	6.1	TF1	II	6.1+3		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	647	3/0-0-1-0	M3
1182	ETHYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	663	611	3/1-1*-1-1	M2
1183	ETHYLDICHLOROSILANE	4.3	WFC	I	4.3+3+8		0	E0	P401	RR7	MP2	T14	TP2 TP7	L10DH	TU14 TU23 TU38 TE21 TE22 TM2 TM3	0	W1		CW23 CW48	X338	431	3/1-1*-1-1	M1
1184	ETHYLENE DICHLORIDE	3	FT1	II	3+6.1		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	312	3/0-0-1-0	M3
1185	ETHYLENEIMINE, STABILIZED	6.1	TF1	I	6.1+3	354 386 676	0	E0	P601		MP2	T22	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW48 CW55	663	648	3/1-1*-1-1	M2
1188	ETHYLENE GLYCOL MONOMETHYL ETH	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1189	ЭФandP MOHOMETandIOBЫЙ ЭTandIEHglanDKOЯЯ and KандCIOTы UKCYSCHOЙ	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1190	ETHYL FORMATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humpin g
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1191	OCTYL ALDEHYDES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1192	ETHYL LACTATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1193	ETHYL METHYL KETONE (METHYL ETHYL KETONE))	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1194	ETHYL NITRITE SOLUTION	3	FT1	I	3+6.1		0	E0	P001		MP7 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	310	3/0-0-1-0	M3
1195	ETHYL PROPIONATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1196	ETHYLTRICHLOROSILANE	3	FC	II	3+8		0	E0	P010		MP19	T10	TP2 TP7	L4BH		2			CW48	X338	321	3/0-0-1-0	M3
1197	EXTRACTS, LIQUID, for flavour or aroma (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	601 640C	5I	E2	P001		MP19	T4	TP1 TP8	L1,5BN		2				33	328	3/0-0-1-0	M3
1197	EXTRACTS, LIQUID, for flavour or aroma (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	601 640D	5I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	328	3/0-0-1-0	M3
1197	EXTRACTS, LIQUID, for flavour or aroma	3	F1	III	3	601 640E	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	328	3/0-0-1-0	M3
1197	EXTRACTS, LIQUID, for flavour or aroma (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	601	5I	E1	P001 R001		MP19					3				33	328	3/0-0-1-0	M3
1197	EXTRACTS, LIQUID, for flavour or aroma (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	601	5I	E1	P001 IBC02 R001	BB4	MP19					3				33	328	3/0-0-1-0	M3
1198	FORMALDEHYDE SOLUTION, FLAMMABLE	3	FC	III	3+8		5I	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		3	W12			38	320	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1199	FURALDEHYDES	6.1	TF1	II	6.1+3		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	63	650	3/0-0-1-0	M3
1201	FUSEL OIL	3	F1	II	3		5l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1201	FUSEL OIL	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	307	3/0-0-1-0	M3
1202	AS OIL or DIESEL FUEL or HEATING OIL, LIGHT (flash-point not more than 60 °C)	3	F1	III	3	363 640K	5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
1202	DIESEL FUEL complying with standard EN 590:2004 or GAS OIL or HEATING OIL, LIGHT with a flash-point as specified in EN 590:2009 + AC:2010	3	F1	III	3	363 640L	5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
1202	GAS OIL or DIESEL FUEL or HEATING OIL, LIGHT (flash-point more than 60 °C and not more than 100 °C	3	F1	III	3	363 640M	5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBV		3	W12			30	315	3/0-0-1-0	M3
1203	MOTOR SPIRIT or GASOLINE or PETROL	3	F1	II	3	243 363 534	1l	E2	P001 IBC02 R001	BB2	MP19	T4	TP1	LGBF	TU9	2				33	305	3/0-0-1-0	M3
1204	NITROGLYCERIN SOLUTION IN ALCOHOL with not more than 1% nitroglycerin	3	D	II	3	28 601	1l	E0	P001 IBC02		MP2					2				33	308	3/0-0-1-0	M3
1206	HEPTANES	3	F1	II	3		1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
1207	HEXALDEHYDE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1208	HEXANES	3	F1	II	3		1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable	3	F1	I	3	163 367	500 ml	E3	P001		MP7 MP17	T11	TP1 TP8	L4BN		1				33	328	3/0-0-1-0	M3
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	163 367 640C	5l	E2	P001	PP1	MP19	T4	TP1 TP8	L1,5BN		2				33	328	3/0-0-1-0	M3
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	163 367 640D	5l	E2	P001 IBC02 R001	PP1	MP19	T4	TP1 TP8	LGBF		2				33	328	3/0-0-1-0	M3
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable	3	F1	III	3	163 367 640E	5l	E1	P001 IBC03 LP01 R001	PP1	MP19	T2	TP1	LGBF		3	W12			30	328	3/0-0-1-0	M3
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	163 367	5l	E1	P001 R001	PP1	MP19					3				33	328	3/0-0-1-0	M3
1210	PRINTING INK, flammable or PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	163 367	5l	E1	P001 IBC02 R001	PP1 BB4	MP19	T2	TP1	LGBF		3				33	328	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1212	ISOBUTANOL (ISOBUTYL ALCOHOL)	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1213	ISOBUTYL ACETATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1214	ISOBUTYLAMINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
1216	SOOCTENES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
1218	ISOPRENE, STABILIZED	3	F1	I	3	386 676	0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				339	304	3/0-0-1-0	M3
1219	ISOPROPANOL (ISOPROPYL ALCOHOL)	3	F1	II	3	601	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1220	ISOPROPYL ACETATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1221	ISOPROPYLAMINE	3	FC	I	3+8		0	E0	P001		MP7 MP17	T11	TP2	L10CH	TU14 TU38 TE21 TE22	1				338	303	3/0-0-1-0	M3
1222	ISOPROPYL NITRATE	3	F1	II	3		1I	E2	P001 IBC02 R001	B7	MP19					2			CW47 CW48	33	310	3/1-1*-1-1	M3
1223	KEROSENE	3	F1	III	3	363	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP2	LGBF		3	W12			30	305	3/0-0-1-0	M3
1224	KETONES, LIQUID, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	274 640C	1I	E2	P001		MP19	T7	TP1 TP8 TP28	L1,5BN		2				33	331	3/0-0-1-0	M3
1224	KETONES, LIQUID, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	274 640D	1I	E2	P001 IBC02 R001		MP19	T7	TP1 TP8 TP28	LGBF		2				33	331	3/0-0-1-0	M3
1224	KETONES, LIQUID, N.O.S.	3	F1	III	3	274	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	331	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1228	MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274	1I	E0	P001 IBC02		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28	336	332	3/0-0-1-0	M3
1228	ERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	274	5I	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BH	TU15	3	W12		CW13 CW28	36	332	3/0-0-1-0	M3
1229	MESITYL OXIDE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1230	METHANOL	3	FT1	II	3+6.1	279	1I	E2	P001 IBC02		MP19	T7	TP2	L4BH	TU15	2			CW13 CW28 CW48 CW49 CW55 CW59 CW69	336	319	3/0-0-1-0	M1
1231	METHYL ACETATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1233	METHYLAMYL ACETATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1234	METHYLAL	3	F1	II	3		1I	E2	P001 IBC02	B8	MP19	T7	TP2	L1,5BN		2				33	305	3/0-0-1-0	M3
1235	METHYLAMINE, AQUEOUS SOLUTION	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	303	3/0-0-1-0	M3
1237	METHYL BUTYRATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1238	METHYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8	354	0	E0	P602		MP8 MP17	T22	TP2 TP35	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW48 CW55	663	611	3/1-1*-1-1	M2
1239	METHYL CHLOROMETHYL ETHER	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T22	TP2 TP35	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW48 CW55	663	647	3/1-1*-1-1	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1242	METHYLDICHLOROSILANE	4.3	WFC	I	4.3+3+8		0	E0	P401	RR7	MP2	T14	TP2 TP7	L10DH	TU14 TU24 TU38 TE21 TE22 TM2 TM3	0	W1		CW23 CW48	X338	431	3/1-1*-1-1	M1
1243	METHYL FORMATE	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				33	301	3/0-0-1-0	M3
																						3/0-0-1-0	M1
1244	METHYLHYDRAZINE	6.1	TFC	I	6.1+3+8	354	0	E0	P602		MP8 MP17	T22	TP2 TP35	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31C W46 CW 47 CW48 CW55 CW69	663	648	3/1-1*-1-1	M2/M1
1245	METHYL ISOBUTYL KETONE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1246	METHYL ISOPROPENYL KETONE, STABILIZED	3	F1	II	3	386 676	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	307	3/1-1*-1-1	M3
1247	METHYL METHACRYLATE MONOMER, STABILIZED	3	F1	II	3	386 676	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	306	3/0-0-1-0	M3
1248	METHYL PROPIONATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1249	METHYL PROPYL KETONE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1250	METHYLTRICHLOROSILANE	3	FC	II	3+8		0	E0	P010		MP19	T10	TP2 TP7	L4BH		2			CW48	X338	321	3/0-0-1-0	M3
1251	METHYL VINYL KETONE, STABILIZED	6.1	TFC	I	6.1+3+8	354 386 676	0	E0	P601	RR7	MP8 MP17	T22	TP2 TP37	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW48 CW55	639	650	3/1-1*-1-1	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1259	NICKEL CARBONYL	6.1	TF1	I	6.1+3		0	E0	P601		MP2			L15CH	TU14 TU15 TU31 TU38 TE21 TE22 TE25 TM3	1			CW13 CW28 CW31 CW55	663	647	3/0-0-1-0	M2
1261	NITROMETHANE	3	F1	II	3		1I	E0	P001 R001	RR2	MP19					2				33	310	3/0-0-1-0	M3
1262	OCTANES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound)	3	F1	I	3	163 367 650	500 ml	E3	P001		MP7 MP17	T11	TP1 TP8 TP27	L4BN		1				33	305	3/0-0-1-0	M3
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound) (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	163 367 640C 650	5I	E2	P001	PP1	MP19	T4	TP1 TP8 TP28	L1,5BN		2				33	305	3/0-0-1-0	M3
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	163 367 640D 650	5I	E2	P001 IBC02 R001	PP1	MP19	T4	TP1 TP8 TP28	LGBF		2				33	305	3/0-0-1-0	M3
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL	3	F1	III	3	163 367 640E 650	5I	E1	P001 IBC03 LP01 R001	PP1	MP19	T2	TP1 TP29	LGBF		3	W12			30	305	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound) (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	163 367 650	5I	E1	P001 R001	PP1	MP19					3				33	305	3/0-0-1-0	M3
1263	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound) (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	163 367 650	5I	E1	P001 IBC02 R001	PP1 BB4	MP19					3				33	305	3/0-0-1-0	M3
1264	PARALDEHYDE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1265	PENTANES, liquid	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				33	301	3/0-0-1-0	M3
1265	PENTANES, liquid	3	F1	II	3		1I	E2	P001 IBC02	B8	MP19	T4	TP1	L1,5BN		2				33	301	3/0-0-1-0	M3
1266	PERFUMERY PRODUCTS with flammable solvents (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	163 640C	5I	E2	P001		MP19	T4	TP1 TP8	L1,5BN		2				33	308	3/0-0-1-0	M3
1266	PERFUMERY PRODUCTS with flammable solvents (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	163 640D	5I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	308	3/0-0-1-0	M3
1266	PERFUMERY PRODUCTS with flammable solvents	3	F1	III	3	163 640E	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	308	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1266	PERFUMERY PRODUCTS with flammable solvents (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3	163	5I	E1	P001 R001		MP19					3				33	308	3/0-0-1-0	M3
1266	PERFUMERY PRODUCTS with flammable solvents (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	163	5I	E1	P001 IBC02 R001	BB4	MP19					3				33	308	3/0-0-1-0	M3
1267	PETROLEUM CRUDE OIL	3	F1	I	3	357	500 ml	E3	P001		MP7 MP17	T11	TP1 TP8	L4BN		1				33	315	3/0-0-1-0	M3
1267	PETROLEUM CRUDE OIL (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	357 640C	1I	E2	P001		MP19	T4	TP1 TP8	L1,5BN		2				33	315	3/0-0-1-0	M3
1267	PETROLEUM CRUDE OIL (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	357 640D	1I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	315	3/0-0-1-0	M3
1267	PETROLEUM CRUDE OIL	3	F1	III	3	357	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	I	3	363	500 ml	E3	P001		MP7 MP17	T11	TP1 TP8	L4BN		1				33	328	3/0-0-1-0	M3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	363 640C	1I	E2	P001		MP19	T7	TP1 TP8 TP28	L1,5BN		2				33	328	3/0-0-1-0	M3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	363 640D	1I	E2	P001 IBC02 R001		MP19	T7	TP1 TP8 TP28	LGBF		2				33	328	3/0-0-1-0	M3
1268	PETROLEUM DISTILLATES, N.O.S. or PETROLEUM PRODUCTS, N.O.S.	3	F1	III	3	363	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		2	W12			30	328	3/0-0-1-0	M3
1272	PINE OIL	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
1274	n-PROPANOL (PROPYL ALCOHOL, NORMAL)	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1274	n-PROPANOL (PROPYL ALCOHOL, NORMAL)	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	307	3/0-0-1-0	M3
1275	PROPIONALDEHYDE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T7	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1276	n-PROPYL ACETATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1277	PROPYLAMINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
1278	1-CHLOROPROPANE	3	F1	II	3		1I	E0	P001 IBC02	B8	MP19	T7	TP2	L1,5BN		2				33	312	3/0-0-1-0	M3
1279	1,2-DICHLOROPROPANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
1280	PROPYLENE OXIDE	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2 TP7	L4BN		1				33	302	3/1-1*-1-1	M3
1281	PROPYL FORMATES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
1282	PYRIDINE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP2	LGBF		2				33	311	3/0-0-1-0	M3
1286	ROSIN OIL (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5I	E2	P001		MP19	T4	TP1	L1,5BN		2				33	307	3/0-0-1-0	M3
1286	ROSIN OIL (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	5I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
1286	ROSIN OIL	3	F1	III	3	640E	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	307	3/0-0-1-0	M3
1286	ROSIN OIL (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3		5I	E1	P001 R001		MP19					3				33	307	3/0-0-1-0	M3
1286	ROSIN OIL (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5I	E1	P001 IBC02 R001	BB4	MP19					3				33	307	3/0-0-1-0	M3
1287	RUBBER SOLUTION (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5I	E2	P001		MP19	T4	TP1 TP8	L1,5BN		2				33	305	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Handling
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1287	RUBBER SOLUTION (vapour pressure at 50 °C not more than 110 kPa))	3	F1	II	3	640D	5I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	305	3/0-0-1-0	M3
1287	RUBBER SOLUTION	3	F1	III	3	640E	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	305	3/0-0-1-0	M3
1287	RUBBER SOLUTION (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3		5I	E1	P001 R001		MP19					3				33	305	3/0-0-1-0	M3
1287	RUBBER SOLUTION (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5I	E1	P001 IBC02 R001	BB4	MP19					3				33	305	3/0-0-1-0	M3
1288	SHALE OIL	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	307	3/0-0-1-0	M3
1288	SHALE OIL	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	307	3/0-0-1-0	M3
1289	SODIUM METHYLATE SOLUTION in alcohol	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1 TP8	L4BH		2				338	319	3/0-0-1-0	M3
1289	SODIUM METHYLATE SOLUTION in alcohol	3	FC	III	3+8		5I	E1	P001 IBC02 R001		MP19	T4	TP1	L4BN		3				38	319	3/0-0-1-0	M3
1292	TETRAETHYL SILICATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
1293	TINCTURES, MEDICINAL	3	F1	II	3	601	1I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	328	3/0-0-1-0	M3
1293	TINCTURES, MEDICINAL	3	F1	III	3	601	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	328	3/0-0-1-0	M3
1294	TOLUENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	309	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1295	TRICHLOROSILANE	4.3	WFC	I	4.3+3+8		0	E0	P401	RR7	MP2	T14	TP2 TP7	L10DH	TU14 TU25 TU38 TE21 TE22 TM2 TM3	0	W1		CW23 CW48	X338	431	3/0-0-1-0	M1
1296	TRIETHYLAMINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
1297	TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	3	FC	I	3+8		0	E0	P001		MP7 MP17	T11	TP1	L10CH	TU14 TU38 TE21 TE22	1				338	311	3/0-0-1-0	M3
1297	TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
1297	TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	3	FC	III	3+8		5I	E1	P001 IBC03 R001		MP19	T7	TP1	L4BN		3	W12			38	311	3/0-0-1-0	M3
1298	TRIMETHYLCHLOROSILANE	3	FC	II	3+8		0	E0	P010		MP19	T10	TP2 TP7	L4BH		2			CW48	X338	321	3/0-0-1-0	M3
1299	TURPENTINE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
1300	TURPENTINE SUBSTITUTE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
1300	TURPENTINE SUBSTITUTE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	305	3/0-0-1-0	M3
1301	VINYL ACETATE, STABILIZED	3	F1	II	3	386 676	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	306	3/0-0-1-0	M3
1302	VINYL ETHYL ETHER, STABILIZED	3	F1	I	3	386 676	0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				339	301	3/1-1*-1-1	M3
1303	VINYLDENE CHLORIDE, STABILIZED	3	F1	I	3	386 676	0	E3	P001		MP7 MP17	T12	TP2 TP7	L4BN		1				339	312	3/0-0-1-0	M3
1304	VINYL ISOBUTYL ETHER, STABILIZED	3	F1	II	3	386 676	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	306	3/1-1*-1-1	M3
1305	VINYLTRICHLOROSILANE	3	FC	II	3+8		0	E0	P010		MP19	T10	TP2 TP7	L4BH		2			CW48	X338	321	3/1-1*-1-1	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humming 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1306	WOOD PRESERVATIVES, LIQUID (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	5I	E2	P001		MP19	T4	TP1 TP8	L1,5BN		2				33	328	3/0-0-1-0	M3
1306	WOOD PRESERVATIVES, LIQUID (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	640D	5I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	328	3/0-0-1-0	M3
1306	WOOD PRESERVATIVES, LIQUID	3	F1	III	3	640E	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	328	3/0-0-1-0	M3
1306	WOOD PRESERVATIVES, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C more than 110 kPa)	3	F1	III	3		5I	E1	P001 R001		MP19					3				33	328	3/0-0-1-0	M3
1306	WOOD PRESERVATIVES, LIQUID (having a flash-point below 23 °C and viscous according to 2.2.3.1.4) (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3		5I	E1	P001 IBC02 R001	BB4	MP19					3				33	328	3/0-0-1-0	M3
1307	XYLENES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	309	3/0-0-1-0	M3
1307	XYLENES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	309	3/0-0-1-0	M3
1308	ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID (vapour pressure at 50 °C more than 110 kPa)	3	F1	I	3		0	E0	P001	PP33	MP7 MP17			L4BN		1				33	328	3/0-0-1-0	M3
1308	ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID (vapour pressure at 50 °C not more than 110 kPa))	3	F1	II	3	640C	1I	E2	P001 R001	PP33	MP19			L1,5BN		2				33	328	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1308	ЦандРКОHandЙ, СУСПЕНДandРОВАHный В IEгKOBOCПAМЕНЯЮЩЕЙCЯ ЖандДКОCTand (давленанде паров пранд 50°C не более 110 кПа)	3	F1	II	3	640D	1I	E2	P001 R001	PP33	MP19			LGBF		2				33	328	3/0-0-1-0	M3
1308	ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID	3	F1	III	3		5I	E1	P001 R001		MP19			LGBF		3				30	328	3/0-0-1-0	M3
1309	ALUMINIUM POWDER, COATED	4.1	F3	II	4.1		1kg	E2	P002 IBC08	PP38 B4	MP11	T3	TP33	SGAN		2	W1			40	403	3/0-0-1-0	M3
1309	ALUMINIUM POWDER, COATED	4.1	F3	III	4.1		5kg	E1	P002 IBC08 LP02 R001	PP11 B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	403	3/0-0-1-0	M3
1310	AMMONIUM PICRATE, WETTED with not less than 10% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP26	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1312	BORNEOL	4.1	F1	III	4.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3	W1	VC1 VC2		40	402	3/0-0-1-0	M3
1313	CALCIUM RESINATE	4.1	F3	III	4.1		5kg	E1	P002 IBC06 R001		MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
1314	CALCIUM RESINATE, FUSED	4.1	F3	III	4.1		5kg	E1	P002 IBC04 R001		MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
1318	COBALT RESINATE, PRECIPITATED	4.1	F3	III	4.1		5kg	E1	P002 IBC06 R001		MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
1320	DINITROPHENOL, WETTED with not less than 15% water, by mass	4.1	DT	I	4.1+6.1	28	0	E0	P406	PP26	MP2					1	W1		CW28 CW70	46	404	3/0-0-1-0	M3
1321	DINITROPHENOLATES, WETTED with not less than 15% water, by mass	4.1	DT	I	4.1+6.1	28	0	E0	P406	PP26	MP2					1	W1		CW28 CW70	46	404	3/0-0-1-0	M3
1322	DINITRORESORCINOL, WETTED with not less than 15% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP26	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1323	FERROCERIUM	4.1	F3	II	4.1	249	1kg	E2	P002 IBC08	B4	MP11	T3	TP33	SGAN		2	W1			40	403	3/0-0-1-0	M3
1324	FILMS, NITROCELLULOSE BASE, gelatin coated, except scrap	4.1	F1	III	4.1		5kg	E1	P002 R001	PP15	MP11					3	W1			40	402	3/0-0-1-0	-
1325	FLAMMABLE SOLID, ORGANIC, N.O.S.	4.1	F1	II	4.1	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W1		CW54	40	401	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1325	FLAMMABLE SOLID, ORGANIC, N.O.S.	4.1	F1	III	4.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3	W1	VC1 VC2	CW54	40	401	3/0-0-1-0	M3
1326	HAFNIUM POWDER, WETTED with not less than 25% water	4.1	F3	II	4.1	586	1kg	E2	P410 IBC06	PP40	MP11	T3	TP33	SGAN		2	W1			40	403	3/0-0-1-0	M3
1327	Hay, Straw or Bhusa	4.1	F1	Not subject to the requirements of Annex 2 to SMGS except for special provisions of CW54 (See 7.5.11)																			
1328	HEXAMETHYLENETETRAMINE	4.1	F1	III	4.1		5kg	E1	P002 IBC08 R001	B3	MP10	T1	TP33	SGAV		3	W1	VC1 VC2		40	402	3/0-0-1-0	M3
1330	MANGANESE RESINATE	4.1	F3	III	4.1		5kg	E1	P002 IBC06 R001		MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
1331	MATCHES, 'STRIKE ANYWHERE'	4.1	F1	III	4.1	293	5kg	E0	P407	PP27	MP12					4	W1			40	402	3/0-0-1-0	-
1332	METALDEHYDE	4.1	F1	III	4.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3	W1	VC1 VC2		40	402	3/0-0-1-0	M3
1333	CERIUM, slabs, ingots or rods	4.1	F3	II	4.1		1kg	E2	P002 IBC08	B4	MP11					2	W1			40	403	3/0-0-1-0	M3
1334	NAPHTHALENE, CRUDE or NAPHTHALENE, REFINED	4.1	F1	III	4.1	501	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV		3	W1	VC1 VC2 AP1		40	402	3/0-0-1-0	M3
1336	NITROGUANIDINE (PICRITE), WETTED with not less than 20% water, by mass	4.1	D	I	4.1	28	0	E0	P406		MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1337	NITROSTARCH, WETTED with not less than 20% water, by mass	4.1	D	I	4.1	28	0	E0	P406		MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1338	PHOSPHORUS, AMORPHOUS	4.1	F3	III	4.1		5kg	E1	P410 IBC08 R001	B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
1339	PHOSPHORUS HEPTASULPHIDE, free from yellow and white phosphorus	4.1	F3	II	4.1	602	1kg	E2	P410 IBC04		MP11	T3	TP33	SGAN		2	W1			40	404	3/0-0-1-0	M3
1340	PHOSPHORUS PENTASULPHIDE, free from yellow and white phosphorus	4.3	WF2	II	4.3+4.1	602	500 g	E2	P410 IBC04		MP14	T3	TP33	SGAN		0	W1		CW23	423	409	3/0-0-1-0	M3
1341	PHOSPHORUS SESQUISULPHIDE, free from yellow and white phosphorus	4.1	F3	II	4.1	602	1kg	E2	P410 IBC04		MP11	T3	TP33	SGAN		2	W1			40	404	3/0-0-1-0	M3
1343	PHOSPHORUS TRISULPHIDE, free from yellow and white phosphorus	4.1	F3	II	4.1	602	1kg	E2	P410 IBC04		MP11	T3	TP33	SGAN		2	W1			40	404	3/0-0-1-0	M3
1344	TRINITROPHENOL (PICRIC ACID), WETTED with not less than 30% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP26	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1345	RUBBER SCRAP or RUBBER SHODDY, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45 %	4.1	F1	II	4.1		1kg	E2	P002 IBC08	B4	MP11	T3	TP33	SGAN		4	W1			40	402	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1346	SILICON POWDER, AMORPHOUS	4.1	F3	III	4.1	32	5kg	E1	P002 IBC08 LP02 R001	B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	403	3/0-0-1-0	M3
1347	SILVER PICRATE, WETTED with not less than 30% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP25 PP26	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1348	SODIUM DINITRO- <i>o</i> -CRESOLATE, WETTED with not less than 15% water, by mass	4.1	DT	I	4.1+6.1	28	0	E0	P406	PP26	MP2					1	W1		CW28 CW70	46	404	3/0-0-1-0	-
1349	SODIUM PICRAMATE, WETTED with not less than 20% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP26	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1350	SULPHUR	4.1	F3	III	4.1	242	5kg	E1	P002 IBC08 LP02 R001	B3	MP11	T1 BK1 BK2	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
1352	TITANIUM POWDER, WETTED with not less than 25% water	4.1	F3	II	4.1	586	1kg	E2	P410 IBC06	PP40	MP11	T3	TP33	SGAN		2	W1			40	403	3/0-0-1-0	M3
1353	FIBRES or FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	4.1	F1	III	4.1	502	5kg	E1	P410 IBC08 R001	B3	MP11					3	W1			40	402	3/0-0-1-0	M3
1354	TRINITROBENZENE, WETTED with not less than 30% water, by mass	4.1	D	I	4.1	28	0	E0	P406		MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1355	TRINITROBENZOIC ACID, WETTED with not less than 30% water, by mass	4.1	D	I	4.1	28	0	E0	P406		MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1356	TRINITROTOLUENE (TNT), WETTED with not less than 30% water, by mass	4.1	D	I	4.1	28	0	E0	P406		MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1357	UREA NITRATE, WETTED with not less than 20% water, by mass	4.1	D	I	4.1	28 227	0	E0	P406		MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1358	ZIRCONIUM POWDER, WETTED with not less than 25% water	4.1	F3	II	4.1	586	1kg	E2	P410 IBC06	PP40	MP11	T3	TP33	SGAN		2	W1			40	403	3/0-0-1-0	M3
1360	CALCIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1		0	E0	P403		MP2					1	W1		CW23 CW28	X462	408	0-0-1-0	-
1361	CARBON, animal or vegetable origin	4.2	S2	II	4.2		0	E0	P002 IBC06	PP12	MP14	T3	TP33	SGAN	TU11	2	W1 W13		CW48	40	405	3/0-0-1-0	M3
1361	CARBON, animal or vegetable origin	4.2	S2	III	4.2		0	E0	P002 IBC08 LP02 R001	PP12 B3	MP14	T1	TP33	SGAV		4	W1 W13	VC1 VC2 AP1	CW48	40	405	3/0-0-1-0	M3
1362	CARBON, ACTIVATED	4.2	S2	III	4.2	646	0	E1	P002 IBC08 LP02 R001	PP11 B3	MP14	T1	TP33	SGAV		4	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
1363	COPRA	4.2	S2	III	4.2		0	E0	P003 IBC08 LP02 R001	PP20 B3 B6	MP14					3	W1	VC1 VC2 AP1	CW54	40	405	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humming
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21b)
1364	COTTON WASTE, OILY	4.2	S2	III	4.2		0	E0	P003 IBC08 LP02 R001	PP19 B3 B6	MP14					3	W1	VC1 VC2 AP1	CW54	40	405	3/3-1-1-1	-
1365	COTTON, WET	4.2	S2	III	4.2		0	E0	P003 IBC08 LP02 R001	PP19 B3 B6	MP14					3	W1	VC1 VC2 AP1	CW54	40	405	3/3-1-1-1	-
1369	p-NITROSODIMETHYLANILINE	4.2	S2	II	4.2		0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
1372	Fibres, animal or fibres, vegetable burnt, wet or damp	4.2	S2		Not subject to the requirements of Annex 2 to SMGS																		
1373	FIBRES or FABRICS, ANIMAL or VEGETABLE or SYNTHETIC, N.O.S. with oilпропантантные мацлом	4.2	S2	III	4.2		0	E0	P410 IBC08 R001	B3	MP14	T1	TP33			3	W1	VC1 VC2 AP1		40	415	3/0-0-1-0	M3
1374	FISH MEAL (FISH SCRAP), UNSTABILIZED	4.2	S2	II	4.2	300	0	E2	P410 IBC08	B4	MP14	T3	TP33			2	W1			40	405	3/0-0-1-0	-
1376	IRON OXIDE, SPENT or IRON SPONGE, SPENT obtained from coal gas purification	4.2	S4	III	4.2	592	0	E0	P002 IBC08 LP02 R001	B3	MP14	T1 BK2	TP33	SGAV		3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
1378	METAL CATALYST, WETTED with a visible excess of liquid	4.2	S4	II	4.2	274	0	E0	P410 IBC01	PP39	MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
1379	PAPER, UNSATURATED OIL TREATED, incompletely dried (including carbon paper)	4.2	S2	III	4.2		0	E0	P410 IBC08 R001	B3	MP14					3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
1380	PENTABORANE	4.2	ST3	I	4.2+6.1		0	E0	P601		MP2			L21DH	TU14 TU38 TC1 TE21 TE22 TE25 TM1	0	W1		CW28	333	407	3/1-1*-1-1	M3
1381	PHOSPHORUS, WHITE or YELLOW, UNDER WATER	4.2	ST3	I	4.2+6.1	503	0	E0	P405		MP2	T9	TP3	L10DH(+)	TU14	0	W1		CW28	46	406	3/0-0-1-0	M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions 3.3	Limited and excepted quantities 3.4/ 3.5.1.2		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category 1.1.3.6	Special provisions for carriage			Hazard identification No. 5.3.2.3	Additional remarks in consignment note		
									Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4		Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11		Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21c)
	WATER or IN SOLUTION												TP31		TU16 TU21 TU38 TE3 TE21 TE22				CW48 CW66			3/1-1*-3-1	
1381	PHOSPHORUS, WHITE or YELLOW, DRY	4.2	ST4	I	4.2+6.1	503	0	E0	P405		MP2	T9	TP3 TP31	L10DH(+)	TU14 TU16 TU21 TU38 TE3 TE21 TE22	0	W1		CW28 CW48 CW66	46	406	3/0-0-1-0 3/1-1*-3-1	M1
1382	POTASSIUM SULPHIDE, ANHYDROUS or POTASSIUM SULPHIDE with less than 30% water of crystallization	4.2	S4	II	4.2	504	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	409	3/0-0-1-0	M3
1383	PYROPHORIC METAL, N.O.S. or PYROPHORIC ALLOY, N.O.S.	4.2	S4	I	4.2	274	0	E0	P404		MP13	T21	TP7 TP33			0	W1			43	415	3/0-0-1-0	M3
1384	SODIUM DITHIONITE (SODIUM HYDROSULPHITE)	4.2	S4	II	4.2		0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
1385	SODIUM SULPHIDE, ANHYDROUS or SODIUM SULPHIDE with less than 30% water of crystallization	4.2	S4	II	4.2	504	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	409	0-0-1-0	M3
1386	SEED CAKE with more than 1.5% oil and not more than 11% moisture	4.2	S2	III	4.2	300	0	E0	P003 IBC08 LP02 R001	PP20 B3 B6	MP14					3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
1387	Wool waste, wet	4.2	S2																				
1389	ALKALI METAL AMALGAM, LIQUID	4.3	W1	I	4.3	182	0	E0	P402	RR8	MP2			L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X323	421	0-0-1-0	M3
1390	ALKALI METAL AMIDES	4.3	W2	II	4.3	182 505	500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		0	W1		CW23	423	421	3/0-0-1-0	M3
1391	ALKALI METAL DISPERSION or ALKALINE EARTH METAL DISPERSION	4.3	W1	I	4.3	182 183 506	0	E0	P402	RR8	MP2	T13	TP2 TP7 42	L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X323	409	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1392	ALKALINE EARTH METAL AMALGAM, LIQUID	4.3	W1	I	4.3	183 506	0	E0	P402		MP2			L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X323	421	0-0-1-0	M3
1393	ALKALINE EARTH METAL ALLOY, N.O.S.	4.3	W2	II	4.3	183 506	500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1		CW23	423	421	3/0-0-1-0	M3
1394	ALUMINIUM CARBIDE	4.3	W2	II	4.3		500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	408	0-0-1-0	M3
1395	ALUMINIUM FERROSILICON POWDER	4.3	WT2	II	4.3+6.1		500g	E2	P410 IBC05	PP40	MP14	T3	TP33	SGAN		2	W1		CW23 CW28	462	408	3/0-0-1-0	M3
1396	ALUMINIUM POWDER, UNCOATED	4.3	W2	II	4.3		500g	E2	P410 IBC07	PP40	MP14	T3	TP33	SGAN		2	W1		CW23	423	409	0-0-1-0	M3
1396	ALUMINIUM POWDER, UNCOATED	4.3	W2	III	4.3		1kg	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		3	W1	VC2 AP4 AP5	CW23	423	409	0-0-1-0	M3
1397	ALUMINIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1	507	0	E0	P403		MP2					1	W1		CW23 CW28	X462	408	3/0-0-1-0	-
1398	ALUMINIUM SILICON POWDER, UNCOATED	4.3	W2	III	4.3	37	1kg	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		3	W1	VC2 AP4 AP5	CW23	423	409	0-0-1-0	M3
1400	BARIUM	4.3	W2	II	4.3		500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1		CW23	423	409	0-0-1-0	M3
1401	CALCIUM	4.3	W2	II	4.3		500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1		CW23	423	409	0-0-1-0	M3
1402	CALCIUM CARBIDE	4.3	W2	I	4.3		0	E0	P403 IBC04		MP2	T9		S2.65AN(+)	TU4 TU22 TM2 TA5	1	W1		CW23	X423	408	0-0-1-0	M3
1402	CALCIUM CARBIDE	4.3	W2	II	4.3		500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	408	0-0-1-0	M3
1403	CALCIUM CYANAMIDE with more than 0.1% calcium carbide	4.3	W2	III	4.3	38	1kg	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		0	W1		CW23	423	408	0-0-1-0	M3
1404	CALCIUM HYDRIDE	4.3	W2	I	4.3		0	E0	P403		MP2					1	W1		CW23	X423	408	0-0-1-0	M3
1405	CALCIUM SILICIDE	4.3	W2	II	4.3		500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	408	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1405	CALCIUM SILICIDE	4.3	W2	III	4.3		1kg	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	408	0-0-1-0	M3
1407	CAESIUM	4.3	W2	I	4.3		0	E0	P403 IBC04		MP2			L10CH(+)	TU2 TU14 TU38 TE5 TE21 TE22 TT3 TM2	1	W1		CW23	X423	409	0-0-1-0	M3
1408	FERROSILICON with 30% or more but less than 90% silicon	4.3	WT2	III	4.3+6.1	39 223	1kg	E1	P003 IBC08 R001	PP20 B4 B6	MP14	T1 BK2	TP33	SGAN		3	W1	VC1 VC2 AP3 AP4 AP5	CW23 CW28	462	408	0-0-1-0	M3
1409	METAL HYDRIDES, WATER-REACTIVE, N.O.S.	4.3	W2	I	4.3	274 508	0	E0	P403		MP2					1	W1		CW23	X423	421	3/0-0-1-0	M3
1409	METAL HYDRIDES, WATER-REACTIVE, N.O.S.	4.3	W2	II	4.3	274 508	500g	E2	P410 IBC04		MP14	T3	TP33	SGAN		2	W1		CW23	423	421	3/0-0-1-0	M3
1410	LITHIUM ALUMINIUM HYDRIDE	4.3	W2	I	4.3		0	E0	P403		MP2					1	W1		CW23	X423	409	0-0-1-0	M3
1411	LITHIUM ALUMINIUM HYDRIDE, ETHEREAL	4.3	WF1	I	4.3+3		0	E0	P402	RR8	MP2					1	W1		CW23	X323	407	3/0-0-1-0	M3
1413	LITHIUM BOROHYDRIDE	4.3	W2	I	4.3		0	E0	P403		MP2					1	W1		CW23	X423	409	0-0-1-0	M3
1414	LITHIUM HYDRIDE	4.3	W2	I	4.3		0	E0	P403		MP2					1	W1		CW23	X423	409	0-0-1-0	M3
1415	LITHIUM	4.3	W2	I	4.3		0	E0	P403 IBC04		MP2			L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X423	409	3/0-0-1-0	M3
1417	LITHIUM SILICON	4.3	W2	II	4.3		500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1		CW23	423	409	0-0-1-0	M3
1418	MAGNESIUM POWDER or MAGNESIUM ALLOYS POWDER	4.3	WS	I	4.3+4.2		0	E0	P403		MP2					1	W1		CW23	X423	409	3/0-0-1-0	M3
1418	MAGNESIUM POWDER or MAGNESIUM ALLOYS POWDER	4.3	WS	II	4.3+4.2		0	E2	P410 IBC05		MP14	T3	TP33	SGAN		2	W1		CW23	423	409	3/0-0-1-0	M3
1418	MAGNESIUM POWDER or MAGNESIUM ALLOYS POWDER	4.3	WS	III	4.3+4.2		0	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		3	W1	VC2 AP4 AP5	CW23	423	409	3/0-0-1-0	M3
1419	MAGNESIUM ALUMINIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1		0	E0	P403		MP2					1	W1		CW23 CW28	X462	408	3/0-0-1-0	-
1420	POTASSIUM METAL ALLOYS, LIQUID	4.3	W1	I	4.3		0	E0	P402		MP2			L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X323	409	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1421	ALKALI METAL ALLOY, LIQUID, N.O.S.	4.3	W1	I	4.3	182	0	E0	P402	RR8	MP2			L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X323	421	3/0-0-1-0	M3
1422	POTASSIUM SODIUM ALLOYS, LIQUID	4.3	W1	I	4.3		0	E0	P402		MP2	T9	TP3 TP7 TP31	L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X323	409	3/0-0-1-0	M3
1423	RUBIDIUM	4.3	W2	I	4.3		0	E0	P403 IBC04		MP2			L10CH(+)	TU2 TU14 TU38 TE5 TE21 TE22 TT3 TM2	1	W1		CW23	X423	409	0-0-1-0	M3
1426	SODIUM BOROHYDRIDE	4.3	W2	I	4.3		0	E0	P403		MP2					1	W1		CW23	X423	409	0-0-1-0	M3
1427	SODIUM HYDRIDE	4.3	W2	I	4.3		0	E0	P403		MP2					1	W1		CW23	X423	409	0-0-1-0	M3
1428	SODIUM	4.3	W2	I	4.3		0	E0	P403 IBC04		MP2	T9	TP7 TP33	L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X423	409	0-0-1-0	M3
1431	SODIUM METHYLATE	4.2	SC4	II	4.2+8		0	E2	P410 IBC05		MP14	T3	TP33	SGAN		2	W1			48	406	3/0-0-1-0	M3
1432	SODIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1		0	E0	P403		MP2					1	W1		CW23 CW28	X462	408	0-0-1-0	-
1433	STANNIC PHOSPHIDES	4.3	WT2	I	4.3+6.1		0	E0	P403		MP2					1	W1		CW23 CW28	X462	408	0-0-1-0	-
1435	ZINC ASHES	4.3	W2	III	4.3		1kg	E1	P002 IBC08 R001	B4	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	409	3/0-0-1-0	M3
1436	ZINC POWDER or ZINC DUST	4.3	WS	I	4.3+4.2		0	E0	P403		MP2					1	W1		CW23	X423	409	3/0-0-1-0	M3
1436	ZINC POWDER or ZINC DUST	4.3	WS	II	4.3+4.2		0	E2	P410 IBC07	PP40	MP14	T3	TP33	SGAN		2	W1		CW23	423	409	3/0-0-1-0	M3
1436	ZINC POWDER or ZINC DUST	4.3	WS	III	4.3+4.2		0	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		3	W1	VC2 AP4 AP5	CW23	423	409	3/0-0-1-0	M3
1437	ZIRCONIUM HYDRIDE	4.1	F3	II	4.1		1kg	E2	P410 IBC04	PP40	MP11	T3	TP33	SGAN		2	W1			40	409	3/0-0-1-0	M3
1438	ALUMINIUM NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1439	AMMONIUM DICHROMATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1442	AMMONIUM PERCHLORATE	5.1	O2	II	5.1	152	1kg	E2	P002 IBC06		MP2	T3	TP33			2	W11	VC1 VC2 AP6 AP7	CW24 CW47 CW48	50	501	3/1-1*-1-1	M1
1444	AMMONIUM PERSULPHATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1445	BARIUM CHLORATE, SOLID	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
1446	BARIUM NITRATE	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
1447	BARIUM PERCHLORATE, SOLID	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
1448	BARIUM PERMANGANATE	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
1449	BARIUM PEROXIDE	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
1450	BROMATES, INORGANIC, N.O.S.	5.1	O2	II	5.1	274 350	1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1451	CAESIUM NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1452	CALCIUM CHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1453	CALCIUM CHLORITE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	3/0-0-1-0	M3
1454	CALCIUM NITRATE	5.1	O2	III	5.1	208	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1455	CALCIUM PERCHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1456	CALCIUM PERMANGANATE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1457	CALCIUM PEROXIDE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	509	-	M3
1458	CHLORATE AND BORATE MIXTURE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1458	CHLORATE AND BORATE MIXTURE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP2	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1459	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE, SOLID	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1459	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE, SOLID	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP2	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1461	CHLORATES, INORGANIC, N.O.S.	5.1	O2	II	5.1	274 351	1kg	E2	P002 IBC06		MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1462	CHLORITES, INORGANIC, N.O.S..	5.1	O2	II	5.1	274 352 509	1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1463	CHROMIUM TRIOXIDE, ANHYDROUS	5.1	OTC	II	5.1+ 6.1+8	510	1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	568	502	-	M3
1465	DIDYMIUM NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1466	FERRIC NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1467	GUANIDINE NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1469	LEAD NITRATE	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
1470	LEAD PERCHLORATE, SOLID	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
1471	LITHIUM HYPOCHLORITE, DRY or LITHIUM HYPOCHLORITE MIXTURE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP10			SGAN	TU3	2	W11		CW24	50	501	-	M3
1471	LITHIUM HYPOCHLORITE, DRY or LITHIUM HYPOCHLORITE MIXTURE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3			CW24	50	501	-	M3
1472	LITHIUM PEROXIDE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	509	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1473	MAGNESIUM BROMATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1474	MAGNESIUM NITRATE	5.1	O2	III	5.1	332	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1475	MAGNESIUM PERCHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1476	MAGNESIUM PEROXIDE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	509	-	M3
1477	NITRATES, INORGANIC, N.O.S.	5.1	O2	II	5.1	511	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1477	NITRATES, INORGANIC, N.O.S.	5.1	O2	III	5.1	511	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1479	OXIDIZING SOLID, N.O.S.	5.1	O2	I	5.1	274	0	E0	P503 IBC05		MP2					1	W10		CW24	55	501	-	M3
1479	OXIDIZING SOLID, N.O.S.	5.1	O2	II	5.1	274	1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1479	OXIDIZING SOLID, N.O.S.	5.1	O2	III	5.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP2	T1	TP33	SGAN	TU3	3			CW24	50	501	-	M3
1481	PERCHLORATES, INORGANIC, N.O.S.	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1481	PERCHLORATES, INORGANIC, N.O.S.	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP2	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1482	PERMANGANATES, INORGANIC, N.O.S.	5.1	O2	II	5.1	274 353	1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1482	PERMANGANATES, INORGANIC, N.O.S.	5.1	O2	III	5.1	274 353	5kg	E1	P002 IBC08 LP02 R001	B3	MP2	T1	TP33	SGAN	TU3	3			CW24	50	501	-	M3
1483	PEROXIDES, INORGANIC, N.O.S.	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	509	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1483	PEROXIDES, INORGANIC, N.O.S.	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP2	T1	TP33	SGAN	TU3	3			CW24	50	509	-	M3
1484	POTASSIUM BROMATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1485	POTASSIUM CHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	3/1-1*-1-1	M1
1486	POTASSIUM NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1487	POTASSIUM NITRATE AND SODIUM NITRITE MIXTURE	5.1	O2	II	5.1	607	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1488	POTASSIUM NITRITE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1489	POTASSIUM PERCHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1490	POTASSIUM PERMANGANATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1491	POTASSIUM PEROXIDE	5.1	O2	I	5.1		0	E0	P503 IBC06		MP2					1	W10		CW24	55	509	-	M3
1492	POTASSIUM PERSULPHATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1493	SILVER NITRATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1494	SODIUM BROMATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1495	SODIUM CHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3 BK1 BK2	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1496	SODIUM CHLORITE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1498	SODIUM NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1499	SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1500	SODIUM NITRITE	5.1	OT2	III	5.1+6.1		5kg	E1	P002 IBC08 R001	B3	MP10	T1	TP33	SGAN	TU3	3			CW24 CW28	56	503	-	M3
1502	SODIUM PERCHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1503	SODIUM PERMANGANATE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1504	SODIUM PEROXIDE	5.1	O2	I	5.1		0	E0	P503 IBC05		MP2					1	W10		CW24 CW48	55	509	-	M3
1505	SODIUM PERSULPHATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1506	STRONTIUM CHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1507	STRONTIUM NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1508	STRONTIUM PERCHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1509	STRONTIUM PEROXIDE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	509	0-0-1-0	M3
1510	TETRANITROMETHANE	6.1	TO1	I	6.1+5.1	354 609	0	E0	P602		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	665	658	-	M3
1511	UREA HYDROGEN PEROXIDE	5.1	OC2	III	5.1+8		5kg	E1	P002 IBC08 R001	B3	MP2	T1	TP33	SGAN	TU3	3			CW24	58	507	-	M3
1512	ZINC AMMONIUM NITRITE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1513	ZINC CHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1514	ZINC NITRATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1515	ZINC PERMANGANATE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
1516	ZINC PEROXIDE	5.1	O2	II	5.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	509	-	M3
1517	ZIRCONIUM PICRAMATE, WETTED with not less than 20% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP26	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
1541	ACETONE CYANOHYDRIN, STABILIZED	6.1	T1	I	6.1	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	669	602	1-1*-1-1	M1
1544	ALKALOIDS, SOLID, N.O.S., or ALKALOID SALTS, SOLID, N.O.S.	6.1	T2	I	6.1	43 274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW60 CW61 CW64	66	620	0-0-1-0	M3
1544	ALKALOIDS, SOLID, N.O.S., or ALKALOID SALTS, SOLID, N.O.S.	6.1	T2	II	6.1	43 274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	620	-	M3
1544	ALKALOIDS, SOLID, N.O.S., or ALKALOID SALTS, SOLID, N.O.S.	6.1	T2	III	6.1	43 274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	3		VC1 VC2 AP7	CW13 CW28 CW31	60	620	-	M3
1545	ALLYL ISOTHIOCYANATE, STABILIZED	6.1	TF1	II	6.1+3	386 676	100 ml	E0	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	639	609	3/0-0-1-0	-
1546	AMMONIUM ARSENATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1547	ANILINE	6.1	T1	II	6.1	279	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	0-0-1-0	M3
1548	ANILINE HYDROCHLORIDE	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
1549	ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S.	6.1	T5	III	6.1	45 274 512	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1550	ANTIMONY LACTATE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	620	-	M3
1551	ANTIMONY POTASSIUM TARTRATE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	620	-	M3
1553	ARSENIC ACID, LIQUID	6.1	T4	I	6.1		0	E5	P001		MP8 MP17	T20	TP2 TP7	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	622	1-1*-1-1	M3
1554	ARSENIC ACID, SOLID	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1555	ARSENIC BROMIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1556	ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	6.1	T4	I	6.1	43 274	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	630	1-1*-1-1	M3
1556	ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	6.1	T4	II	6.1	43 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	630	-	M3
1556	ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	6.1	T4	III	6.1	43 274	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3
1557	ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	6.1	T5	I	6.1	43 274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU15 TU38 TE22	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	M3
1557	ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	6.1	T5	II	6.1	43 274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	-	M3
1557	ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	6.1	T5	III	6.1	43 274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3
1558	ARSENIC	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	617	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1559	ARSENIC PENTOXIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1560	ARSENIC TRICHLORIDE	6.1	T4	I	6.1		0	E0	P602		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	622	1-1*-1-1	M3
1561	ARSENIC TRIOXIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31 CW47 CW48	60	603	0-0-1-0	M1
1562	ARSENICAL DUST	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	617	-	-
1564	BARIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	177 274 513 587	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	-	M3
1564	BARIUM COMPOUND, N.O.S.	6.1	T5	III	6.1	177 274 513 587	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3
1565	BARIUM CYANIDE	6.1	T5	I	6.1		0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW46 CW47	66	619	0-0-1-0	M1
1566	BERYLLIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	274 514	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	-	-
1566	BERYLLIUM COMPOUND, N.O.S.	6.1	T5	III	6.1	274 514	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	-
1567	BERYLLIUM POWDER	6.1	TF3	II	6.1+4.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	64	617	3/0-0-1-0	-
1569	BROMOACETONE	6.1	TF1	II	6.1+3		0	E0	P602		MP15	T20	TP2	L4BH	TU15	2			CW13 CW28 CW31	63	647	3/0-0-1-0	-
1570	BRUCINE	6.1	T2	I	6.1	43	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	620	1-1*-1-1	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1571	BARIUM AZIDE, WETTED with not less than 50% water, by mass	4.1	DT	I	4.1+6.1	28 568	0	E0	P406		MP2					1	W1		CW28 CW70	46	404	3/0-0-1-0	M3
1572	CACODYLIC ACID	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1573	CALCIUM ARSENATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1574	CALCIUM ARSENATE AND CALCIUM ARSENITE MIXTURE, SOLID	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1575	CALCIUM CYANIDE	6.1	T5	I	6.1		0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW46 CW47	66	619	0-0-1-0	M1
1577	CHLORODINITROBENZENES, LIQUID	6.1	T1	II	6.1	279	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
1578	CHLORONITROBENZENES, SOLID	6.1	T2	II	6.1	279	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	616	-	-
1579	4-CHLORO-o-TOLUIDINE HYDROCHLORIDE, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
1580	CHLOROPICRIN	6.1	T1	I	6.1	354	0	E0	P601		MP8 MP17	T22	TP2 TP37	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW48	66	624	1-1*-1-1	M3
1581	CHLOROPICRIN AND METHYL BROMIDE MIXTURE with more than 2% chloropicrin	2	2T		2.3 (+13)		0	E0	P200		MP9	T50 (M)		PxBH(M)	TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	26	209	0-0-1-0 0-0-3-0	M2 M1
1582	CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	2	2T		2.3 (+13)		0	E0	P200		MP9	T50 (M)		PxBH(M)	TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	26	209	1-1-1-1 1-1-3-1	M2 M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1583	CHLOROPICRIN MIXTURE, N.O.S.	6.1	T1	I	6.1	274 315 515	0	E0	P602		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	624	1-1-1-1	M3
1583	CHLOROPICRIN MIXTURE, N.O.S.	6.1	T1	II	6.1	274 515	100 ml	E0	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31 CW48	60	624	1-1-1-1	M3
1583	CHLOROPICRIN MIXTURE, N.O.S.	6.1	T1	III	6.1	274 515	Sl	E0	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	624	1-1-1-1	M3
1585	COPPER ACETOARSENITE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1586	COPPER ARSENITE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1587	COPPER CYANIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31 CW46 CW47	60	619	0-0-1-0	M1
1588	ЦандАHandДЫ HEOPgAHandЧЕCKandE ТВЕРДЫЕ, Н.У.К.	6.1	T5	I	6.1	47 274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW60 CW61 CW64	66	619	1-1-1-1	M3
1588	CYANIDES, INORGANIC, SOLID, N.O.S.	6.1	T5	II	6.1	47 274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	619	1-1-1-1	M3
1588	CYANIDES, INORGANIC, SOLID, N.O.S.	6.1	T5	III	6.1	47 274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	619	1-1-1-1	M3
1589	CYANOGEN CHLORIDE, STABILIZED	2	2TC		2.3+8	386 676	0	E0	P200		MP9					1			CW9 CW10 CW36 CW46 CW47	268	203	3/1-1*-3-1	M1
1590	DICHLOROANILINES, LIQUID	6.1	T1	II	6.1	279	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humming
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1591	o-DICHLOROBENZENE	6.1	T1	III	6.1	279	5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
1593	DICHLOROMETHANE	6.1	T1	III	6.1	516	5l	E1	P001 IBC03 LP01 R001	B8	MP19	T7	TP2	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	M3
1594	DIETHYL SULPHATE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	611	-	-
1595	DIMETHYL SULPHATE	6.1	TC1	I	6.1+8	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	668	611	0-0-1-0	M3
1596	DINITROANILINES	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
1597	DINITROBENZENES, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
1597	DINITROBENZENES, LIQUID	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	-
1598	DINITRO-o-CRESOL	6.1	T2	II	6.1	43	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
1599	DINITROPHENOL SOLUTION	6.1	T1	II	6.1		100ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	M3
1599	DINITROPHENOL SOLUTION	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
1600	DINITROTOLUENES, MOLTEN	6.1	T1	II	6.1		0	E0				T7	TP3	L4BH	TU15	0			CW13 CW31	60	608	-	-
1601	DISINFECTANT, SOLID, TOXIC, N.O.S.	6.1	T2	I	6.1	274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU15 TU38 TE22	1	W10		CW13 CW28 CW31	66	634	1-1*-1-1	M3
1601	DISINFECTANT, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	634	-	M3
1601	DISINFECTANT, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	634	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1602	DYE, LIQUID, TOXIC, N.O.S. or DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	6.1	T1	I	6.1	274	0	E5	P001		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	615	1-1*-1-1	M3
1602	DYE, LIQUID, TOXIC, N.O.S. or DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	274	100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	615	-	M3
1602	DYE, LIQUID, TOXIC, N.O.S. or DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	274	5l	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	615	-	M3
1603	ETHYL BROMOACETATE	6.1	TF1	II	6.1+3		100 ml	E0	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	63	647	3/0-0-1-0	-
1604	ETHYLENEDIAMINE	8	CF1	II	8+3		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	807	0-0-1-0	M3
1605	ETHYLENE DIBROMIDE	6.1	T1	I	6.1	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	605	0-0-1-0	M3
1606	FERRIC ARSENATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1607	FERRIC ARSENITE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1608	FERROUS ARSENATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1611	HEXAETHYL TETRAPHOSPHATE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	614	-	-
1612	HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	2	1T		2.3 (+13)		0	E0	P200		MP9	(M)		CxBH(M)	TU38 TU50 TE22 TE25 TA4 TT9	1			CW9 CW10 CW36	26	209	0-0-3-0	M1
1613	HYDROCYANIC ACID, AQUEOUS SOLUTION with not more than 20% hydrogen cyanide	6.1	TF1	I	6.1+3	48	0	E0	P601		MP8 MP17	T14	TP2	L15DH(+)	TU14 TU15 TU38 TE21 TE22 TE25	0			CW13 CW28 CW31 CW47 CW58	663	602	3/0-0-3-0	M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1614	HYDROGEN CYANIDE, STABILIZED, containing less than 3% water and absorbed in a porous inert	6.1	TF1	I	6.1+3	386 603 676	0	E0	P099 P601	RR10	MP2					0			CW13 CW28 CW31 CW47 CW58	663	602	3/0-0-3-0	M1
1616	LEAD ACETATE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	620	-	M3
1617	LEAD ARSENATES	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1618	LEAD ARSENITES	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1620	LEAD CYANIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31 CW46 CW47	60	603	0-0-1-0	M1
1621	LONDON PURPLE	6.1	T5	II	6.1	43	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1622	MAGNESIUM ARSENATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1623	MERCURIC ARSENATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1624	MERCURIC CHLORIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31 CW46 CW47	60	603	0-0-1-0	-
1625	MERCURIC NITRATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1626	MERCURIC POTASSIUM CYANIDE	6.1	T5	I	6.1		0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW46	66	619	1-1*-1-1	M1
1627	MERCUROUS NITRATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1629	MERCURY ACETATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1630	MERCURY AMMONIUM CHLORIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1631	MERCURY BENZOATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1634	MERCURY BROMIDES	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1636	MERCURY CYANIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31 CW46 CW47	60	619	0-0-1-0	M1
1637	MERCURY GLUCONATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1638	MERCURY IODIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1639	MERCURY NUCLEATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1640	MERCURY OLEATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1641	MERCURY OXIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1642	MERCURY OXYCYANIDE, DESENSITIZED	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31 CW46 CW47	60	619	0-0-1-0	M1
1643	MERCURY POTASSIUM IODIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1644	MERCURY SALICYLATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1645	MERCURY SULPHATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1646	MERCURY THIOCYANATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1647	METHYL BROMIDE AND ETHYLENE DIBROMIDE MIXTURE, LIQUID	6.1	T1	I	6.1	354	0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	605	1-1*-1-1	M3
1648	ACETONITRILE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T7	TP2	LGBF		2				33	310	3/0-0-1-0	M3
1649	MOTOR FUEL ANTI-KNOCK MIXTURE	6.1	T3	I	6.1		0	E0	P602		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22 TT6	1			CW13 CW28 CW31 CW47 CW48 CW55	66	601	3/1-1-1-1	M1
1650	beta-NAPHTHYLAMINE, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
1651	NAPHTHYLTHIOUREA	6.1	T2	II	6.1	43	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	612	-	-
1652	NAPHTHYLUREA	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
1653	NICKEL CYANIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	619	-	-
1654	NICOTINE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	620	-	-
1655	NICOTINE COMPOUND, SOLID, N.O.S. or NICOTINE PREPARATION, SOLID, N.O.S.	6.1	T2	I	6.1	43 274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU15 TU38 TE22	1	W10 W 12		CW13 CW28 CW31	66	620	1-1*-1-1	M3
1655	NICOTINE COMPOUND, SOLID, N.O.S. or NICOTINE PREPARATION, SOLID, N.O.S.	6.1	T2	II	6.1	43 274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	620	-	M3
1655	NICOTINE COMPOUND, SOLID, N.O.S. or NICOTINE PREPARATION, SOLID, N.O.S.	6.1	T2	III	6.1	43 274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	620	-	M3
1656	NICOTINE HYDROCHLORIDE, LIQUID or NICOTINE HYDROCHLORIDE, SOLUTION	6.1	T1	II	6.1	43	100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	622	-	-
1656	NICOTINE HYDROCHLORIDE, LIQUID or NICOTINE HYDROCHLORIDE, SOLUTION	6.1	T1	III	6.1	43	SI	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	622	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humming
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1657	NICOTINE SALICYLATE	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	620	-	-
1658	NICOTINE SULPHATE, SOLUTION	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	622	-	-
1658	NICOTINE SULPHATE, SOLUTION	6.1	T1	III	6.1		SI	E1	P001 IBC03 LP01 R001		MP19	T7	TP2	L4BH	TU15	2	W12		CW13 CW28 CW31	60	622	-	-
1659	NICOTINE TARTRATE	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	620	-	-
1660	NITRIC OXIDE, COMPRESSED	2	1TOC		2.3+5.1 +8		0	E0	P200		MP9					1			CW9 CW10 CW36	265	203	1-1*-1-1	M2
1661	NITROANILINES (o-, m-, p-)	6.1	T2	II	6.1	279	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	M3
1662	NITROBENZENE	6.1	T1	II	6.1	279	100ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	M3
1663	NITROPHENOLS (o-, m-, p-)	6.1	T2	III	6.1	279	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
1664	NITROTOLUENES, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
1665	NITROXYLENES, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
1669	PENTACHLOROETHANE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	605	-	-
1670	PERCHLOROMETHYL MERCAPTAN	6.1	T1	I	6.1	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW46	66	612	1-1*-1-1	M3
1671	PHENOL, SOLID	6.1	T2	II	6.1	279	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
1672	PHENYLCARBYLAMINE CHLORIDE	6.1	T1	I	6.1		0	E0	P602		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW46	66	616	1-1*-1-1	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1673	PHENYLENEDIAMINES (o-, m-, p-)	6.1	T2	III	6.1	279	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
1674	PHENYLMERCURIC ACETATE	6.1	T3	II	6.1	43	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	619	-	-
1677	POTASSIUM ARSENATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1678	POTASSIUM ARSENITE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1679	POTASSIUM CUPROCYANIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	619	-	-
1680	POTASSIUM CYANIDE, SOLID	6.1	T5	I	6.1		0	E5	P002 IBC07	RR100 B100	MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW46 CW47	66	619	0-0-1-0	M1
1683	SILVER ARSENITE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1684	SILVER CYANIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31 CW46 CW47	60	603	0-0-1-0	M1
1685	SODIUM ARSENATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1686	SODIUM ARSENITE, AQUEOUS SOLUTION	6.1	T4	II	6.1	43	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	622	-	M3
1686	SODIUM ARSENITE, AQUEOUS SOLUTION	6.1	T4	III	6.1	43	5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP2	L4BH	TU15	2	W12		CW13 CW28 CW31	60	622	-	M3
1687	SODIUM AZIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10					2	W11		CW13 CW28 CW31	60	619	-	-
1688	SODIUM CACODYLATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1689	SODIUM CYANIDE, SOLID	6.1	T5	I	6.1		0	E5	P002 IBC07	RR100 B100	MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW46 CW47	66	619	0-0-1-0	M1
1690	SODIUM FLUORIDE, SOLID	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	603	-	M3
1691	STRONTIUM ARSENITE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1692	STRYCHNINE or STRYCHNINE SALTS	6.1	T2	I	6.1		0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW46 CW47	66	620	0-0-1-0	-
1693	TEAR GAS SUBSTANCE, LIQUID, N.O.S.	6.1	T1	I	6.1	274	0	E0	P001		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	615	0-0-1-0	-
1693	TEAR GAS SUBSTANCE, LIQUID, N.O.S.	6.1	T1	II	6.1	274	0	E0	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	615	0-0-1-0	-
1694	BROMOBENZYL CYANIDES, LIQUID	6.1	T1	I	6.1	138	0	E0	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW46	66	616	1-1*-1-1	-
1695	CHLOROACETONE, STABILIZED	6.1	TFC	I	6.1+3+8	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW47 CW48 CW55	663	606	3/0-0-1-0	-
1697	CHLOROACETOPHENONE, SOLID	6.1	T2	II	6.1		0	E0	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	616	0-0-1-0	-
1698	DIPHENYLAMINE CHLOROARSINE	6.1	T3	I	6.1		0	E0	P002		MP18	T6	TP33	S10AH	TU15	1			CW13 CW28 CW31	66	626	1-1*-1-1	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1699	DIPHENYLCHLOROARSINE, LIQUID	6.1	T3	I	6.1		0	E0	P001		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	617	1-1-1-1	-
1700	TEAR GAS CANDLES	6.1	TF4		6.1+4.1		0	E0	P600							2			CW13 CW28 CW31	64	639	3/0-0-1-0	-
1701	XYLYL BROMIDE, SOLID	6.1	T1	II	6.1		0	E0	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	605	-	-
1702	TETRACHLOROETHANE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	605	-	M3
1704	TETRAETHYL DITHIOPYROPHOSPHATE	6.1	T1	II	6.1	43	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	614	-	-
1707	THALLIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	43 274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	-	-
1708	TOLUIDINES, LIQUID	6.1	T1	II	6.1	279	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	616	-	M3
1709	2,4-TOLUYLENEDIAMINE, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
1710	TRICHLOROETHYLENE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	M3
1711	XYLIDINES, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	M3
1712	ZINC ARSENATE, ZINC ARSENITE or ZINC ARSENATE AND ZINC ARSENITE MIXTURE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
1713	ZINC CYANIDE	6.1	T5	I	6.1		0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW46 CW47	66	603	0-0-1-0	M1
1714	ZINC PHOSPHIDE	4.3	WT2	I	4.3+6.1		0	E0	P403		MP2					1	W1		CW23 CW28	X462	408	0-0-1-0	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1715	ACETIC ANHYDRIDE	8	CF1	II	8+3		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	803	3/0-0-1-0	M3
1716	ACETYL BROMIDE	8	C3	II	8		1I	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	803	-	M3
1717	ACETYL CHLORIDE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T8	TP2	L4BH		2				X338	323	3/0-0-1-0	M3
1718	BUTYL ACID PHOSPHATE	8	C3	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3
1719	CAUSTIC ALKALI LIQUID, N.O.S.	8	C5	II	8	274	1I	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				80	818	-	M3
1719	CAUSTIC ALKALI LIQUID, N.O.S.	8	C5	III	8	274	5I	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	818	-	M3
1722	ALLYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8		0	E0	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW58	668	611	1-1*-1-1	M3
1723	ALLYL IODIDE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP2	L4BH		2				338	323	3/0-0-1-0	M3
1724	ALLYLTRICHLOROSILANE, STABILIZED	8	CF1	II	8+3	386 676	0	E0	P010		MP15	T10	TP2 TP7	L4BN		2			CW48	X839	805	3/1-1*-1-1	M3
1725	ALUMINIUM BROMIDE, ANHYDROUS	8	C2	II	8	588	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	-	M3
1726	ALUMINIUM CHLORIDE, ANHYDROUS	8	C2	II	8	588	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	-	M3
1727	AMMONIUM HYDROGENDIFLUORIDE, SOLID	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	0-0-1-0	-
1728	AMYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	1-1*-1-1	M3
1729	ANISOYL CHLORIDE	8	C4	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	804	0-0-1-0	M3
1730	ANTIMONY PENTACHLORIDE, LIQUID	8	C1	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				X80	801	-	M3
1731	ANTIMONY PENTACHLORIDE SOLUTION	8	C1	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	-	M3
1731	ANTIMONY PENTACHLORIDE SOLUTION	8	C1	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3
1732	ANTIMONY PENTAFLUORIDE	8	CT1	II	8+6.1		1I	E0	P001 IBC02		MP15	T7	TP2	L4BN		2			CW13 CW28	86	801	0-0-1-0	M3
1733	ANTIMONY TRICHLORIDE	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	806	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1736	BENZOYL CHLORIDE	8	C3	II	8		1I	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	804	0-0-1-0	M3
1737	BENZYL BROMIDE	6.1	TC1	II	6.1+8		0	E4	P001 IBC02		MP15	T8	TP2	L4BH	TU15	2			CW13 CW28 CW31	68	647	-	-
1738	BENZYL CHLORIDE	6.1	TC1	II	6.1+8		0	E4	P001 IBC02		MP15	T8	TP2	L4BH	TU15	2			CW13 CW28 CW31	68	647	0-0-1-0	M3
1739	BENZYL CHLOROFORMATE	8	C9	I	8		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1				88	814	0-0-1-0	M3
1740	HYDROGENDIFLUORIDES, SOLID, N.O.S.	8	C2	II	8	517	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	815	-	M3
1740	HYDROGENDIFLUORIDES, SOLID, N.O.S.	8	C2	III	8	517	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	815	-	M3
1741	BORON TRICHLORIDE	2	2TC		2.3+8		0	E0	P200		MP9	(M)				1			CW9 CW10 CW36	268	203	0-0-3-0	M1
1742	BORON TRIFLUORIDE ACETIC ACID COMPLEX, LIQUID	8	C3	II	8		1I	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	803	-	M3
1743	BORON TRIFLUORIDE PROPIONIC ACID COMPLEX, LIQUID	8	C3	II	8		1I	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	803	-	M3
1744	BROMINE or BROMINE SOLUTION	8	CT1	I	8+6.1		0	E0	P804		MP2	T22	TP2 TP10	L21DH(+)	TU14 TU33 TU38 TC5 TE21 TE22 TE25 TT2 TM3 TM5	1			CW13 CW28	886	802	0-0-1-0	M3
1745	BROMINE PENTAFLUORIDE	5.1	OTC	I	5.1+6.1+8		0	E0	P200		MP2	T22	TP2	L10DH	TU3 TU38 TE16 TE22	1			CW24 CW28	568	504	0-0-1-0	M3
1746	BROMINE TRIFLUORIDE	5.1	OTC	I	5.1+6.1+8		0	E0	P200		MP2	T22	TP2	L10DH	TU3 TU38 TE16 TE22	1			CW24 CW28	568	504	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1747	BUTYLTRICHLOROSILANE	8	CF1	II	8+3		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2			CW48	X83	805	3/1-1*-1-1	M3
1748	CALCIUM HYPOCHLORITE, DRY or CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)	5.1	O2	II	5.1	314	1kg	E2	P002 IBC08	B4	MP10			SGAN	TU3	2	W11		CW24 CW35	50	501	-	M3
1748	CALCIUM HYPOCHLORITE, DRY or CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)	5.1	O2	III	5.1	316	5kg	E1	P002 IBC08 R001	B4 B13	MP10			SGAV	TU3	3			CW24 CW35	50	501	-	M3
1749	CHLORINE TRIFLUORIDE	2	2TOC		2.3+5.1+ 8(+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TU50 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW16 CW36	265	203	3/1-1*-1-1	M1
1750	CHLOROACETIC ACID SOLUTION	6.1	TC1	II	6.1+8		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	68	611	-	-
1751	CHLOROACETIC ACID, SOLID	6.1	TC2	II	6.1+8		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	68	611	-	-
1752	CHLOROACETYL CHLORIDE	6.1	TC1	I	6.1+8	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	668	611	1-1*-1-1	-
1753	CHLOROPHENYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1754	CHLOROSULPHONIC ACID (with or without sulphur trioxide)	8	C1	I	8		0	E0	P001		MP8 MP17	T20	TP2	L10BH	TU38 TE22	1				X88	801	0-0-1-0	M3
1755	CHROMIC ACID SOLUTION	8	C1	II	8	518	1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	801	-	M3
1755	CHROMIC ACID SOLUTION	8	C1	III	8	518	5l	E1	P001 IBC02 LP01 R001		MP19	T4	TP1	L4BN		3				80	801	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1756	CHROMIC FLUORIDE, SOLID	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	-	M3
1757	CHROMIC FLUORIDE SOLUTION	8	C1	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	-	M3
1757	CHROMIC FLUORIDE SOLUTION	8	C1	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3
1758	CHROMIUM OXYCHLORIDE	8	C1	I	8		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1				X88	801	0-0-1-0	M3
1759	CORROSIVE SOLID, N.O.S.	8	C10	I	8	274	0	E0	P002 IBC07		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1	W10			88	822	0-0-1-0	M3
1759	CORROSIVE SOLID, N.O.S.	8	C10	II	8	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	822	0-0-1-0	M3
1759	CORROSIVE SOLID, N.O.S.	8	C10	III	8	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	822	0-0-1-0	M3
1760	CORROSIVE LIQUID, N.O.S.	8	C9	I	8	274	0	E0	P001		MP8 MP17	T14	TP2 TP27	L10BH	TU38 TE22	1				88	823	0-0-1-0	M3
1760	CORROSIVE LIQUID, N.O.S.	8	C9	II	8	274	1l	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				80	823	0-0-1-0	M3
1760	CORROSIVE LIQUID, N.O.S.	8	C9	III	8	274	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	823	0-0-1-0	M3
1761	CUPRIETHYLENEDIAMINE SOLUTION	8	CT1	II	8+6.1		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2			CW13 CW28	86	807	0-0-1-0	M3
1761	CUPRIETHYLENEDIAMINE SOLUTION	8	CT1	III	8+6.1		5l	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BN		3	W12		CW13 CW28	86	807	0-0-1-0	M3
1762	CYCLOHEXYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1763	CYCLOHEXYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1764	DICHLOROACETIC ACID	8	C3	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	803	-	M3
1765	DICHLOROACETYL CHLORIDE	8	C3	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				X80	803	3/1-1*-1-1	M3
1766	DICHLOROPHENYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1767	DIETHYLDICHLOROSILANE	8	CF1	II	8+3		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2			CW48	X83	805	0-0-1-0	M3
1768	DIFLUOROPHOSPHORIC ACID, ANHYDROUS	8	C1	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	806	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergen cy card number	Minimum protective distance	Humpin g
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1769	DIPHENYLDICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1770	DIPHENYLMETHYL BROMIDE	8	C10	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	813	0-0-1-0	M3
1771	DODECYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1773	FERRIC CHLORIDE, ANHYDROUS	8	C2	III	8	590	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
1774	FIRE EXTINGUISHER CHARGES, corrosive liquid	8	C9	II	8		1l	E0	P001	PP4						2				80	823	-	M3
1775	FLUOROBORIC ACID	8	C1	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	-	M3
1776	FLUOROPHOSPHORIC ACID, ANHYDROUS	8	C1	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	806	-	M3
1777	FLUOROSULPHONIC ACID	8	C1	I	8		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1				88	801	0-0-1-0	M3
1778	FLUOROSILICIC ACID	8	C1	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	801	0-0-1-0	M3
1779	FORMIC ACID with more than 85% acid by mass	8	CF1	II	8+3		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	803	0-0-1-0	M3
1780	FUMARYL CHLORIDE	8	C3	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	803	-	M3
1781	HEXADECYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1782	HEXAFLUOROPHOSPHORIC ACID	8	C1	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	801	-	M3
1783	HEXAMETHYLENEDIAMINE SOLUTION	8	C7	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	807	-	M3
1783	HEXAMETHYLENEDIAMINE SOLUTION	8	C7	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3
1784	HEXYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1786	HYDROFLUORIC ACID AND SULPHURIC ACID MIXTURE	8	CT1	I	8+6.1		0	E0	P001		MP8 MP17	T10	TP2	L10DH	TU14 TU38 TE21 TE22	1			CW13 CW28	886	801	0-0-1-0	-
1787	HYDRIODIC ACID	8	C1	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	-	M3
1787	HYDRIODIC ACID	8	C1	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1788	HYDROBROMIC ACID	8	C1	II	8	519	1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	-	M3
1788	HYDROBROMIC ACID	8	C1	III	8	519	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3
1789	HYDROCHLORIC ACID	8	C1	II	8	520	1I	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	801	0-0-1-0	M3
1789	HYDROCHLORIC ACID	8	C1	III	8	520	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	0-0-1-0	M3
1790	HYDROFLUORIC ACID solution with more than 85% hydrofluoride	8	CT1	I	8+6.1	640I	0	E0	P802		MP2	T10	TP2	L21DH(+)	TU14 TU34 TU38 TC1 TE17 TE21 TE22 TE25 TA4 TT9 TM3	1			CW13 CW28 CW46	886	801	0-0-1-0	-
1790	HYDROFLUORIC ACID solution with more than 60% but not more than 85% hydrofluoride	8	CT1	I	8+6.1	640J	0	E0	P001	PP81	MP8 MP17	T10	TP2	L10DH	TU14 TU38 TE21 TE22	1			CW13 CW28 CW46	886	801	0-0-1-0	-
1790	HYDROFLUORIC ACID solution with not more than 60% hydrofluoride	8	CT1	II	8+6.1		1I	E2	P001 IBC02		MP15	T8	TP2	L4DH	TU14 TE17 TE21	2			CW13 CW28 CW46	86	801	0-0-1-0	-
1791	HYPOCHLORITE SOLUTION	8	C9	II	8	521	1I	E2	P001 IBC02	PP10 B5	MP15	T7	TP2 TP24	L4BV(+)	TE11	2				80	816	-	M3
1791	HYPOCHLORITE SOLUTION	8	C9	III	8	521	5I	E1	P001 IBC02 LP01 R001	B5	MP19	T4	TP2 TP24	L4BV(+)	TE11	3				80	816	-	M3
1792	IODINE MONOCHLORIDE, SOLID	8	C2	II	8		1kg	E0	P002 IBC08	B4	MP10	T7	TP2	SGAN L4BN		2	W11			80	802	-	M3
1793	ISOPROPYL ACID PHOSPHATE	8	C3	III	8		5I	E1	P001 IBC02 LP01 R001		MP19	T4	TP1	L4BN		3				80	803	-	M3

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1794	LEAD SULPHATE with more than 3% free acid	8	C2	II	8	591	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11	VC1 VC2 AP7		80	801	-	M3
1796	NITRATING ACID MIXTURE with more than 50% nitric acid	8	CO1	I	8+5.1		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TC6 TE22 TT1	1			CW24	885	802	0-0-1-0	M3
1796	NITRATING ACID MIXTURE with not more than 50% nitric acid	8	C1	II	8		1l	E0	P001 IBC02		MP15	T8	TP2	L4BN		2			CW24	80	802	0-0-1-0	M3
1798	NITRIC ACID AND NITROHYDROCHLORIC ACID MIXTURE	8	COT	CARRIAGE PROHIBITED																			
1799	NONYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1800	OCTADECYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1801	OCTYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
1802	PERCHLORIC ACID with not more than 50% acid, by mass	8	CO1	II	8+5.1	522	1l	E0	P001 IBC02		MP3	T7	TP2	L4BN		2			CW24	85	802	0-0-1-0	M3
1803	PHENOLSULPHONIC ACID, LIQUID	8	C3	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	804	0-0-1-0	M3
1804	PHENYLTRICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	0-0-1-0	M3
1805	PHOSPHORIC ACID, SOLUTION	8	C1	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	802	0-0-1-0	M3
1806	PHOSPHORUS PENTACHLORIDE	8	C2	II	8		1kg	E0	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	-	M3
1807	PHOSPHORUS PENTOXIDE	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	0-0-1-0	M3
1808	PHOSPHORUS TRIBROMIDE	8	C1	II	8		1l	E0	P001 IBC02		MP15	T7	TP2	L4BN		2				X80	801	-	M3
1809	PHOSPHORUS TRICHLORIDE	6.1	TC3	I	6.1+8	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	668	656	0-0-1-0	M3
1810	PHOSPHORUS OXYCHLORIDE	6.1	TC3	I	6.1+8	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	X668	656	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1811	POTASSIUM HYDROGENDIFLUORIDE, SOLID	8	CT2	II	8+6.1		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11		CW13 CW28	86	806	-	M3
1812	POTASSIUM FLUORIDE, SOLID	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	603	-	M3
1813	POTASSIUM HYDROXIDE, SOLID	8	C6	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	808	-	M3
1814	POTASSIUM HYDROXIDE SOLUTION	8	C5	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	809	-	M3
1814	POTASSIUM HYDROXIDE SOLUTION	8	C5	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	809	-	M3
1815	PROPIONYL CHLORIDE	3	FC	II	3+8		1l	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	323	3/0-0-1-0	M3
1816	PROPYLTRICHLOROSILANE	8	CF1	II	8+3		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X83	805	3/1-1*-1-1	M3
1817	PYROSULPHURYL CHLORIDE	8	C1	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				X80	803	-	M3
1818	SILICON TETRACHLORIDE	8	C1	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	801	0-0-1-0	M3
1819	SODIUM ALUMINATE SOLUTION	8	C5	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	809	-	M3
1819	SODIUM ALUMINATE SOLUTION	8	C5	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	809	-	M3
1823	SODIUM HYDROXIDE, SOLID	8	C6	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	808	-	M3
1824	SODIUM HYDROXIDE SOLUTION	8	C5	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	809	-	M3
1824	SODIUM HYDROXIDE SOLUTION	8	C5	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	809	-	M3
1825	SODIUM MONOXIDE	8	C6	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	808	-	M3
1826	NITRATING ACID MIXTURE, SPENT, with more than 50% nitric acid	8	CO1	I	8+5.1	113	0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1			CW24	885	802	0-0-1-0	M3
1826	NITRATING ACID MIXTURE, SPENT, with not more than 50% nitric acid	8	C1	II	8	113	1l	E0	P001 IBC02		MP15	T8	TP2	L4BN		2			CW24	80	802	0-0-1-0	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1827	STANNIC CHLORIDE, ANHYDROUS	8	C1	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				X80	801	1-1*-1-1	M3
1828	SULPHUR CHLORIDES	8	C1	I	8		0	E0	P602		MP8 MP17	T20	TP2	L10BH	TU38 TE22	1				X88	803	0-0-1-0	M3
1829	SULPHUR TRIOXIDE, STABILIZED	8	C1	I	8	386 623 676	0	E0	P001		MP8 MP17	T20	TP4 TP26	L10BH	TU32 TU38 TE13 TE22 TT5 TM3	1				X88	801	3/1-1*-1-1	M3
1830	SULPHURIC ACID with more than 51% acid	8	C1	II	8		1I	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	801	0-0-1-0	M3
1831	SULPHURIC ACID, FUMING	8	CT1	I	8+6.1		0	E0	P602		MP8 MP17	T20	TP2	L10BH	TU38 TE22	1			CW13 CW28 CW46	X886	802	0-0-1-0	M3
1832	SULPHURIC ACID, SPENT	8	C1	II	8	113	1I	E0	P001 IBC02		MP15	T8	TP2	L4BN		2				80	801	-	M3
1833	SULPHUROUS ACID	8	C1	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	0-0-1-0	M3
1834	SULPHURYL CHLORIDE	6.1	TC3	I	6.1.+8	354	0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	X668	656	0-0-1-0	M3
1835	TETRAMETHYLAMMONIUM HYDROXIDE AQUEOUS SOLUTION with more than 2.5% but less than 25% tetramethylammonium hydroxide	8	CT1	II	8 + 6.1	279 408	1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2			CW13 CW28	86	807	-	M3
1835	TETRAMETHYLAMMONIUM HYDROXIDE AQUEOUS SOLUTION with not more than 2.5% tetramethylammonium hydroxide	8	C7	III	8	408	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP2	L4BN		3	W12			80	807	-	M3
1836	THIONYL CHLORIDE	8	C1	I	8		0	E0	P802		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1				X88	803	0-0-1-0	M3
1837	THIOPHOSPHORYL CHLORIDE	8	C1	II	8		1I	E0	P001 IBC02		MP15	T7	TP2	L4BN		2				X80	803	-	M3
1838	TITANIUM TETRACHLORIDE	6.1	TC3	I	6.1.+8	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	X668	656	0-0-1-0	M3
1839	TRICHLOROACETIC ACID	8	C4	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	803	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note			
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping	
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3		4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)	
1840	ZINC CHLORIDE SOLUTION	8	C1	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3	
1841	ACETALDEHYDE AMMONIA	9	M11	III	9		5kg	E1	P002 IBC08 LP02 R001	B3 B6	MP10	T1	TP33	SGAV		3		VC1 VC2	CW31	90	905	-	-	
1843	AMMONIUM DINITRO-o-CRESOLATE, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-	
1845	Carbon dioxide, solid (dry ice)	9	M11	Not subject to the requirements of Annex 2 to SMGS , except for 5.5.3																				
1846	CARBON TETRACHLORIDE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	605	-	M3	
1847	POTASSIUM SULPHIDE, HYDRATED with not less than 30% water of crystallization	8	C6	II	8	523	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	808	0-0-1-0	M3	
1848	PROPIONIC ACID with not less than 10% and less than 90% acid by mass	8	C3	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3	
1849	SODIUM SULPHIDE, HYDRATED with not less than 30% water	8	C6	II	8	523	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	808	-	M3	
1851	MEDICINE, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	221 601	100 ml	E4	P001		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	622	-	M3	
1851	MEDICINE, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	221 601	5l	E1	P001 LP01 R001		MP19			L4BH	TU15	2			CW13 CW28 CW31	60	622	-	M3	
1854	BARIUM ALLOYS, PYROPHORIC	4.2	S4	I	4.2		0	E0	P404		MP13	T21	TP7 TP33			0	W1			43	405	3/0-0-1-0	M3	
1855	CALCIUM, PYROPHORIC or CALCIUM ALLOYS, PYROPHORIC	4.2	S4	I	4.2		0	E0	P404		MP13					0	W1			43	405	3/0-0-1-0	M3	
1856	Rags, oily	4.2	S2	Not subject to the requirements of Annex 2 to SMGS																				
1857	Textile waste, wet	4.2	S2	Not subject to the requirements of Annex 2 to SMGS																				
1858	HEXAFLUOROPROPYLENE (REFRIGERANT GAS R 1216)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1	
1859	SILICON TETRAFLUORIDE	2	2TC		2.3+8 (+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TU50	1			CW9 CW10	268	203	0-0-1-0	M2	

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
															1E22 TE25 TA4 TT9 TM6				CW36			0-0-3-0	M1
1860	VINYL FLUORIDE, STABILIZED	2	2F		2.1 (+13)	386 662 676	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TU50 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	239	205	3/0-0-1-0 3/0-0-3-0	M2 M1
1862	ETHYL CROTONATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP2	LGBF		2				33	306	3/0-0-1-0	M3
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	I	3	363	500 ml	E3	P001		MP7 MP17	T11	TP1 TP8 TP28	L4BN		1				33	305	3/0-0-1-0	M3
1863	FUEL, AVIATION, TURBINE ENGINE (vapour pressure more than 110 kPa at 50°C)	3	F1	II	3	363 640C	1I	E2	P001		MP19	T4	TP1 TP8	L1,5BN		2				33	305	3/0-0-1-0	M3
1863	FUEL, AVIATION, TURBINE ENGINE (vapour pressure not more than 110 kPa at 50°C)	3	F1	II	3	363 640D	1I	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	305	3/0-0-1-0	M3
1863	FUEL, AVIATION, TURBINE ENGINE	3	F1	III	3	363	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	305	3/0-0-1-0	M3
1865	n-PROPYL NITRATE	3	F1	II	3		1I	E2	P001 IBC02 R001	B7	MP19					2				33	310	3/0-0-1-0	M3
1866	RESIN SOLUTION, flammable	3	F1	I	3		500 ml	E3	P001		MP7 MP17	T11	TP1 TP8 TP28	L4BN		1				33	328	3/0-0-1-0	M3
1866	RESIN SOLUTION, flammable (vapour pressure exceeding 110 kPa at 50°C)	3	F1	II	3	640C	5I	E2	P001	PP1	MP19	T4	TP1 TP8	L1,5BN		2				33	328	3/0-0-1-0	M3
1866	RESIN SOLUTION, flammable (vapour pressure not exceeding 110 kPa at 50°C)	3	F1	II	3	640D	5I	E2	P001 IBC02 R001	PP1	MP19	T4	TP1 TP8	LGBF		2				33	328	3/0-0-1-0	M3
1866	RESIN SOLUTION, flammable	3	F1	III	3	640E	5I	E1	P001 IBC03 LP01 R001	PP1	MP19	T2	TP1	LGBF		3	W12			30	328	3/0-0-1-0	M3

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1866	RESIN SOLUTION, flammable (with a flash-point below 23°C and density as set forth in item 2.2.3.1.4) (vapour pressure exceeding 110 kPa at 50°C)	3	F1	III	3		5l	E1	P001 R001	PP1	MP19					3				33	328	3/0-0-1-0	M3
1866	RESIN SOLUTION, flammable (with a flash-point below 23°C and density as set forth in item 2.2.3.1.4) (vapour pressure not exceeding 110 kPa at 50°C)	3	F1	III	3		5l	E1	P001 IBC02 R001	PP1 BB4	MP19					3				33	328	3/0-0-1-0	M3
1868	DECABORANE	4.1	FT2	II	4.1+6.1		1kg	E0	P002 IBC06		MP10	T3	TP33	SGAN		2	W1		CW28	46	404	3/0-0-1-0	M3
1869	MAGNESIUM or MAGNESIUM ALLOYS with more than 50% magnesium in pellets, turnings or ribbons	4.1	F3	III	4.1	59	5kg	E1	P002 IBC08 LP02 R001	B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	403	3/0-0-1-0	M3
1870	POTASSIUM BOROHYDRIDE	4.3	W2	I	4.3		0	E0	P403		MP2					1	W1		CW23	X423	409	0-0-1-0	M3
1871	TITANIUM HYDRIDE	4.1	F3	II	4.1		1kg	E2	P410 IBC04	PP40	MP11	T3	TP33	SGAN		2	W1			40	409	3/0-0-1-0	M3
1872	LEAD DIOXIDE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP2	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
1873	PERCHLORIC ACID with more than 50% but not more than 72% acid, by mass	5.1	OC1	I	5.1+8	60	0	E0	P502	PP28	MP3	T10	TP1	L4DN(+)	TU3 TU28 TE16	1			CW24	558	505	0-0-1-0	M3
1884	BARIUM OXIDE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	603	-	M3
1885	BENZIDINE	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
1886	BENZYLIDENE CHLORIDE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	605	-	-
1887	BROMOCHLOROMETHANE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	M3
1888	CHLOROFORM	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1889	CYANOGEN BROMIDE	6.1	TC2	I	6.1+8		0	E0	P002		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW46	668	626	1-1*-1-1	-
1891	ETHYL BROMIDE	3	FT1	II	3+6.1		1 L	E2	P001 IBC02	B8	MP19	T7	TP2	L4BH	TU15	2			CW13 CW28	336	312	0-0-1-0	M3
1892	ETHYLDICHLOROARSINE	6.1	T3	I	6.1	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	626	1-1*-1-1	M3
1894	PHENYLMERCURIC HYDROXIDE	6.1	T3	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	619	-	-
1895	PHENYLMERCURIC NITRATE	6.1	T3	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	619	-	-
1897	TETRACHLOROETHYLENE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	0-0-1-0	M3
1898	ACETYL IODIDE	8	C3	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	803	-	M3
1902	DIISOCTYL ACID PHOSPHATE	8	C3	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3
1903	DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	8	C9	I	8	274	0	E0	P001		MP8 MP17			L10BH	TU38 TE22	1				88	823	-	M3
1903	DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	8	C9	II	8	274	1l	E2	P001 IBC02		MP15			L4BN		2				80	823	-	M3
1903	DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	8	C9	III	8	274	5l	E1	P001 IBC03 LP01 R001		MP19			L4BN		3	W12			80	823	-	M3
1905	SELENIC ACID	8	C2	I	8		0	E0	P002 IBC07		MP18	T6	TP33	S10AN		1	W10			88	806	0-0-1-0	M3
1906	SLUDGE ACID	8	C1	II	8		1l	E0	P001 IBC02		MP15	T8	TP2 TP28	L4BN		2				80	801	-	M3
1907	SODA LIME with more than 4% sodium hydroxide	8	C6	III	8	62	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	808	-	M3
1908	CHLORITE SOLUTION	8	C9	II	8	521	1l	E2	P001 IBC02		MP15	T7	TP2 TP24	L4BV(+)	TE11	2				80	816	-	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1908	CHLORITE SOLUTION	8	C9	III	8	521	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP2 TP24	L4BV(+)	TE11	3	W12			80	816	-	M3
1910	Calcium oxide	8	C6	Not subject to the requirements of Annex 2 to SMGS																			
1911	DIBORANE	2	2TF		2.3+ 2.1		0	E0	P200		MP9					1			CW9 CW10 CW36	263	212	3/1-1*-1-1	M2
1912	METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	2	2F		2.1 (+13)	228 662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	209	3/1-1*-1-1 3/1-1*-3-1	M2 M1
1913	NEON, REFRIGERATED LIQUID	2	3A		2.2 (+13)	593	120 ml	E1	P203		MP9	T75	TP5	RxBN	TU19 TA4 TT9 TM6	3	W5		CW9 CW11 CW30 CW36	22	201	0-0-1-0 0-0-3-0	M2 M1
1914	BUTYL PROPIONATES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1915	CYCLOHEXANONE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
1916	2,2'-DICHLORODIETHYL ETHER	6.1	TF1	II	6.1+3		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	63	606	3/0-0-1-0	M3
1917	ETHYL ACRYLATE, STABILIZED	3	F1	II	3	386 676	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	306	3/1-1*-1-1	M3
1918	ISOPROPYLBENZENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3
1919	METHYL ACRYLATE, STABILIZED	3	F1	II	3	386 676	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	306	3/0-0-1-0	M3
1920	NONANES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1921	PROPYLENEIMINE, STABILIZED	3	FT1	I	3+6.1	386 676	0	E0	P001		MP2	T14	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28	336	311	3/0-0-1-0	M3
1922	PYRROLIDINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
1923	CALCIUM DITHIONITE (CALCIUM HYDROSULPHITE)	4.2	S4	II	4.2		0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
1928	METHYL MAGNESIUM BROMIDE IN ETHYL ETHER	4.3	WF1	I	4.3+3		0	E0	P402	RR8	MP2			L10DH	TU4 TU14 TU22 TU38 TE21 TE22 TM2	0	W1		CW23	X323	407	3/1-1*-1-1	M3
1929	POTASSIUM DITHIONITE (POTASSIUM HYDROSULPHITE)	4.2	S4	II	4.2		0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
1931	ZINC DITHIONITE (ZINC HYDROSULPHITE)	9	M11	III	9		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2	CW31	90	904	-	-
1932	ZIRCONIUM SCRAP	4.2	S4	III	4.2	524 592	0	E0	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
1935	CYANIDE SOLUTION, N.O.S.	6.1	T4	I	6.1	274 525	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW46 CW47 CW55	66	630	1-1*-1-1	M3
1935	CYANIDE SOLUTION, N.O.S.	6.1	T4	II	6.1	274 525	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW46 CW47 CW55	60	630	1-1*-1-1	M3
1935	CYANIDE SOLUTION, N.O.S.	6.1	T4	III	6.1	274 525	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW47 CW55	60	630	1-1*-1-1	M3
1938	BROMOACETIC ACID SOLUTION	8	C3	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	803	-	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1938	BROMOACETIC ACID SOLUTION	8	C3	III	8		5l	E1	P001 IBC02 LP01 R001		MP19	T7	TP2	L4BN		3				80	803	-	M3
1939	PHOSPHORUS OXYBROMIDE	8	C2	II	8		1kg	E0	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	-	M3
1940	THIOGLYCOLIC ACID	8	C3	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	803	-	M3
1941	DIBROMODIFLUOROMETHANE	9	M11	III	9		5l	E1	P001 LP01 R001		MP15	T11	TP2	L4BN		3			CW31	90	904	-	-
1942	AMMONIUM NITRATE with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance	5.1	O2	III	5.1	306 611	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	509	-	M3
1944	MATCHES, SAFETY (book, card or strike on box)	4.1	F1	III	4.1	293	5kg	E1	P407 R001		MP11					4	W1			40	402	3/0-0-1-0	-
1945	MATCHES, WAX 'VESTA'	4.1	F1	III	4.1	293	5kg	E1	P407 R001		MP11					4	W1			40	402	3/0-0-1-0	-
1950	AEROSOLS, asphyxiating	2	5A		2.2	190 327 344 625	1l	E0	P207 LP02	PP87 RR6 L2	MP9					3	W14		CW9 CW12	20	220	-	-
1950	AEROSOLS, corrosive	2	5C		2.2+8	190 327 344 625	1l	E0	P207 LP02	PP87 RR6 L2	MP9					1	W14		CW9 CW12	28	220	-	-
1950	AEROSOLS, corrosive, oxidizing	2	5CO		2.2+5.1+ 8	190 327 344 625	1l	E0	P207 LP02	PP87 RR6 L2	MP9					1	W14		CW9 CW12	285	220	-	-
1950	AEROSOLS, highly flammable	2	5F		2.1	190 327 344 625	1l	E0	P207 LP02	PP87 RR6 L2	MP9					2	W14		CW9 CW12	23	220	-	-
1950	AEROSOLS, highly flammable, corrosive	2	5FC		2.1+8	190 327 344 625	1l	E0	P207 LP02	PP87 RR6 L2	MP9					1	W14		CW9 CW12	238	220	-	-
1950	AEROSOLS, oxidizing	2	5O		2.2+5.1	190 327 344 625	1l	E0	P207 LP02	PP87 RR6 L2	MP9					3	W14		CW9 CW12	25	220	-	-

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1950	AEROSOLS, toxic	2	5T		2.2+6.1	190 327 344 625	120 ml	E0	P207 LP02	PP87 RR6 L2	MP9					1	W14		CW9 CW12 CW28	26	220	-	-
1950	AEROSOLS, toxic, corrosive	2	5TC		2.2+6.1+ 8	190 327 344 625	120 ml	E0	P207 LP02	PP87 RR6 L2	MP9					1	W14		CW9 CW12 CW28	268	220	-	-
1950	AEROSOLS, toxic, highly flammable	2	5TF		2.1+6.1	190 327 344 625	120 ml	E0	P207 LP02	PP87 RR6 L2	MP9					1	W14		CW9 CW12 CW28	263	220	-	-
1950	AEROSOLS, toxic, highly flammable, corrosive	2	5TFC		2.1+6.1+ 8	190 327 344 625	120 ml	E0	P207 LP02	PP87 RR6 L2	MP9					1	W14		CW9 CW12 CW28	263	220	-	-
1950	AEROSOLS, toxic, oxidizing	2	5TO		2.2+5.1+ 6.1	190 327 344 625	120 ml	E0	P207 LP02	PP87 RR6 L2	MP9					1	W14		CW9 CW12 CW28	265	220	-	-
1950	AEROSOLS, toxic, oxidizing, corrosive	2	5TOC		2.2+5.1+ 6.1+8	190 327 344 625	120 ml	E0	P207 LP02	PP87 RR6 L2	MP9					1	W14		CW9 CW12 CW28	265	220	-	-
1951	ARGON, REFRIGERATED LIQUID	2	3A		2.2 (+13)	593	120 ml	E1	P203		MP9	T75	TP5	RxBN	TU19 TA4 TT9 TM6	3	W5		CW9 CW11 CW30 CW36	22	201	0-0-1-0 0-0-3-0	M2 M1
1952	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	2	2A		2.2 (+13)	662 392	120 ml	E1	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9 TM6	3			CW9 CW10 CW36	20	207	3/1-1*-1-1 3/1-1*-3-1	M2 M1
1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	2	1TF		2.3+ 2.1 (+13)	274	0	E0	P200		MP9	(M)		CxBH(M)	TU6 TU38 TU50 TE22 TE25 TA4 TT9	1			CW9 CW10 CW36 CW61	263	219	0-0-1-0 0-0-3-0	M2 M1
1954	COMPRESSED GAS, FLAMMABLE, N.O.S.	2	1F		2.1 (+13)	274 660 662	0	E0	P200		MP9	(M)		CxBN(M)	TU38 TU50 TE22 TA4 TT9	2			CW9 CW10 CW 36	23	218	3/0-0-1-0 3/0-0-3-0	M2 M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1955	COMPRESSED GAS, TOXIC, N.O.S.	2	1T		2.3 (+13)	274	0	E0	P200		MP9	(M)		CxBH(M)	TU6 TU38 TU50 TE22 TE25 TA4 TT9	1			CW9 CW10 CW 36	26	220	3/0-0-3-0	M1
1956	COMPRESSED GAS, N.O.S.	2	1A		2.2 (+13)	274 655 662	120 ml	E1	P200		MP9	(M)		CxBN(M)	TU50 TA4 TT9	3			CW9 CW10 CW 36	20	215	0-0-1-0 0-0-3-0	M2 M1
1957	DEUTERIUM, COMPRESSED	2	1F		2.1 (+13)	662	0	E0	P200		MP9	(M)		CxBN(M)	TU38 TU50 TE22 TA4 TT9	2			CW9 CW10 CW36	23	204	3/0-0-1-0 3/0-0-3-0	M2 M1
1958	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 114)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1959	1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TU50 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	239	205	3/0-0-1-0 3/0-0-3-0	M2 M1
1961	ETHANE, REFRIGERATED LIQUID	2	3F		2.1 (+13)		0	E0	P203		MP9	T75	TP5	RxBN	TU18 TU38 TE22 TE26 TA4 TT9 TM6	2	W5		CW9 CW11 CW30 CW36	223	206	3/0-0-1-0 3/0-0-3-0	M2 M1
1962	ETHYLENE	2	2F		2.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TU50 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	204	3/0-0-1-0 3/0-0-3-0	M2 M1
1963	HELIUM, REFRIGERATED LIQUID	2	3A		2.2 (+13)	593	120 ml	E1	P203		MP9	T75	TP5 TP34	RxBN	TU19 TA4 TT9 TM6	3	W5		CW9 CW11 CW30 CW36	22	201	0-0-1-0 0-0-3-0	M2 M1
1964	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.	2	1F		2.1 (+13)	274 662	0	E0	P200		MP9	(M)		CxBN(M)	TU38 TU50 TE22	2			CW9 CW10 CW 36	23	206	3/0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
															TE22 TA4 TT9				CW36			3/0-0-3-0	M1
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., such as A, A01, A02, A0, A1, B1, B2, B or C mixtures	2	2F		2.1 (+13)	274 583 660 662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1966	HYDROGEN, REFRIGERATED LIQUID	2	3F		2.1 (+13)		0	E0	P203		MP9	T75	TP5 TP23 TP34	RxBN	TU18 TU38 TE22 TE26 TA4 TT9 TM6	2	W5		CW9 CW11 CW30 CW36	223	204	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1967	INSECTICIDE GAS, TOXIC, N.O.S.	2	2T		2.3 (+13)	274	0	E0	P200		MP9	(M)		PxBH(M)	TU6 TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	26	220	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1968	INSECTICIDE GAS, N.O.S.	2	2A		2.2 (+13)	274 662	120 ml	E1	P200		MP9	(M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	215	0-0-1-0	M2
																						0-0-3-0	M1
1969	ISOBUTANE	2	2F		2.1 (+13)	657 660 662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1970	KRYPTON, REFRIGERATED LIQUID	2	3A		2.2 (+13)	593	120 ml	E1	P203		MP9	T75	TP5	RxBN	TU19 TA4 TT9 TM6	3	W5		CW9 CW11 CW30 CW36	22	201	0-0-1-0	M2
																						0-0-3-0	M1
1971	METHANE, COMPRESSED, or NATURAL GAS, COMPRESSED with high methane content	2	1F		2.1 (+13)	660 662	0	E0	P200		MP9	(M)		CxBN(M)	TU38 TU50 TE22 TA4 TT9	2			CW9 CW10 CW36	23	204	3/0-0-1-0	M2
																						3/0-0-3-0	M1
1972	METHANE, REFRIGERATED LIQUID, or NATURAL GAS, REFRIGERATED LIQUID with high methane content	2	3F		2.1 (+13)	660	0	E0	P203		MP9	T75	TP5	RxBN	TU18 TU38 TE22	2	W5		CW9 CW11 CW36	223	204	3/0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
	High methane content														TE22 TE26 TA4 TT9 TM6				CW30 CW36			3/0-0-3-0	M1
1973	CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1974	CHLORODIFLUOROBROMOMETHANE (REFRIGERANT GAS R 12B1)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1975	NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE (NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURE)	2	2TOC		2.3+ 5.1+8		0	E0	P200		MP9					1			CW9 CW10 CW36 CW47	265	211	1-1-1-1	M2
1976	OCTAFLUOROCYCLOBUTANE (REFRIGERANT GAS RC 318)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1977	NITROGEN, REFRIGERATED LIQUID	2	3A		2.2 (+13)	345 346 593	120 ml	E1	P203		MP9	T75	TP5	RxBN	TU19 TA4 TT9 TM6	3	W5		CW9 CW11 CW30 CW36	22	201	0-0-1-0 0-0-3-0	M2 M1
1978	PROPANE	2	2F		2.1 (+13)	657 660 662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0 3/0-0-3-0	M2 M1
1982	TETRAFLUOROMETHANE, COMPRESSED (REFRIGERANT GAS R 14)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
1983	1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW 36	20	201	0-0-1-0 0-0-3-0	M2 M1
1984	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9 TM6	3			CW9 CW10 CW 36	20	201	0-0-1-0 0-0-3-0	M2 M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1	274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	331	3/0-0-1-0	M3
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274	1I	E2	P001 IBC02		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28	336	331	3/0-0-1-0	M3
1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	274	5I	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BH	TU15	3	W12		CW13 CW28	36	331	3/0-0-1-0	M3
1987	ALCOHOLS, N.O.S. (vapour pressure more than 110 kPa at 50°C)	3	F1	II	3	274 601 640C	1I	E2	P001		MP19	T7	TP1 TP8 TP28	L1,5BN		2				33	331	3/0-0-1-0	M3
1987	ALCOHOLS, N.O.S. (vapour pressure not more than 110 kPa at 50°C)	3	F1	II	3	274 601 640D	1I	E2	P001 IBC02 R001		MP19	T7	TP1 TP8 TP28	LGBF		2				33	331	3/0-0-1-0	M3
1987	ALCOHOLS, N.O.S.	3	F1	III	3	274 601	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	331	3/0-0-1-0	M3
1988	ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1	274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	331	3/0-0-1-0	M3
1988	ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274	1I	E2	P001 IBC02		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28	336	331	3/0-0-1-0	M3
1988	ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	274	5I	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BH	TU15	3	W12		CW13 CW28	36	331	3/0-0-1-0	M3
1989	ALDEHYDES, N.O.S.	3	F1	I	3	274	0	E3	P001		MP7 MP17	T11	TP1 TP27	L4BN		1				33	331	3/0-0-1-0	M3
1989	ALDEHYDES, N.O.S. (vapour pressure more than 110 kPa at 50°C)	3	F1	II	3	274 640C	1I	E2	P001		MP19	T7	TP1 TP8 TP28	L1,5BN		2				33	331	3/0-0-1-0	M3
1989	ALDEHYDES, N.O.S. (vapour pressure not more than 110 kPa at 50°C)	3	F1	II	3	274 640D	1I	E2	P001 IBC02 R001		MP19	T7	TP1 TP8 TP28	LGBF		2				33	331	3/0-0-1-0	M3
1989	ALDEHYDES, N.O.S.	3	F1	III	3	274	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	331	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1990	BENZALDEHYDE	9	M11	III	9		5I	E1	P001 IBC03 LP01 R001		MP15	T2	TP1	LGBV		3	W12		CW31	90	901	-	-
1991	CHLOROPRENE, STABILIZED	3	FT1	I	3+6.1	386 676	0	E0	P001		MP7 MP17	T14	TP2 TP6	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	312	3/0-0-1-0	M3
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.	3	FT1	I	3+6.1	274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW60 CW64 CW65 CW67	336	319	3/0-0-1-0	M3
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.	3	FT1	II	3+6.1	274	1I	E2	P001 IBC02		MP19	T7	TP2	L4BH	TU15	2			CW13 CW28 CW60 CW64 CW65 CW67	336	319	3/0-0-1-0	M3
1992	FLAMMABLE LIQUID, TOXIC, N.O.S.	3	FT1	III	3+6.1	274	5I	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BH	TU15	3	W12		CW13 CW28 CW60 CW64 CW65 CW67	36	319	3/0-0-1-0	M3
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	I	3	274	0	E3	P001		MP7 MP17	T11	TP1 TP27	L4BN		1			CW60 CW64 CW65 CW67	33	328	3/0-0-1-0	M3
1993	FLAMMABLE LIQUID, N.O.S. (vapour pressure more than 110 kPa at 50°C)	3	F1	II	3	274 601 640C	1I	E2	P001		MP19	T7	TP1 TP8 TP28	L1,5BN		2			CW60 CW64 CW65 CW67	33	328	3/0-0-1-0	M3
1993	FLAMMABLE LIQUID, N.O.S. (vapour pressure not more than 110 kPa at 50°C)	3	F1	II	3	274 601 640D	1I	E2	P001 IBC02 R001		MP19	T7	TP1 TP8 TP28	LGBF		2			CW60 CW64 CW65 CW67	33	328	3/0-0-1-0	M3
1993	FLAMMABLE LIQUID, N.O.S.	3	F1	III	3	274 601 640E	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	328	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
1993	FLAMMABLE LIQUID, N.O.S. (with a flash point below 23°C and density as specified in item 2.2.3.1.4) (vapour pressure more than 110 kPa at 50°C)	3	F1	III	3	274 601	5I	E1	P001 R001		MP19					3				33	328	3/0-0-1-0	M3
1993	FLAMMABLE LIQUID, N.O.S. (with a flash point below 23°C and density as specified in item 2.2.3.1.4) (vapour pressure not more than 110 kPa at 50°C)	3	F1	III	3	274 601	5I	E1	P001 IBC02 R001	BB4	MP19					3				33	328	3/0-0-1-0	M3
1994	IRON PENTACARBONYL	6.1	TF1	I	6.1+3	354	0	E0	P601		MP2	T22	TP2	L15CH	TU14 TU15 TU31 TU38 TE21 TE22 TE25 TM3	1			CW13 CW28 CW31 CW48 CW55	663	647	3/1-1*-1-1	M2
1999	TARS, LIQUID, including road oils and cutback bitumens (vapour pressure more than 110 kPa at 50°C)	3	F1	II	3	640C	5I	E2	P001		MP19	T3	TP3 TP29	L1,5BN		2				33	328	3/0-0-1-0	M3
1999	TARS, LIQUID, including road oils and cutback bitumens (vapour pressure not more than 110 kPa at 50°C)	3	F1	II	3	640D	5I	E2	P001 IBC02 R001		MP19	T3	TP3 TP29	LGBF		2				33	328	3/0-0-1-0	M3
1999	TARS, LIQUID, including road oils and cutback bitumens	3	F1	III	3	640E	5I	E1	P001 IBC03 LP01 R001		MP19	T1	TP3	LGBF		3	W12			30	328	3/0-0-1-0	M3
1999	TARS, LIQUID, including road oils and cutback bitumens (with a flash point below 23°C and density as specified in item 2.2.3.1.4) (vapour pressure more than 110 kPa at 50°C)	3	F1	III	3		5I	E1	P001 R001		MP19					3				33	328	3/0-0-1-0	M3
1999	TARS, LIQUID, including road oils and cutback bitumens (with a flash point below 23°C and density as specified in item 2.2.3.1.4) (vapour pressure not more than 110 kPa at 50°C)	3	F1	III	3		5I	E1	P001 IBC02 R001	BB4	MP19					3				33	328	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2000	CELLULOID in block, rods, rolls, sheets, tubes, etc., except scrap	4.1	F1	III	4.1	502	5kg	E1	P002 LP02 R001	PP7	MP11					3	W1			40	402	3/0-0-1-0	-
2001	COBALT NAPHTHENATES, POWDER	4.1	F3	III	4.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
2002	CELLULOID, SCRAP	4.2	S2	III	4.2	526 592	0	E0	P002 IBC08 LP02 R001	PP8 B3	MP14					3	W1			40	405	3/0-0-1-0	M3
2004	MAGNESIUM DIAMIDE	4.2	S4	II	4.2		0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
2006	PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.	4.2	S2	III	4.2	274 528	0	E0	P002 R001		MP14					3	W1			40	405	3/0-0-1-0	M3
2008	ZIRCONIUM POWDER, DRY	4.2	S4	I	4.2	524 540	0	E0	P404		MP13	T21	TP7 TP33			0	W1			43	405	3/0-0-1-0	M3
2008	ZIRCONIUM POWDER, DRY	4.2	S4	II	4.2	524 540	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
2008	ZIRCONIUM POWDER, DRY	4.2	S4	III	4.2	524 540	0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
2009	ZIRCONIUM, DRY, finished sheets, strip or coiled wire	4.2	S4	III	4.2	524 592	0	E1	P002 LP02 R001		MP14					3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
2010	MAGNESIUM HYDRIDE	4.3	W2	I	4.3		0	E0	P403		MP2					1	W1		CW23	X423	409	0-0-1-0	M3
2011	MAGNESIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1		0	E0	P403		MP2					1	W1		CW23 CW28	X462	408	0-0-1-0	-
2012	POTASSIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1		0	E0	P403		MP2					1	W1		CW23 CW28	X462	408	0-0-1-0	-
2013	STRONTIUM PHOSPHIDE	4.3	WT2	I	4.3+6.1		0	E0	P403		MP2					1	W1		CW23 CW28	X462	408	3/0-0-1-0	-
2014	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)	5.1	OC1	II	5.1+8		1l	E2	P504 IBC02	PP10 B5	MP15	T7	TP2 TP6 TP24	L4BV(+)	TU3 TC2 TE8 TE11 TT1	2			CW24	58	505	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2015	HYDROGEN PEROXIDE, STABILIZED or HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED with more than 70% hydrogen peroxide	5.1	OC1	I	5.1+8	640N	0	E0	P501		MP2	T9	TP2 TP6 TP24	L4DV(+)	TU3 TU28 TC2 TE8 TE9 TE16 TT1	1	W5		CW24 CW46 CW47 CW55 CW56 CW69	559	505	1-1*-1-1	M1
2015	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with more than 60% but not more than 70% hydrogen peroxide	5.1	OC1	I	5.1+8	640O	0	E0	P501		MP2	T9	TP2 TP6 TP24	L4BV(+)	TU3 TU28 TC2 TE7 TE8 TE9 TE16 TT1	1	W5		CW24 CW46 CW47 CW55 CW56 CW69	559	505	1-1*-1-1	M1
2016	AMMUNITION, TOXIC, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	6.1	T10		6.1		0	E0	P600		MP10					2			CW13 CW28 CW31	60	634	-	-
2017	AMMUNITION, TEAR-PRODUCING, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	6.1	TC5		6.1+8		0	E0	P600							2			CW13 CW28 CW31	68	639	-	-
2018	CHLOROANILINES, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
2019	CHLOROANILINES, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2020	CHLOROPHENOLS, SOLID	6.1	T2	III	6.1	205	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
2021	CHLOROPHENOLS, LIQUID	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2022	CRESYLIC ACID	6.1	TC1	II	6.1+8		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	68	640	-	-
2023	EPICHLOROHYDRIN	6.1	TF1	II	6.1+3	279	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	63	647	3/0-0-1-0	-
2024	MERCURY COMPOUND, LIQUID, N.O.S.	6.1	T4	I	6.1	43 274	0	E5	P001		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	630	1-1*-1-1	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2024	MERCURY COMPOUND, LIQUID, N.O.S.	6.1	T4	II	6.1	43 274	100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	630	-	M3
2024	MERCURY COMPOUND, LIQUID, N.O.S.	6.1	T4	III	6.1	43 274	5l	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3
2025	MERCURY COMPOUND, SOLID, N.O.S.	6.1	T5	I	6.1	43 66 274 529	0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	M3
2025	MERCURY COMPOUND, SOLID, N.O.S.	6.1	T5	II	6.1	43 66 274 529	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31 CW61 CW64	60	630	-	M3
2025	MERCURY COMPOUND, SOLID, N.O.S.	6.1	T5	III	6.1	43 66 274 529	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3
2026	PHENYLMERCURIC COMPOUND, N.O.S.	6.1	T3	I	6.1	43 274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	630	1-1*-1-1	M3
2026	PHENYLMERCURIC COMPOUND, N.O.S.	6.1	T3	II	6.1	43 274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	630	1-1-1-1	M3
2026	PHENYLMERCURIC COMPOUND, N.O.S.	6.1	T3	III	6.1	43 274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	630	1-1-1-1	M3
2027	SODIUM ARSENITE, SOLID	6.1	T5	II	6.1	43	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
2028	BOMBS, SMOKE, NON-EXPLOSIVE with corrosive liquid, without initiating device	8	C11	II	8		0	E0	P803							2				80	836	-	-
2029	HYDRAZINE, ANHYDROUS	8	CFT	I	8+3+6.1		0	E0	P001		MP8 MP17					1			CW13 CW28 CW46 CW47	886	807	3/1-1*-1-1	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2030	HYDRAZINE HYDRATE or HYDRAZINE AQUEOUS SOLUTION with HYDRAZINE, AQUEOUS SOLUTION with more than 37% hydrazine, by mass	8	CT1	I	8+6.1	530	0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1			CW13 CW28 CW46 CW47 CW55 CW69	886	807	3/1-1*-1-1	M3
2030	HYDRAZINE, AQUEOUS SOLUTION with more than 37% hydrazine, by mass	8	CT1	II	8+6.1	530	1I	E0	P001 IBC02		MP15	T7	TP2	L4BN		2			CW13 CW28 CW46	86	807	3/1-1*-1-1	M3
2030	HYDRAZINE, AQUEOUS SOLUTION with more than 37% hydrazine, by mass	8	CT1	III	8+6.1	530	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12		CW13 CW28 CW46	86	807	3/1-1*-1-1	M3
2031	NITRIC ACID, other than red fuming, with more than 70% nitric acid	8	CO1	I	8+5.1		0	E0	P001	PP81	MP8 MP17	T10	TP2	L10BH	TU38 TC6 TE22 TT1	1			CW24	885	802	0-0-1-0	M3
2031	NITRIC ACID, other than red fuming, with not less than 65% but not more than 70% nitric acid	8	CO1	II	8+5.1		1I	E2	P001 IBC02	PP81 B15	MP15	T8	TP2	L4BN		2				85	802	0-0-1-0	M3
2031	NITRIC ACID, other than red fuming, with less than 65% nitric acid	8	C1	II	8		1I	E2	P001 IBC02	PP81 B15	MP15	T8	TP2	L4BN		2				80	802	0-0-1-0	M3
2032	NITRIC ACID, RED FUMING	8	COT	I	8+5.1+ 6.1		0	E0	P602		MP8 MP17	T20	TP2	L10BH	TU38 TC6 TE22 TT1	1			CW13 CW24 CW28 CW46 CW47 CW55 CW69	856	802	3/1-1*-1-1	M1
2033	POTASSIUM MONOXIDE	8	C6	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	808	-	M3
2034	HYDROGEN AND METHANE MIXTURE, COMPRESSED	2	1F		2.1 (+13)	662	0	E0	P200		MP9	(M)		CxBN(M)	TU38 TU50 TE22 TA4 TT9	2			CW9 CW10 CW36	23	204	3/0-0-1-0 3/0-0-3-0	M2 M1
2035	1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)	TP60	PxBN(M)	TU38 TU50 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	205	3/0-0-1-0 3/0-0-3-0	M2 M1
2036	XENON	2	2A		2.2 (+13)	392	120 ml	E1	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9	3			CW9 CW10	20	201	0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
															TM6				CW36			0-0-3-0	M1
2037	GAS CARTRIDGES without a release device, non-refillable	2	5A		2.2	191 303 344	1I	E0	P003 LP200	PP17 PP96 RR6 L2	MP9					3	W14		CW9 CW12	20	220	-	-
2037	GAS CARTRIDGES without a release device, non-refillable	2	5F		2.1	191 303 327 344	1I	E0	P003 LP200	PP17 PP96 RR6 L2	MP9					2	W14		CW9 CW12	23	220	-	-
2037	GAS CARTRIDGES without a release device, non-refillable	2	5O		2.2+5.1	191 303 344	1I	E0	P003 LP200	PP17 PP96 RR6 L2	MP9					3	W14		CW9 CW12	25	220	-	-
2037	GAS CARTRIDGES without a release device, non-refillable	2	5T		2.3	303 344	120 ml	E0	P003 LP200	PP17 PP96 RR6 L2	MP9					1	W14		CW9 CW12	26	220	-	-
2037	GAS CARTRIDGES without a release device, non-refillable	2	5TC		2.3+8	303 344	120 ml	E0	P003 LP200	PP17 PP96 RR6 L2	MP9					1	W14		CW9 CW12	268	220	-	-
2037	GAS CARTRIDGES without a release device, non-refillable	2	5TF		2.3+2.1	303 344	120 ml	E0	P003 LP200	PP17 PP96 RR6	MP9					1	W14		CW9 CW12	263	220	-	-
2037	GAS CARTRIDGES without a release device, non-refillable	2	5TFC		2.3+2.1+8	303 344	120 ml	E0	P003 LP200	PP17 PP96 RR6 L2	MP9					1	W14		CW9 CW12	263	220	-	-
2037	GAS CARTRIDGES without a release device, non-refillable	2	5TO		2.3+5.1	303 344	120 ml	E0	P003 LP200	PP17 PP96 RR6 L2	MP9					1	W14		CW9 CW12	265	220	-	-
2037	GAS CARTRIDGES without a release device, non-refillable	2	5TOC		2.3+5.1+8	303 344	120 ml	E0	P003 LP200	PP17 PP96 RR6 L2	MP9					1	W14		CW9 CW12	265	220	-	-
2038	DINITROTOLUENES, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2044	2,2-DIMETHYLPROPANE	2	2F		2.1(+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0 3/0-0-3-0	M2 M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Handling
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2045	ISOBUTYRALDEHYDE (ISOBUTYRIC ALDEHYDE)	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
2046	CYMENES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3
2047	DICHLOROPROPENES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		3				33	312	3/0-0-1-0	M3
2047	DICHLOROPROPENES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	312	3/0-0-1-0	M3
2048	DICYCLOPENTADIENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	320	3/0-0-1-0	M3
2049	DIETHYLBENZENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3
2050	DIISOBUTYLENE, ISOMERIC COMPOUNDS	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2051	2-DIMETHYLAMINOETHANOL	8	CF1	II	8+3		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	807	3/0-0-1-0	M3
2052	DIPENTENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3
2053	METHYL ISOBUTYL CARBINOL	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2054	MORPHOLINE	8	CF1	I	8+3		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1				883	807	3/0-0-1-0	M3
2055	STYRENE MONOMER, STABILIZED	3	F1	III	3	386 676	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			39	317	3/0-0-1-0	M3
2056	TETRAHYDROFURAN	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	301	3/0-0-1-0	M3

UN No	Name and description	Class	Classifi- cation code	Packing group	Labels	Special provis- ions 3.3	Limited and excepted quantities 3.4/ 3.5.1.2		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transp ort categor y 1.1.3.6	Special provisions for carriage			Hazard identifi- cation No. 5.3.2.3	Additional remarks in consignment note		
									Packing instructio ns 4.1.4	Special packing provisio s 4.1.4	Mixed packing provisio s 4.1.10	Instruc tions 4.2.5.2, 7.3.2	Special provisio ns 4.2.5.3	Tank code 4.3	Special provisio ns 4.3.5, 6.8.4		Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11		Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2057	TRIPROPYLENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2057	TRIPROPYLENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	305	3/0-0-1-0	M3
2058	VALERALDEHYDE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	3	D	I	3	28 198 531	0	E0	P001		MP7 MP17	T11	TP1 TP8 TP27	L4BN		1				33	328	3/0-0-1-0	M3
2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose (vapour pressure more than 110 kPa at 50°C)	3	D	II	3	28 198 531 640C	1I	E0	P001 IBC02		MP19	T4	TP1 TP8	L1,5BN		2				33	328	3/0-0-1-0	M3
2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose (vapour pressure not more than 110 kPa at 50°C)	3	D	II	3	28 198 531 640D	1I	E0	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		2				33	328	3/0-0-1-0	M3
2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	3	D	III	3	28 198 531	5I	E0	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	328	3/0-0-1-0	M3
2067	AMMONIUM NITRATE BASED FERTILIZER	5.1	O2	III	5.1	186 306 307	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
2071	Ammonium nitrate based-fertilizer, uniform mixtures of the nitrogen/phosphate, nitrogen/potash or nitrogen/phosphate/potash type, containing not more than 70% ammonium nitrate and not more than 0.4% total combustible/organic material calculated as carbon, or not more than 45% ammonium nitrate and an unlimited amount of flammable material	9	M11	Not subject to the requirements of Annex 2 to SMGS																			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2073	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 35% but not more than 50% ammonia	2	4A		2.2 (+13)	532	120 ml	E0	P200		MP9	(M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10	20	208	1-1-1-1	M2
																						1-1-3-1	M1
2074	ACRYLAMIDE, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
2075	CHLORAL, ANHYDROUS, STABILIZED	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	69	605	0-0-1-0	-
2076	CRESOLS, LIQUID	6.1	TC1	II	6.1+8		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	68	608	-	-
2077	alpha-NAPHTHYLAMINE	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
2078	TOLUENE DIISOCYANATE	6.1	T1	II	6.1	279	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	609	-	-
2079	DIETHYLENETRIAMINE	8	C7	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	807	0-0-1-0	M3
2186	HYDROGEN CHLORIDE, REFRIGERATED LIQUID	2	3TC	CARRIAGE PROHIBITED																			
2187	CARBON DIOXIDE, REFRIGERATED LIQUID	2	3A		2.2 (+13)		120 ml	E1	P203		MP9	T75	TP5	RxBN	TU19 TA4 TT9 TM6	3	W5		CW9 CW11 CW30 CW36	22	201	0-0-1-0	M2
																						0-0-3-0	M1
2188	ARSINE	2	2TF		2.3+ 2.1		0	E0	P200		MP9					1			CW9 CW10 CW36	263	209	3/1-1*-1-1	M2
2189	DICHLOROSILANE	2	2TFC		2.3+ 2.1+ 8 (+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36 CW55	263	210	3/1-1*-1-1	M1
																						3/1-1*-3-1	M1
2190	OXYGEN DIFLUORIDE, COMPRESSED	2	1TOC		2.3+ 5.1+8		0	E0	P200		MP9					1			CW9 CW10 CW36	265	211	1-1-1-1	M2
2191	SULPHURYL FLUORIDE	2	2T		2.3 (+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38	1			CW9	26	209	0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
															TU50 TE22 TE25 TA4 TT9 TM6				CW10 CW36			0-0-3-0	M1
2192	GERMANE (GERMANIUM TETRAHYDRIDE)	2	2TF		2.3+ 2.1	632	0	E0	P200		MP9	(M)				1			CW9 CW10 CW36	263	209	3/1-1*-1-1	M2
2193	HEXAFLUOROETHANE, COMPRESSED (REFRIGERANT GAS R 116)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0 0-0-3-0	M2 M1
2194	SELENIUM HEXAFLUORIDE	2	2TC		2.3+8		0	E0	P200		MP9					1			CW9 CW10 CW36	268	203	1-1-1-1	M1
2195	TELLURIUM HEXAFLUORIDE	2	2TC		2.3+8		0	E0	P200		MP9					1			CW9 CW10 CW36	268	203	1-1-1-1	M1
2196	TUNGSTEN HEXAFLUORIDE	2	2TC		2.3+8		0	E0	P200		MP9					1			CW9 CW10 CW36	268	203	1-1*-1-1	M1
2197	HYDROGEN IODIDE, ANHYDROUS	2	2TC		2.3+8 (+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	268	203	1-1-1-1 1-1-3-1	M1 M1
2198	PHOSPHORUS PENTAFLUORIDE	2	2TC		2.3+8		0	E0	P200		MP9					1			CW9 CW10 CW36	268	203	0-0-3-0	M1
2199	PHOSPHINE	2	2TF		2.3+ 2.1	632	0	E0	P200		MP9					1			CW9 CW10 CW36	263	209	3/1-1*-1-1	M2
2200	PROPADIENE, STABILIZED	2	2F		2.1 (+13)	386 662 676	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	239	206	3/0-0-1-0 3/0-0-3-0	M2 M1
2201	NITROUS OXIDE, REFRIGERATED LIQUID	2	3O		2.2+ 5.1 (+13)		0	E0	P203		MP9	T75	TP5 TP22	RxBN	TU7 TU19 TA4 TT9	3	W5		CW9 CW11 CW30	225	202	0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
															TM6				CW36			0-0-3-0	M1
2202	HYDROGEN SELENIDE, ANHYDROUS	2	2TF		2.3+ 2.1		0	E0	P200		MP9					1			CW9 CW10 CW36	263	209	3/1-1*-1-1	M2
2203	SILANE	2	2F		2.1 (+13)	632 662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TU50 TE22 TA4 TT9 TM6	2			CW9 CW10 CW36	23	206	3/0-0-1-0 3/0-0-3-0	M2 M1
2204	CARBONYL SULPHIDE	2	2TF		2.3+ 2.1 (+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TE22 TE25 TA4 TT9 TM6	1			CW9 CW10 CW36	263	209	3/1-1*-1-1 3/1-1*-3-1	M2 M1
2205	ADIPONITRILE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T3	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2206	ISOCYANATES, TOXIC, N.O.S., or ISOCYANATE SOLUTION, TOXIC, N.O.S.	6.1	T1	II	6.1	274 551	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	632	-	M3
2206	ISOCYANATES, TOXIC, N.O.S., or ISOCYANATE SOLUTION, TOXIC, N.O.S.	6.1	T1	III	6.1	274 551	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	632	-	M3
2208	CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 10% but not more than 39% available chlorine	5.1	O2	III	5.1	314	5kg	E1	P002 IBC08 LP02 R001	B3 B13 L3	MP10			SGAN	TU3	3			CW24 CW35	50	501	-	M3
2209	FORMALDEHYDE SOLUTION with not less than 25% formaldehyde	8	C9	III	8	533	5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3
2210	MANEB or MANEB PREPARATION with not less than 60% maneb	4.2	SW1	III	4.2+4.3	273	0	E1	P002 IBC06 R001		MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
2211	POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour	9	M3	III	HeT	382 633 675	5kr	E1	P002 IBC08 R001	PP14 B3 B6	MP10	T1	TP33	SGAN	TE20	3		VC1 VC2 AP2	CW31 CW36	90	902	-	-
2212	ASBESTOS, AMPHIBOLE (amosite, tremolite, antophyllite, crocidolite)	9	M1	II	9	168 274 542 675	1kr	E0	P002 IBC08	PP37 B4	MP10	T3	TP33	SGAH	TU15	2	W11	VC1 VC2 AP12	CW13 CW28 CW31 CW36	90	904	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2213	PARAFORMALDEHYDE	4.1	F1	III	4.1		5kg	E1	P002 IBC08 LP02 R001	PP12 B3	MP10	T1 BK1 BK2	TP33	SGAV		3	W1 W13	VC1 VC2		40	402	3/0-0-1-0	-
2214	PHTHALIC ANHYDRIDE with more than 0.05% of maleic anhydride	8	C4	III	8	169	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	804	-	M3
2215	MALEIC ANHYDRIDE, MOLTEN	8	C3	III	8		0	E0				T4	TP3	L4BN		0				80	803	0-0-1-0	M3
2215	MALEIC ANHYDRIDE	8	C4	III	8		5kg	E1	P002 IBC08 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	803	0-0-1-0	M3
2216	Fish meal (fish scrap), stabilized	9	M11	Not subject to the requirements of Annex 2 to SMGS																			
2217	SEED CAKE with not more than 1.5% oil and not more than 11% moisture	4.2	S2	III	4.2	142 300	0	E0	P002 IBC08 LP02 R001	PP20 B3 B6	MP14					3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
2218	ACRYLIC ACID, STABILIZED	8	CF1	II	8+3	386 676	1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				839	803	3/0-0-1-0	M3
2219	ALLYL GLYCIDYL ETHER	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2222	ANISOLE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2224	BENZONITRILE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2225	BENZENESULPHONYL CHLORIDE	8	C3	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	804	-	M3
2226	BENZOTRICHLORIDE	8	C9	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	804	-	M3
2227	n-BUTYL METHACRYLATE, STABILIZED	3	F1	III	3	386 676	5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			39	316	3/0-0-1-0	M3
2232	2-CHLOROETHANAL	6.1	T1	I	6.1	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	625	1-1*-1-1	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4		7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2233	CHLOROANISIDINES	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
2234	CHLOROBENZOTRIFLUORIDES	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	318	3/0-0-1-0	M3
2235	CHLOROBENZYL CHLORIDES, LIQUID	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	616	-	M3
2236	3-CHLORO-4-METHYLPHENYL ISOCYANATE, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	609	-	-
2237	CHLORONITROANILINES	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
2238	CHLOROTOLUENES	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	318	3/0-0-1-0	M3
2239	CHLOROTOLUIDINES, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
2240	CHROMOSULPHURIC ACID	8	C1	I	8		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1				88	802	0-0-1-0	M3
2241	CYCLOHEPTANE	3	F1	II	3		1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2242	CYCLOHEPTENE	3	F1	II	3		1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2243	CYCLOHEXYL ACETATE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2244	CYCLOPENTANOL	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2245	CYCLOPENTANONE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21b)
2246	CYCLOPENTENE	3	F1	II	3		1l	E2	P001 IBC02	B8	MP19	T7	TP2	L1,5BN		2				33	301	3/0-0-1-0	M3
2247	n-DECANE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
2248	DI-n-BUTYLAMINE	8	CF1	II	8+3		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	807	3/0-0-1-0	M3
2249	DICHLORODIMETHYL ETHER, SYMMETRICAL	6.1	TF1	CARRIAGE PROHIBITED																			
2250	DICHLOROPHENYL ISOCYANATES	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	609	-	-
2251	BICYCLO[2.2.1]HEPTA-2,5-DIENE, STABILIZED (2,5-NORBORNADIENE, STABILIZED)	3	F1	II	3	386 676	1l	E2	P001 IBC02 R001		MP19	T7	TP2	LGBF		2				339	305	3/1-1*-1-1	M3
2252	1,2-DIMETHOXYETHANE	3	F1	II	3		1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2253	N,N-DIMETHYLANILINE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	0-0-1-0	-
2254	MATCHES, FUSEE	4.1	F1	III	4.1	293	5kg	E0	P407 R001		MP11					4	W1			40	402	3/0-0-1-0	-
2256	CYCLOHEXENE	3	F1	II	3		1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2257	POTASSIUM	4.3	W2	I	4.3		0	E0	P403 IBC04		MP2	T9	TP7 TP33	L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X423	409	0-0-1-0	M3
2258	1,2-PROPYLENEDIAMINE	8	CF1	II	8+3		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	807	3/0-0-1-0	M3
2259	TRIETHYLENETETRAMINE	8	C7	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	807	-	M3
2260	TRIPROPYLAMINE	3	FC	III	3+8		5l	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		2	W12			38	325	3/0-0-1-0	M3
2261	XYLENOLS, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	616	-	-
2262	DIMETHYLCARBAMOYL CHLORIDE	8	C3	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	803	-	M3
2263	DIMETHYLCYCLOHEXANES	3	F1	II	3		1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2264	N,N-DIMETHYLCYCLOHEXYLAMINE	8	CF1	II	8+3		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	807	3/0-0-1-0	M3
2265	N,N-DIMETHYLFORMAMIDE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP2	LGBF		3	W12			30	311	3/0-0-1-0	M3
2266	DIMETHYL-N-PROPYLAMINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP2	L4BH		2				338	311	3/0-0-1-0	M3
2267	DIMETHYL THIOPHOSPHORYL CHLORIDE	6.1	TC1	II	6.1+8		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	68	611	-	-
2269	3,3'-IMINODIPROPYLAMINE	8	C7	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP2	L4BN		3	W12			80	807	-	M3
2270	ETHYLAMINE, AQUEOUS SOLUTION with not less than 50% but not more than 70% ethylamine	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	303	3/0-0-1-0	M3
2271	ETHYL AMYL KETONE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2272	N-ETHYLANILINE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2273	2-ETHYLANILINE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2274	N-ETHYL-N-BENZYLANILINE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2275	2-ETHYLBUTANOL	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2276	2-ETHYLHEXYLAMINE	3	FC	III	3+8		5I	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		3	W12			38	325	3/0-0-1-0	M3
2277	ETHYL METHACRYLATE, STABILIZED	3	F1	II	3	386 676	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	306	3/1-1*-1-1	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2278	n-HEPTENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2279	HEXACHLOROBUTADIENE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	606	-	M3
2280	HEXAMETHYLENEDIAMINE, SOLID	8	C8	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	807	-	M3
2281	HEXAMETHYLENE DIISOCYANATE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	609	-	-
2282	HEXANOLS	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2283	ISOBUTYL METHACRYLATE, STABILIZED	3	F1	III	3	386 676	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			39	316	3/1-1*-1-1	M3
2284	ISOBUTYRONITRILE	3	FT1	II	3+6.1		1I	E2	P001 IBC02		MP19	T7	TP2	L4BH	TU15	2			CW13 CW28	336	310	3/0-0-1-0	M3
2285	ISOCYANATOBENZOTRIFLUORIDES	6.1	TF1	II	6.1+3		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	63	609	3/0-0-1-0	-
2286	PENTAMETHYLHEPTANE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
2287	ISOHEPTENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2288	ISOHEXENE	3	F1	II	3		1I	E2	P001 IBC02 R001	B8	MP19	T11	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2289	ISOPHORONEDIAMINE	8	C7	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3
2290	ISOPHORONE DIISOCYANATE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP2	L4BH	TU15	2	W12		CW13 CW28 CW31	60	609	-	M3
2291	LEAD COMPOUND, SOLUBLE, N.O.S.	6.1	T5	III	6.1	199 274 535	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2293	4-METHOXY-4-METHYLPENTAN-2-ONE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2294	N-METHYLANILINE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2295	METHYL CHLOROACETATE	6.1	TF1	I	6.1+3		0	E0	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	647	3/0-0-1-0	-
2296	METHYLCYCLOHEXANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2297	METHYLCYCLOHEXANONE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2298	METHYLCYCLOPENTANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2299	METHYL CHLOROACETATE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	606	-	M3
2300	2-METHYL-5-ETHYLPYRIDINE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2301	2-METHYLFURAN	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2302	5-METHYLHEXAN-2-ONE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2303	ISOPROPENYLBENZENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	314	3/0-0-1-0	M3
2304	NAPHTHALENE, MOLTEN	4.1	F2	III	4.1	536	0	E0				T1	TP3	LGBV	TU27 TE4 TE6	3				44	402	-	-
2305	NITROBENZENESULPHONIC ACID	8	C4	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	804	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2306	NITROBENZOTRIFLUORIDES, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2307	3-NITRO-4-CHLORO-BENZOTRIFLUORIDE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP10	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2308	NITROSYLSULPHURIC ACID, LIQUID	8	C1	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				X80	801	0-0-1-0	M3
2309	OCTADIENES	3	F1	II	3		1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2310	PENTANE-2,4-DIONE	3	FT1	III	3+6.1		5l	E1	P001 IBC03 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28	36	320	3/0-0-1-0	M3
2311	PHENETIDINES	6.1	T1	III	6.1	279	5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2312	PHENOL, MOLTEN	6.1	T1	II	6.1		0	E0				T7	TP3	L4BH	TU15	0			CW13 CW31	60	608	-	-
2313	PICOLINES	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	LGBF		3	W12			30	311	3/0-0-1-0	M3
2315	POLYCHLORINATED BIPHENYLS, LIQUID	9	M2	II	9	305	1l	E2	P906 IBC02		MP15	T4	TP1	L4BH	TU15	0		VC1 VC2 AP9	CW13 CW28 CW31	90	904	-	-
2316	SODIUM CUPROCYANIDE, SOLID	6.1	T5	I	6.1		0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31	66	619	1-1-1-1	M1
2317	SODIUM CUPROCYANIDE SOLUTION	6.1	T4	I	6.1		0	E5	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	622	1-1*-1-1	M1
2318	SODIUM HYDROSULPHIDE with less than 25% water of crystallization	4.2	S4	II	4.2	504	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
2319	TERPENE HYDROCARBONS, N.O.S.	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	315	3/0-0-1-0	M3
2320	TETRAETHYLENEPENTAMINE	8	C7	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humming 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2321	TRICHLOROBENZENES, LIQUID	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2322	TRICHLOROBUTENE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	605	-	-
2323	TRIETHYL PHOSPHITE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	327	3/0-0-1-0	M3
2324	TRISOBUTYLENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
2325	1,3,5-TRIMETHYLBENZENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3
2326	TRIMETHYLCYCLO-HEXYLAMINE	8	C7	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3
2327	TRIMETHYLHEXAMETHYLENE- DIAMINES	8	C7	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3
2328	TRIMETHYLHEXAMETHYLENE DIISOCYANATE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP2	L4BH	TU15	2	W12		CW13 CW28 CW31	60	609	-	M3
2329	TRIMETHYL PHOSPHITE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	327	3/0-0-1-0	M3
2330	UNDECANE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
2331	ZINC CHLORIDE, ANHYDROUS	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2332	ACETALDEHYDE OXIME	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	LGBF		3	W12			30	326	3/0-0-1-0	M3
2333	ALLYL ACETATE	3	FT1	II	3+6.1		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	313	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2334	ALLYLAMINE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48 CW55	663	648	3/1-1*-1-1	M2
2335	ALLYL ETHYL ETHER	3	FT1	II	3+6.1		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	313	3/0-0-1-0	M3
2336	ALLYL FORMATE	3	FT1	I	3+6.1		0	E0	P001		MP7 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	313	3/0-0-1-0	M3
2337	PHENYL MERCAPTAN	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/1-1*-1-1	M2
2338	BENZOTRIFLUORIDE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2339	2-BROMOBUTANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2340	2-BROMOETHYL ETHYL ETHER	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2341	1-BROMO-3-METHYLBUTANE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	324	3/0-0-1-0	M3
2342	BROMOMETHYLPROPANES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2343	2-BROMOPENTANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2344	BROMOPROPANES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2344	BROMOPROPANES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	312	3/0-0-1-0	M3
2345	3-BROMOPROPYNE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2346	BUTANEDIONE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2347	BUTYL MERCAPTAN	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	304	3/0-0-1-0	M3
2348	BUTYL ACRYLATES, STABILIZED	3	F1	III	3	386 676	5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			39	316	3/0-0-1-0	M3
2350	BUTYL METHYL ETHER	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2351	BUTYL NITRITES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	310	3/0-0-1-0	M3
2351	BUTYL NITRITES	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	310	3/0-0-1-0	M3
2352	BUTYL VINYL ETHER, STABILIZED	3	F1	II	3	386 676	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	306	3/1-1*-1-1	M3
2353	BUTYRYL CHLORIDE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T8	TP2	L4BH		2				338	323	3/0-0-1-0	M3
2354	CHLOROMETHYL ETHYL ETHER	3	FT1	II	3+6.1		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	312	3/0-0-1-0	M3
2356	2-CHLOROPROPANE	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				33	304	3/0-0-1-0	M3
2357	CYCLOHEXYLAMINE	8	CF1	II	8+3		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	807	3/0-0-1-0	M3
2358	CYCLOOCTATETRAENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2359	DIALLYLAMINE	3	FTC	II	3+6.1+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	338	311	3/0-0-1-0	M3
2360	DIALLYL ETHER	3	FT1	II	3+6.1		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	306	3/0-0-1-0	M3
2361	DIISOBUTYLAMINE	3	FC	III	3+8		5I	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		3	W12			38	325	3/0-0-1-0	M3
2362	1,1-DICHLOROETHANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2363	ETHYL MERCAPTAN	3	F1	I	3		0	E0	P001		MP7 MP17	T11	TP2	L4BN		1			CW48	33	304	3/1-1*-1-1	M3
2364	n-PROPYLBENZENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2366	DIETHYL CARBONATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2367	alpha-METHYLVALERALDEHYDE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
2368	alpha-PINENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3
2370	1-HEXENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	0-0-1-0	M3
2371	ISOPENTENES	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				33	301	3/0-0-1-0	M1
2372	1,2-DI-(DIMETHYLAMINO) ETHANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	310	3/0-0-1-0	M3
2373	DIETHOXYMETHANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2374	3,3-DIETHOXYPROPENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2375	DIETHYL SULPHIDE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T7	TP1	LGBF		2				33	304	3/0-0-1-0	M3
2376	2,3-DIHYDROPYRAN	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2377	1,1-DIMETHOXYETHANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T7	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2378	2-DIMETHYLAMINOACETONITRILE	3	FT1	II	3+6.1		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	310	3/0-0-1-0	M3
2379	1,3-DIMETHYLBUTYLAMINE	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
2380	DIMETHYLDIETHOXYLANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2			CW48	33	306	3/0-0-1-0	M3
2381	DIMETHYL DISULPHIDE	3	FT1	II	3 +6.1		1I	E0	P001 IBC02		MP19	T7	TP2 TP39	L4BH	TU15	2			CW13 CW28	336	304	3/0-0-1-0	M3
2382	DIMETHYLHYDRAZINE, SYMMETRICAL	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW46 CW55 CW69	663	648	3/1-1*-1-1	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2383	DIPROPYLAMINE	3	FC	II	3+8		II	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
2384	DI-n-PROPYL ETHER	3	F1	II	3		II	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2385	ETHYL ISOBUTYRATE	3	F1	II	3		II	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2386	1-ETHYLPYPERIDINE	3	FC	II	3+8		II	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
2387	FLUOROBENZENE	3	F1	II	3		II	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2388	FLUOROTOLUENES	3	F1	II	3		II	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2389	FURAN	3	F1	I	3		0	E3	P001		MP7 MP17	T12	TP2	L4BN		1				33	301	3/0-0-1-0	M3
2390	2-IODOBUTANE	3	F1	II	3		II	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2391	IODOMETHYLPROPANES	3	F1	II	3		II	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2392	IODOPROPANES	3	F1	III	3		SI	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	324	3/0-0-1-0	M3
2393	ISOBUTYL FORMATE	3	F1	II	3		II	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2394	ISOBUTYL PROPIONATE	3	F1	III	3		SI	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	306	3/0-0-1-0	M3
2395	ISOBUTYRYL CHLORIDE	3	FC	II	3+8		II	E2	P001 IBC02		MP19	T7	TP2	L4BH		2				338	323	3/0-0-1-0	M3
2396	METHACRYLALDEHYDE, STABILIZED	3	FT1	II	3+6.1	386 676	II	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	313	3/0-0-1-0	M3
2397	3-METHYLBUTAN-2-ONE	3	F1	II	3		II	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	307	3/0-0-1-0	M3
2398	METHYL tert-BUTYL ETHER	3	F1	II	3		II	E2	P001 IBC02 R001		MP19	T7	TP1	LGBF		2				33	301	3/0-0-1-0	M3
2399	1-METHYLPYPERIDINE	3	FC	II	3+8		II	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2400	METHYL ISOVALERATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2401	PIPERIDINE	8	CF1	I	8+3		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1			CW48	883	807	3/0-0-1-0	M3
2402	PROPANETHIOLS	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	304	3/0-0-1-0	M3
2403	ISOPROPENYL ACETATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2404	PROPIONITRILE	3	FT1	II	3+6.1		1I	E0	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	310	3/0-0-1-0	M3
2405	ISOPROPYL BUTYRATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2406	ISOPROPYL ISOBUTYRATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2407	ISOPROPYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8	354	0	E0	P602		MP8 MP17					1			CW13 CW28 CW31 CW47 CW48	663	611	3/1-1*-1-1	M2
2409	ISOPROPYL PROPIONATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2410	1,2,3,6-TETRAHYDROPYRIDINE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	310	3/0-0-1-0	M3
2411	BUTYRONITRILE	3	FT1	II	3+6.1		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	310	3/0-0-1-0	M3
2412	TETRAHYDROTHIOPHENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	304	3/0-0-1-0	M3
2413	TETRAPROPYL ORTHOTITANATE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2414	THIOPHENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	304	3/0-0-1-0	M3
2416	TRIMETHYL BORATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T7	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2417	CARBONYL FLUORIDE	2	2TC		2.3+8 (+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TU50	1			CW9 CW10	268	203	0-0-1-0 0-0-3-0	M1 M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note									
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humpling							
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6							
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21b)							
2418	SULPHUR TETRAFLUORIDE	2	2TC		2.3+8		0	E0	P200		MP9					1			CW9 CW10 CW36	268	203	1-1*-1-1	M1							
2419	BROMOTRIFLUOROETHYLENE	2	2F		2.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TE22	2			CW9 CW10 CW36	23	206	3/0-0-1-0	M2							
2420	HEXAFLUOROACETONE	2	2TC		2.3+8(+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TE22	1			CW9 CW10 CW36	268	203	3/0-0-3-0	M1							
2421	NITROGEN TRIOXIDE	2	2TOC						CARRIAGE PROHIBITED																					
2422	OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)	2	2A		2.2(+13)	662	120 ml	E1	P200		MP9	(M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-1-0	M2							
2424	OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)	2	2A		2.2(+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW36	20	201	0-0-3-0	M1							
2426	AMMONIUM NITRATE, LIQUID (hot concentrated solution)	5.1	O1		5.1	252	0	E0				T7	TP1 TP16 TP17	L4BV(+)	TU3 TU12 TU29 TC3 TE9 TE10 TA1	0				59	505	0-0-1-0	-							
2427	POTASSIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	II	5.1		1l	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24	50	505	-	M3							
2427	POTASSIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	III	5.1		5l	E1	P504 IBC02 R001		MP2	T4	TP1	LGBV	TU3	3			CW24	50	505	-	M3							
2428	SODIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	II	5.1		1l	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24	50	505	0-0-1-0	M3							
2428	SODIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	III	5.1		5l	E1	P504 IBC02 R001		MP2	T4	TP1	LGBV	TU3	3			CW24	50	505	0-0-1-0	M3							
2429	CALCIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	II	5.1		1l	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24	50	505	-	M3							
2429	CALCIUM CHLORATE, AQUEOUS SOLUTION	5.1	O1	III	5.1		5l	E1	P504 IBC02 R001		MP2	T4	TP1	LGBV	TU3	3			CW24	50	505	-	M3							
2430	ALKYLPHENOLS, SOLID, N.O.S. (including C2-C12 homologues)	8	C4	I	8		0	E0	P002 IBC07		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1	W10			88	804	-	M3							
2430	ALKYLPHENOLS, SOLID, N.O.S. (including C2-C12 homologues)	8	C4	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	804	-	M3							
2430	ALKYLPHENOLS, SOLID, N.O.S. (including C2-C12 homologues)	8	C4	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	804	-	M3							
2431	ANISIDINES	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	616	-	M3							

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2432	N,N-DIETHYLANILINE	6.1	T1	III	6.1	279	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2433	CHLORONITROTOLUENES, LIQUID	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	616	-	M3
2434	DIBENZYL-DICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/1-1*-1-1	M3
2435	ETHYLPHENYL-DICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	-	M3
2436	THIOACETIC ACID	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	304	3/0-0-1-0	M3
2437	METHYLPHENYL-DICHLOROSILANE	8	C3	II	8		0	E0	P010		MP15	T10	TP2 TP7	L4BN		2				X80	805	3/0-0-1-0	M3
2438	TRIMETHYLACETYL CHLORIDE	6.1	TFC	I	6.1+3+8		0	E0	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW47 CW48 CW55	663	611	3/1-1*-1-1	M2
2439	SODIUM HYDROGENDIFLUORIDE	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	0-0-1-0	M3
2440	STANNIC CHLORIDE PENTAHYDRATE	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2441	TITANIUM TRICHLORIDE, PYROPHORIC or TITANIUM TRICHLORIDE MIXTURE,	4.2	SC4	I	4.2+8	537	0	E0	P404		MP13					0	W1			48	406	3/0-0-1-0	M3
2442	TRICHLOROACETYL CHLORIDE	8	C3	II	8		0	E0	P001		MP15	T7	TP2	L4BN		2				X80	803	3/1-1*-1-1	M3
2443	VANADIUM OXYTRICHLORIDE	8	C1	II	8		1I	E0	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	-	M3
2444	VANADIUM TETRACHLORIDE	8	C1	I	8		0	E0	P802		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1				X88	801	0-0-1-0	M3
2446	NITROCRESOLS, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
2447	PHOSPHORUS, WHITE, MOLTEN	4.2	ST3	I	4.2+ 6.1		0	E0				T21	TP3 TP7 TP26	L10DH(+)	TU14 TU16 TU21 TU38 TE3 TE21 TE22	0			CW66	446	406	3/1-1*-3-1	M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2448	SULPHUR, MOLTEN	4.1	F3	III	4.1	538	0	E0				T1	TP3	LGBV(+)	TU27 TE4 TE6	3				44	404	3/0-0-1-0	-
2451	NITROGEN TRIFLUORIDE	2	2O		2.2+ 5.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9	3			CW9 CW10	25	202	0-0-1-0 0-0-3-0	M2 M1
2452	ETHYLACETYLENE, STABILIZED	2	2F		2.1 (+13)	386 662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TE22	2			CW9 CW10	239	206	3/0-0-1-0 3/0-0-3-0	M2 M1
2453	ETHYL FLUORIDE (REFRIGERANT GAS R 161)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TE22	2			CW9 CW10	23	205	3/0-0-1-0 3/0-0-3-0	M2 M1
2454	METHYL FLUORIDE (REFRIGERANT GAS R 41)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TU50	2			CW9 CW10	23	205	3/0-0-1-0 3/0-0-3-0	M2 M1
2455	METHYL NITRITE	2	2A						CARRIAGE PROHIBITED														
2456	2-CHLOROPROPENE	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				33	304	3/0-0-1-0	M3
2457	2,3-DIMETHYLBUTANE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T7	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2458	HEXADIENES	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2459	2-METHYL-1-BUTENE	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				33	301	3/0-0-1-0	M3
2460	2-METHYL-2-BUTENE	3	F1	II	3		1I	E2	P001 IBC02	B8	MP19	T7	TP1	L1,5BN		2				33	305	3/0-0-1-0	M3
2461	METHYLPENTADIENE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
2463	ALUMINIUM HYDRIDE	4.3	W2	I	4.3		0	E0	P403		MP2					1	W1		CW23	X423	409	0-0-1-0	M3
2464	BERYLLIUM NITRATE	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
2465	DICHLOROISOCYANURIC ACID, DRY or DICHLOROISOCYANURIC ACID SALTS	5.1	O2	II	5.1	135	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
2466	POTASSIUM SUPEROXIDE	5.1	O2	I	5.1		0	E0	P503 IBC06		MP2					1	W10		CW24	55	509	-	M3
2468	TRICHLOROISOCYANURIC ACID, DRY	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
2469	ZINC BROMATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
2470	PHENYLACETONITRILE, LIQUID	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2471	OSMIUM TETROXIDE	6.1	T5	I	6.1		0	E5	P002 IBC07	PP30	MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31	66	603	1-1*-1-1	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2473	SODIUM ARSANILATE	6.1	T3	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	626	-	M3
2474	THIOPHOSGENE	6.1	T1	I	6.1	279 354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	612	-	-
2475	VANADIUM TRICHLORIDE	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2477	METHYL ISOTHIOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/1-1*-1-1	M2
2478	ISOCYANATES, FLAMMABLE, TOXIC, N.O.S. or ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274 539	1I	E2	P001 IBC02		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28	336	333	3/0-0-1-0	M3
2478	ISOCYANATES, FLAMMABLE, TOXIC, N.O.S. or ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	274	5I	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BH	TU15	3	W12		CW13 CW28	36	333	3/0-0-1-0	M3
2480	METHYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P601		MP2	T22	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW55	663	609	3/1-1*-1-1	M3
2481	ETHYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31	663	609	3/0-0-1-0	M3
2482	n-PROPYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	663	609	3/1-1*-1-1	M2
2483	ISOPROPYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/0-0-1-0	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2484	tert-BUTYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	663	609	3/1-1*-1-1	M2
2485	n-BUTYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	663	609	3/1-1*-1-1	M2
2486	ISOBUTYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/0-0-1-0	M3
2487	PHENYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/0-0-1-0	-
2488	CYCLOHEXYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/0-0-1-0	-
2490	DICHLOROISOPROPYL ETHER	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	606	-	-
2491	ETHANOLAMINE or ETHANOLAMINE SOLUTION	8	C7	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3
2493	HEXAMETHYLENEIMINE	3	FC	II	3+8		1l	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
2495	IODINE PENTAFLUORIDE	5.1	OTC	I	5.1+6.1+ 8		0	E0	P200		MP2			L10DH	TU3 TU38 TE16 TE22	1			CW24 CW28	568	504	0-0-1-0	M3
2496	PROPIONIC ANHYDRIDE	8	C3	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3
2498	1,2,3,6-TETRAHYDRO-BENZALDEHYDE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2501	TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE SOLUTION	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	614	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2501	TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE SOLUTION	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	614	-	M3
2502	VALERYL CHLORIDE	8	CF1	II	8+3		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	803	3/0-0-1-0	M3
2503	ZIRCONIUM TETRACHLORIDE	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2504	TETRABROMOETHANE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	M3
2505	AMMONIUM FLUORIDE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	603	-	M3
2506	AMMONIUM HYDROGEN SULPHATE	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAV		2	W11	VC1 VC2 AP7		80	806	-	M3
2507	CHLOROPLATINIC ACID, SOLID	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	-
2508	MOLYBDENUM PENTACHLORIDE	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2509	POTASSIUM HYDROGEN SULPHATE	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAV		2	W11	VC1 VC2 AP7		80	806	-	-
2511	2-CHLOROPROPIONIC ACID	8	C3	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP2	L4BN		3	W12			80	803	-	M3
2512	AMINOPHENOLS (o-, m-, p-)	6.1	T2	III	6.1	279	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
2513	BROMOACETYL BROMIDE	8	C3	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				X80	803	3/1-1*-1-1	M3
2514	BROMOBENZENE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	318	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2515	BROMOFORM	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	M3
2516	CARBON TETRABROMIDE	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	605	-	M3
2517	1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22	2			CW9 CW10	23	205	3/0-0-1-0 3/0-0-3-0	M2 M1
2518	1,5,9-CYCLODODECATRIENE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	614	-	-
2520	CYCLOOCTADIENES	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
2521	DIKETENE, STABILIZED	6.1	TF1	I	6.1+3	354 386 676	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	650	3/0-0-1-0	M3
2522	2-DIMETHYLAMINOETHYL METHACRYLATE, STABILIZED	6.1	T1	II	6.1	386 676	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	69	614	-	-
2524	ETHYL ORTHOFORMATE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2525	ETHYL OXALATE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	607	-	M3
2526	FURFURYLAMINE	3	FC	III	3+8		5l	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		3	W12			38	325	3/0-0-1-0	M3
2527	ISOBUTYL ACRYLATE, STABILIZED	3	F1	III	3	386 676	5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			39	316	3/1-1*-1-1	M2
2528	ISOBUTYL ISOBUTYRATE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2529	ISOBUTYRIC ACID	3	FC	III	3+8		5l	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		3	W12			38	320	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2531	METHACRYLIC ACID, STABILIZED	8	C3	II	8	386 676	1I	E2	P001 IBC02 LP01		MP15	T7	TP2 TP18 TP30	L4BN		2				89	803	-	M3
2533	METHYL TRICHLOROACETATE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	606	-	M3
2534	METHYLCHLOROSILANE	2	2TFC		2.3+2.1+ 8		0	E0	P200		MP9	(M)				1			CW9 CW10 CW36 CW48	263	210	3/1-1*-1-1	M1
2535	4-METHYLMORPHOLINE (N-METHYLMORPHOLINE)	3	FC	II	3+8		1I	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
2536	METHYLTETRAHYDROFURAN	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2538	NITRONAPHTHALENE	4.1	F1	III	4.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
2541	TERPINOLENE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3
2542	TRIBUTYLAMINE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	614	-	-
2545	HAFNIUM POWDER, DRY	4.2	S4	I	4.2	540	0	E0	P404		MP13					0	W1			43	405	3/0-0-1-0	M3
2545	HAFNIUM POWDER, DRY	4.2	S4	II	4.2	540	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
2545	HAFNIUM POWDER, DRY	4.2	S4	III	4.2	540	0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
2546	TITANIUM POWDER, DRY	4.2	S4	I	4.2	540	0	E0	P404		MP13					0	W1			43	405	3/0-0-1-0	-
2546	TITANIUM POWDER, DRY	4.2	S4	II	4.2	540	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	-
2546	TITANIUM POWDER, DRY	4.2	S4	III	4.2	540	0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	-
2547	SODIUM SUPEROXIDE	5.1	O2	I	5.1		0	E0	P503 IBC06		MP2					1	W10		CW24	55	509	-	M3
2548	CHLORINE PENTAFLUORIDE	2	2TOC		2.3+ 5.1+8		0	E0	P200		MP9					1			CW9 CW10 CW36	265	211	1-1-1-1	M2
2552	HEXAFLUOROACETONE HYDRATE, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	625	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2554	METHYLALYL CHLORIDE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	312	3/0-0-1-0	M3
2555	NITROCELLULOSE WITH WATER (not less than 25% water, by mass)	4.1	D	II	4.1	28 394 541	0	E0	P406		MP2					2	W1		CW70	40	402	3/0-0-1-0	M3
2556	NITROCELLULOSE WITH ALCOHOL (not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass)	4.1	D	II	4.1	28 394 541	0	E0	P406		MP2					2	W1		CW70	40	402	3/0-0-1-0	M3
2557	NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITH or WITHOUT PLASTICIZER, WITH or WITHOUT PIGMENT	4.1	D	II	4.1	241 394 541	0	E0	P406		MP2					2	W1		CW70	40	402	3/0-0-1-0	M3
2558	EPIBROMOHYDRIN	6.1	TF1	I	6.1+3		0	E0	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	647	3/1-1*-1-1	M2
2560	2-METHYLPENTAN-2-OL	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2561	3-METHYL-1-BUTENE	3	F1	I	3		0	E3	P001		MP7 MP17	T11	TP2	L4BN		1				33	301	3/0-0-1-0	M3
2564	TRICHLOROACETIC ACID SOLUTION	8	C3	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	803	-	M3
2564	TRICHLOROACETIC ACID SOLUTION	8	C3	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3
2565	DICYCLOHEXYLAMINE	8	C7	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3
2567	SODIUM PENTACHLOROPHENATE	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	620	-	-
2570	CADMIUM COMPOUND	6.1	T5	I	6.1	274 596	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	1-1-1-1	M3
2570	CADMIUM COMPOUND	6.1	T5	II	6.1	274 596	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	1-1-1-1	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2570	CADMIUM COMPOUND	6.1	T5	III	6.1	274 596	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	1-1-1-1	M3
2571	ALKYLSULPHURIC ACIDS	8	C3	II	8		1l	E2	P001 IBC02		MP15	T8	TP2 TP28	L4BN		2				80	803	-	-
2572	PHENYLHYDRAZINE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	616	-	-
2573	THALLIUM (I) CHLORATE	5.1	OT2	II	5.1+ 6.1		1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
2574	TRICRESYL PHOSPHATE with more than 3% ortho isomer	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	614	-	-
2576	PHOSPHORUS OXYBROMIDE, MOLTEN	8	C1	II	8		0	E0				T7	TP3	L4BN		2				80	801	-	-
2577	PHENYLACETYL CHLORIDE	8	C3	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	804	-	M3
2578	PHOSPHORUS TRIOXIDE	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2579	PIPERAZINE	8	C8	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	807	0-0-1-0	M3
2580	ALUMINIUM BROMIDE SOLUTION	8	C1	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3
2581	ALUMINIUM CHLORIDE SOLUTION	8	C1	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3
2582	FERRIC (III) CHLORIDE SOLUTION	8	C1	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3
2583	ALKYLSULPHONIC ACIDS, SOLID or ARYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	803	-	M3
2584	ALKYLSULPHONIC ACIDS, LIQUID or ARYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid	8	C1	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	803	-	M3
2585	ALKYLSULPHONIC ACIDS, SOLID or ARYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid	8	C4	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	803	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergen cy card number	Minimum protective distance	Humpin g
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2									1.1.3.6				5.3.2.3			
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2586	ALKYLSULPHONIC ACIDS, LIQUID or ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid	8	C3	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3
2587	BENZOQUINONE	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	616	-	-
2588	PESTICIDE, SOLID, TOXIC, N.O.S.	6.1	T7	I	6.1	61 274 648	0	E5	P002 IBC02		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	613	1-1*-1-1	M3
2588	PESTICIDE, SOLID, TOXIC, N.O.S.	6.1	T7	II	6.1	61 274 648	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	1-1*-1-1	M3
2588	PESTICIDE, SOLID, TOXIC, N.O.S.	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	1-1*-1-1	M3
2589	VINYL CHLOROACETATE	6.1	TF1	II	6.1+3		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	63	647	3/0-0-1-0	-
2590	ASBESTOS, CHRYSOTILE	9	M1	III	9	168 678	5 kr	E1	P002 IBC08 R001	PP37 B4	MP10	T1	TP33	SGAH	TU15	3	W11	VC1 VC2 AP12	CW13 CW28 CW31 CW38	90	904	-	-
2591	XENON, REFRIGERATED LIQUID	2	3A		2.2 (+13)	593	120 ml	E1	P203		MP9	T75	TP5	RxBN	TU19 TA4 TT9	3	W5		CW9 CW11	22	201	0-0-1-0 0-0-3-0	M2 M1
2599	CHLOROTRIFLUOROMETHANE AND TRIFLUOROETHANE AZEOTROPIC MIXTURE, w/w 1:1 (50%)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	(M)		PxBN(M)	TU50 TA4 TT9 TM6	3			CW9 CW10 CW28	20	201	0-0-1-0 0-0-3-0	M2 M1
2601	CYCLOBUTANE	2	2F		2.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TE22 TA4 TT9 TM6	2			CW9 CW10 CW28	23	206	3/0-0-1-0 3/0-0-3-0	M2 M1
2602	DICHLORODIFLUOROMETHANE AND 1,1-DIFLUOROETHANE AZEOTROPIC MIXTURE, w/w 1:1 (34%)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW28	20	201	0-0-1-0 0-0-3-0	M2 M1
2603	CYCLOHEPTATRIENE	3	FT1	II	3+6.1		1l	E2	P001 IBC02		MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	313	3/0-0-1-0	M3
2604	BORON TRIFLUORIDE DIETHYL ETHERATE	8	CF1	I	8+3		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1				883	812	3/1-1*-1-1	M3
2605	METHOXYMETHYL ISOCYANATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2606	METHYL ORTHOSILICATE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48 CW55	663	607	3/1-1*-1-1	M2
2607	ACROLEIN DIMER, STABILIZED	3	F1	III	3	386 676	SI	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			39	316	3/1-1*-1-1	M3
2608	NITROPROPANES	3	F1	III	3		SI	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	326	3/0-0-1-0	M3
2609	TRIALLYL BORATE	6.1	T1	III	6.1		SI	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	626	-	M3
2610	TRIALLYLAMINE	3	FC	III	3+8		SI	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		3	W12			38	325	3/0-0-1-0	M3
2611	PROPYLENE CHLOROXYDRIN	6.1	TF1	II	6.1+3		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	63	647	3/0-0-1-0	-
2612	METHYL PROPYL ETHER	3	F1	II	3		1I	E2	P001 IBC02	B8	MP19	T7	TP2	L1,5BN		2				33	306	3/0-0-1-0	M3
2614	METHALLYL ALCOHOL	3	F1	III	3		SI	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2615	ETHYL PROPYL ETHER	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2616	TRIISOPROPYL BORATE	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	306	3/0-0-1-0	M3
2616	TRIISOPROPYL BORATE	3	F1	III	3		SI	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	306	3/0-0-1-0	M3
2617	METHYLCYCLOHEXANOLS, flammable	3	F1	III	3		SI	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2618	VINYLTOLUENES, STABILIZED	3	F1	III	3	386 676	SI	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			39	317	3/1-1*-1-1	M2
2619	BENZYLDIMETHYLAMINE	8	CF1	II	8+3		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	807	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2620	AMYL BUTYRATES	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2621	ACETYL METHYL CARBINOL	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2622	GLYCIDALDEHYDE	3	FT1	II	3+6.1		1l	E2	P001 IBC02	B8	MP19	T7	TP1	L4BH	TU15	2			CW13 CW28	336	313	3/0-0-1-0	M3
2623	FIRELIGHTERS, SOLID with flammable liquid	4.1	F1	III	4.1		5kg	E1	P002 LP02 R001	PP15	MP11					4	W1			40	410	3/0-0-1-0	M3
2624	MAGNESIUM SILICIDE	4.3	W2	II	4.3		500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1		CW23	423	409	3/0-0-1-0	M3
2626	CHLORIC ACID, AQUEOUS SOLUTION with not more than 10% chloric acid	5.1	O1	II	5.1	613	1l	E0	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24	50	505	0-0-1-0	M3
2627	NITRITES, INORGANIC, N.O.S.	5.1	O2	II	5.1	103 274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
2628	POTASSIUM FLUOROACETATE	6.1	T2	I	6.1		0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31	66	620	1-1*-1-1	-
2629	SODIUM FLUOROACETATE	6.1	T2	I	6.1		0	E5	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31	66	620	1-1*-1-1	-
2630	SELENATES or SELENITES	6.1	T5	I	6.1	274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	-
2642	FLUOROACETIC ACID	6.1	T2	I	6.1		0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	625	1-1*-1-1	-
2643	METHYL BROMOACETATE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	606	-	-
2644	METHYL IODIDE	6.1	T1	I	6.1	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	605	1-1*-1-1	-
2645	PHENACYL BROMIDE	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	616	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2646	HEXACHLOROCYCLOPENTADIENE	6.1	T1	I	6.1	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	605	1-1*-1-1	-
2647	MALONONITRILE	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
2648	1,2-DIBROMOBUTAN-3-ONE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	606	-	-
2649	1,3-DICHLOROACETONE	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	625	-	-
2650	1,1-DICHLORO-1-NITROETHANE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	624	-	-
2651	4,4'-DIAMINODIPHENYLMETHANE	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
2653	BENZYL IODIDE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	605	-	-
2655	POTASSIUM FLUOROSILICATE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	603	-	M3
2656	QUINOLINE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2657	SELENIUM DISULPHIDE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	617	-	-
2659	SODIUM CHLOROACETATE	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	620	-	M3
2660	NITROTOLUIDINES (MONO-)	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
2661	HEXACHLOROACETONE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	625	-	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2664	DIBROMOMETHANE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	M3
2667	BUTYLTOLUENES	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	616	-	M3
2668	CHLOROACETONITRILE	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/0-0-1-0	-
2669	CHLOROCRESOLS SOLUTION	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	616	-	-
2669	CHLOROCRESOLS SOLUTION	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP2	L4BH	TU15	2	W12		CW13 CW28 CW31	60	616	-	-
2670	CYANURIC CHLORIDE	8	C4	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	803	-	M3
2671	AMINOPYRIDINES (o-, m-, p-)	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
2672	AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia	8	C5	III	8	801	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP1	L4BN		3	W12			80	809	-	M3
2673	2-AMINO-4-CHLOROPHENOL	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	616	-	-
2674	SODIUM FLUOROSILICATE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	619	-	M3
2676	STIBINE	2	2TF		2.3+2.1		0	E0	P200		MP9					1			CW9 CW10 CW36	263	209	3/1-1-1-1	M2
2677	RUBIDIUM HYDROXIDE SOLUTION	8	C5	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	809	-	M3
2677	RUBIDIUM HYDROXIDE SOLUTION	8	C5	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	809	-	M3
2678	RUBIDIUM HYDROXIDE	8	C6	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		3	W11			80	808	-	M3
2679	LITHIUM HYDROXIDE SOLUTION	8	C5	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		3				80	809	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humming 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2679	LITHIUM HYDROXIDE SOLUTION	8	C5	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP2	L4BN		3	W12			80	809	-	M3
2680	LITHIUM HYDROXIDE	8	C6	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	808	-	M3
2681	CAESIUM HYDROXIDE SOLUTION	8	C5	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	809	-	M3
2681	CAESIUM HYDROXIDE SOLUTION	8	C5	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	809	-	M3
2682	CAESIUM HYDROXIDE	8	C6	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	808	-	M3
2683	AMMONIUM SULPHIDE SOLUTION	8	CFT	II	8+3+ 6.1		1l	E2	P001 IBC01		MP15	T7	TP2	L4BN		2			CW13 CW28	836	809	0-0-1-0	M3
2684	3-DIETHYLAMINOPROPYLAMINE	3	FC	III	3+8		5l	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		3	W12			38	325	3/0-0-1-0	M3
2685	N,N-DIETHYLETHYLENEDIAMINE	8	CF1	II	8+3		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	807	3/0-0-1-0	M3
2686	2-DIETHYLAMINOETHANOL	8	CF1	II	8+3		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	807	3/0-0-1-0	M3
2687	DICYCLOHEXYLAMMONIUM NITRITE	4.1	F3	III	4.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	-
2688	1-BROMO-3-CHLOROPROPANE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	M3
2689	GLYCEROL alpha- MONOCHLOROHYDRIN	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	625	-	M3
2690	N,n-BUTYLIMIDAZOLE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2691	PHOSPHORUS PENTABROMIDE	8	C2	II	8		1kg	E0	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	-	M3
2692	BORON TRIBROMIDE	8	C1	I	8		0	E0	P602		MP8 MP17	T20	TP2	L10BH	TU38 TE22	1				X88	801	3/1-1*-1-1	M3
2693	BISULPHITES, AQUEOUS SOLUTION, N.O.S.	8	C1	III	8	274	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	816	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2698	TETRAHYDROPHthalic ANHYDRIDES with more than 0.05% of maleic anhydride	8	C4	III	8	169	5kg	E1	P002 IBC08 LP02 R001	PP14 B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	804	-	M3
2699	TRIFLUOROACETIC ACID	8	C3	I	8		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1				88	803	0-0-1-0	M3
2705	1-PENTOL	8	C9	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	803	-	M3
2707	DIMETHYLDIOXANES	3	F1	II	3		1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	316	3/0-0-1-0	M3
2707	DIMETHYLDIOXANES	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2709	BUTYLBENZENES	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	317	3/0-0-1-0	M3
2710	DIPROPYL KETONE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2713	ACRIDINE	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
2714	ZINC RESINATE	4.1	F3	III	4.1		5kg	E1	P002 IBC06 R001		MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
2715	ALUMINIUM RESINATE	4.1	F3	III	4.1		5kg	E1	P002 IBC06 R001		MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
2716	1,4-BUTYNE DIOL	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	607	3/0-0-1-0	M3
2717	CAMPBOR, synthetic	4.1	F1	III	4.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3	W1	VC1 VC2		40	402	3/0-0-1-0	M3
2719	BARIIUM BROMATE	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
2720	CHROMIUM (III) NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2721	COPPER (III) CHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
2722	LITHIUM NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
2723	MAGNESIUM CHLORATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	M3
2724	MANGANESE (II) NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
2725	NICKEL (II) NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
2726	NICKEL (II) NITRITE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
2727	THALLIUM (I) NITRATE	6.1	TO2	II	6.1+ 5.1		500g	E4	P002 IBC06		MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	65	657	1-1*-1-1	-
2728	ZIRCONIUM NITRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
2729	HEXACHLOROBENZENE	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
2730	NITROANISOLE, LIQUID	6.1	T1	III	6.1	279	5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	616	-	M3
2732	NITROBROMOBENZENES, LIQUID	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	3	FC	I	3+8	274 544	0	E0	P001		MP7 MP17	T14	TP1 TP27	L10CH	TU14 TU38 TE21 TE22	1				338	330	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	3	FC	II	3+8	274 544	1I	E2	P001 IBC02		MP19	T11	TP1 TP27	L4BH		2				338	330	3/0-0-1-0	M3
2733	AMINES, FLAMMABLE, CORROSIVE, N.O.S. or POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	3	FC	III	3+8	274 544	5I	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BN		3	W12			38	330	3/0-0-1-0	M3
2734	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	8	CF1	I	8+3	274	0	E0	P001		MP8 MP17	T14	TP2 TP27	L10BH	TU38 TE22	1				883	821	3/0-0-1-0	M3
2734	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	8	CF1	II	8+3	274	1I	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				83	821	3/0-0-1-0	M3
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	C7	I	8	274	0	E0	P001		MP8 MP17	T14	TP2 TP27	L10BH	TU38 TE22	1				88	821	0-0-1-0	M3
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	C7	II	8	274	1I	E2	P001 IBC02		MP15	T11	TP1 TP27	L4BN		2				80	821	0-0-1-0	M3
2735	AMINES, LIQUID, CORROSIVE, N.O.S. or POLYAMINES, LIQUID, CORROSIVE, N.O.S.	8	C7	III	8	274	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	821	0-0-1-0	M3
2738	N-BUTYLANILINE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2739	BUTYRIC ANHYDRIDE	8	C3	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3
2740	n-PROPYL CHLOROFORMATE	6.1	TFC	I	6.1+3+8		0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	668	611	3/1-1*-1-1	-
2741	BARIUM HYPOCHLORITE with more than 22% available chlorine	5.1	OT2	II	5.1+6.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	-	M3
2742	CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	TFC	II	6.1+3+8	274 561	100 ml	E4	P001 IBC01		MP15			L4BH	TU15	2			CW13 CW28 CW31	638	637	3/0-0-1-0	M3
2743	n-BUTYL CHLOROFORMATE	6.1	TFC	II	6.1+3+8		100 ml	E0	P001		MP15	T20	TP2	L4BH	TU15	2			CW13 CW28 CW31 CW55	638	611	3/0-0-1-0	-
2744	CYCLOBUTYL CHLOROFORMATE	6.1	TFC	II	6.1+3+8		100 ml	E4	P001 IBC01		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31 CW55	638	611	3/0-0-1-0	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergen cy card number	Minimum protective distance	Humpin g
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2745	CHLOROMETHYL CHLOROFORMATE	6.1	TC1	II	6.1+8		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	68	611	-	-
2746	PHENYL CHLOROFORMATE	6.1	TC1	II	6.1+8		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	68	611	-	-
2747	tert-BUTYLCYCLOHEXYL CHLOROFORMATE	6.1	T1	III	6.1		SI	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	611	-	M3
2748	2-ETHYLHEXYL CHLOROFORMATE	6.1	TC1	II	6.1+8		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	68	611	-	-
2749	TETRAMETHYLSILANE	3	F1	I	3		0	E0	P001		MP7 MP17	T14	TP2	L4BN		1				33	304	3/0-0-1-0	M3
2750	1,3-DICHLOROPROPANOL-2	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	606	-	-
2751	DIETHYLTHIOPHOSPHORYL CHLORIDE	8	C3	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	803	-	M3
2752	1,2-EPOXY-3-ETHOXYPROPANE	3	F1	III	3		SI	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
2753	N-ETHYLBENZYL TOLUIDINES, LIQUID	6.1	T1	III	6.1		SI	E1	P001 IBC03 LP01 R001		MP19	T7	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2754	N-ETHYL TOLUIDINES	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2757	CARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2757	CARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648	500 g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
2757	CARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2758	CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2758	CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2759	ARSENICAL PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 0		E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2759	ARSENICAL PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 500g		E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
2759	ARSENICAL PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 5kg		E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3
2760	ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2760	ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2761	ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 0		E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2761	ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 500g		E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
2761	ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 5kg		E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2762	ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2762	ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2763	TRIAZINE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 0		E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2763	TRIAZINE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 500g		E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	1	W11		CW13 CW28 CW31 CW48	60	613	-	M3
2763	TRIAZINE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 5kg		E1	P002 IBC08 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3
2764	TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2764	TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2771	THIOCARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 0		E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2771	THIOCARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 500g		E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
2771	THIOCARBAMATE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 5kg		E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2772	THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2772	THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2775	COPPER BASED PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2775	COPPER BASED PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	1	W11		CW13 CW28 CW31 CW48	60	613	-	M3
2775	COPPER BASED PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3
2776	COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2776	COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2777	MERCURY BASED PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2777	MERCURY BASED PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
2777	MERCURY BASED PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2778	MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2778	MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2779	SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2779	SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
2779	SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3
2780	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2780	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2781	BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2781	BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
2781	BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2782	BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2782	BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2783	ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 0		E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	-
2783	ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 500g		E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	-
2783	ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648 5kg		E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	-
2784	ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274 0		E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2784	ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274 1I		E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2785	4-THIAPENTANAL	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	612	-	M3
2786	ORGANOTIN PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648 0		E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
2786	ORGANOTIN PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648 500g		E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2786	ORGANOTIN PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3
2787	ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2787	ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274	1l	E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.	6.1	T3	I	6.1	43 274	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	630	1-1-1-1	M3
2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.	6.1	T3	II	6.1	43 274	100ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	630	1-1-1-1	M3
2788	ORGANOTIN COMPOUND, LIQUID, N.O.S.	6.1	T3	III	6.1	43 274	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	1-1-1-1	M3
2789	ACETIC ACID, GLACIAL or ACETIC ACID SOLUTION, more than 80% acid, by mass	8	CF1	II	8+3		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	803	3/0-0-1-0	M3
2790	ACETIC ACID SOLUTION, not less than 50% but not more than 80% acid, by mass	8	C3	II	8		1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	-	M3
2790	ACETIC ACID SOLUTION, more than 10% and less than 50% acid, by mass	8	C3	III	8	597 647	5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3
2793	FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS in a form liable to self-heating	4.2	S4	III	4.2	592	0	E1	P003 IBC08 LP02 R001	PP20 B3 B6	MP14					3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	-
2794	BATTERIES, WET, FILLED WITH ACID, electric storage	8	C11		8	295 598	1l	E0	P801							3		VC1 VC2 AP8		80	834	-	-
2795	BATTERIES, WET, FILLED WITH ALKALI, electric storage	8	C11		8	295 401 598	1l	E0	P801 P801a							3		VC1 VC2 AP8		80	835	-	-
2796	SULPHURIC ACID with not more than 51% acid or BATTERY FLUID, ACID	8	C1	II	8		1l	E2	P001 IBC02		MP15	T8	TP2	L4BN		2				80	801	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2797	BATTERY FLUID, ALKALI	8	C5	II	8		1I	E2	P001 IBC02		MP15	T7	TP2 TP28	L4BN		2				80	809	-	M3
2798	PHENYLPHOSPHORUS DICHLORIDE	8	C3	II	8		1I	E0	P001 IBC02		MP15	T7	TP2	L4BN		2				80	804	-	M3
2799	PHENYLPHOSPHORUS THIODICHLORIDE	8	C3	II	8		1I	E0	P001 IBC02		MP15	T7	TP2	L4BN		2				80	804	-	M3
2800	BATTERIES, WET, NON-SPILLABLE, electric storage	8	C11		8	238 295 598	1I	E0	P003 P801	PP16						3		VC1 VC2 AP8		80	836	-	-
2801	DYE, LIQUID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	8	C9	I	8	274	0	E0	P001		MP8 MP17	T14	TP2 TP27	L10BH	TU38 TE22	1				88	823	-	M3
2801	DYE, LIQUID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	8	C9	II	8	274	1I	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				80	823	-	M3
2801	DYE, LIQUID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	8	C9	III	8	274	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	823	-	M3
2802	COPPER CHLORIDE	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2803	GALLIUM	8	C10	III	8	365	5kg	E0	P800	PP41	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	813	-	M3
2805	LITHIUM HYDRIDE, FUSED SOLID	4.3	W2	II	4.3		500g	E2	P410 IBC04	PP40	MP14	T3	TP33	SGAN		2	W1		CW23	423	409	3/0-0-1-0	M3
2806	LITHIUM NITRIDE	4.3	W2	I	4.3		0	E0	P403 IBC04		MP2					1	W1		CW23	X423	409	3/0-0-1-0	-
2807	Magnetized material	9	M11	Not subject to the requirements of Annex 2 to SMGS																			
2809	MERCURY	8	CT1	III	8 +6.1	365	5kg	E0	P800		MP15			L4BN		3			CW13 CW28	86	811	-	M3
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	T1	I	6.1	274 315 614	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW60 CW64	66	615	1-1*-1-1	M3
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	T1	II	6.1	274 614	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	615	1-1*-1-1	M3
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	T1	III	6.1	274 614	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	615	1-1*-1-1	M3
2811	TOXIC SOLID, ORGANIC, N.O.S.	6.1	T2	I	6.1	274 614	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU15 TU38 TE22	1	W10		CW13 CW28 CW31	66	634	1-1-1-1	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2811	TOXIC SOLID, ORGANIC, N.O.S.	6.1	T2	II	6.1	274 614	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	634	1-1-1-1	M3
2811	TOXIC SOLID, ORGANIC, N.O.S.	6.1	T2	III	6.1	274 614	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	634	1-1-1-1	M3
2812	Sodium aluminate, solid	8	C6	Not subject to the requirements of Annex 2 to SMGS																			
2813	WATER-REACTIVE SOLID, N.O.S.	4.3	W2	I	4.3	274	0	E0	P403 IBC99	PP83	MP2	T9	TP7 TP33	S10AN L10DH	TU4 TU14 TU22 TU38 TE21 TE22 TM2	0	W1		CW23	X423	421	3/0-0-1-0	M3
2813	WATER-REACTIVE SOLID, N.O.S.	4.3	W2	II	4.3	274	500g	E2	P410 IBC07	PP83	MP14	T3	TP33	SGAN		0	W1		CW23 CW63 CW64	423	421	3/0-0-1-0	M3
2813	WATER-REACTIVE SOLID, N.O.S.	4.3	W2	III	4.3	274	1kg	E1	P410 IBC08 R001	PP83 B4	MP14	T1	TP33	SGAN		0	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	421	3/0-0-1-0	M3
2814	INFECTIOUS SUBSTANCE, AFFECTING HUMANS	6.2	I1		6.2	318	0	E0	P620		MP5					0	W9		CW13 CW18 CW26 CW28 CW46	606	623	-	-
2814	INFECTIOUS SUBSTANCE, AFFECTING HUMANS, in refrigerated liquid nitrogen	6.2	I1		6.2+2.2	318	0	E0	P620		MP5					0	W9		CW13 CW18 CW26 CW28 CW46	606	623	-	-
2814	INFECTIOUS SUBSTANCE, AFFECTING HUMANS (animal material only)	6.2	I1		6.2	318	0	E0	P620		MP5	BK1 BK2				0	W9		CW13 CW18 CW26 CW28 CW46	606	623	-	-
2815	N-AMINOETHYLPIPERAZINE	8	C7	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3
2817	AMMONIUM HYDROGENDIFLUORIDE SOLUTION	8	CT1	II	8+6.1		1l	E2	P001 IBC02		MP15	T8	TP2	L4DH	TU14 TE17 TE21 TT4	2			CW13 CW28	86	801	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2817	AMMONIUM HYDROGENDIFLUORIDE SOLUTION	8	CT1	III	8+6.1		5I	E1	P001 IBC03 R001		MP19	T4	TP1	L4DH	TU14 TE17 TE21	3	W12		CW13 CW28	86	801	0-0-1-0	M3
2818	AMMONIUM POLYSULPHIDE SOLUTION	8	CT1	II	8+6.1		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2			CW13 CW28	86	809	3/0-0-1-0	M3
2818	AMMONIUM POLYSULPHIDE SOLUTION	8	CT1	III	8+6.1		5I	E1	P001 IBC03 R001		MP19	T4	TP1	L4BN		3	W12		CW13 CW28	86	809	3/0-0-1-0	M3
2819	AMYL ACID PHOSPHATE	8	C3	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3
2820	BUTYRIC ACID	8	C3	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3
2821	PHENOL SOLUTION	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2821	PHENOL SOLUTION	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	-
2822	2-CHLOROPYRIDINE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
2823	CROTONIC ACID, SOLID	8	C4	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	803	-	M3
2826	ETHYL CHLOROTHIOFORMATE	8	CF1	II	8+3		0	E0	P001		MP15	T7	TP2	L4BN		2				83	814	3/0-0-1-0	M3
2829	CAPROIC ACID	8	C3	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	-	M3
2830	LITHIUM FERROSILICON	4.3	W2	II	4.3		500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1		CW23	423	409	3/0-0-1-0	M3
2831	1,1,1-TRICHLOROETHANE	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	M3
2834	PHOSPHOROUS ACID	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2835	SODIUM ALUMINIUM HYDRIDE	4.3	W2	II	4.3		500g	E0	P410 IBC04		MP14	T3	TP33	SGAN		2	W1		CW23	423	409	3/0-0-1-0	M3
2837	BISULPHATES, AQUEOUS SOLUTION	8	C1	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2837	BISULPHATES, AQUEOUS SOLUTION	8	C1	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	801	-	M3
2838	VINYL BUTYRATE, STABILIZED	3	F1	II	3	386 676	1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	306	3/1-1*-1-1	M3
2839	ALDOL	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	607	-	-
2840	BUTYRALDOXIME	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	326	3/0-0-1-0	M3
2841	DI-n-AMYLAMINE	3	FT1	III	3+6.1		5I	E1	P001 IBC03 R001		MP19	T4	TP1	L4BH	TU15	3	W12		CW13 CW28	36	325	3/0-0-1-0	M3
2842	NITROETHANE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	326	3/0-0-1-0	M3
2844	CALCIUM MANGANESE SILICON	4.3	W2	III	4.3		1kg	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	408	3/0-0-1-0	M3
2845	PYROPHORIC LIQUID, ORGANIC, N.O.S.	4.2	S1	I	4.2	274	0	E0	P400		MP2	T22	TP2 TP7	L21DH	TU14 TU38 TC1 TE21 TE22 TE25 TM1	0	W1			333	424	3/1-1*-1-1	M3
2846	PYROPHORIC SOLID, ORGANIC, N.O.S.	4.2	S2	I	4.2	274	0	E0	P404		MP13					0	W1			43	415	3/0-0-1-0	M3
2849	3-CHLOROPROPANOL-1	6.1	T1	III	6.1		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	625	-	M3
2850	PROPYLENE TETRAMER	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	315	3/0-0-1-0	M3
2851	BORON TRIFLUORIDE DIHYDRATE	8	C1	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	801	-	M3
2852	DIPICRYL SULPHIDE, WETTED with not less than 10% water, by mass	4.1	D	I	4.1	28 545	0	E0	P406	PP24	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2853	MAGNESIUM FLUOROSILICATE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	603	-	M3
2854	AMMONIUM FLUOROSILICATE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	603	-	M3
2855	ZINC FLUOROSILICATE	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	619	-	M3
2856	FLUOROSILICATES, N.O.S.	6.1	T5	III	6.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3
2857	REFRIGERATING MACHINES containing non-flammable, non-toxic gases or ammonia solutions (UN 2672)	2	6A		2.2	119	0	E0	P003	PP32	MP9					3			CW9	20	213	-	-
2858	ZIRCONIUM, DRY, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)	4.1	F3	III	4.1	546	5kg	E1	P002 LP02 R001		MP11					3	W1	VC1 VC2		40	403	3/0-0-1-0	M3
2859	AMMONIUM METAVANADATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
2861	AMMONIUM POLYVANADATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
2862	VANADIUM PENTOXIDE, non-fused form	6.1	T5	III	6.1	600	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	603	-	M3
2863	SODIUM AMMONIUM VANADATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
2864	POTASSIUM METAVANADATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
2865	HYDROXYLAMINE SULPHATE	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2869	TITANIUM TRICHLORIDE MIXTURE	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	806	-	M3
2869	TITANIUM TRICHLORIDE MIXTURE	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2870	ALUMINIUM BOROHYDRIDE	4.2	SW1	I	4.2+4.3		0	E0	P400		MP2	T21	TP7 TP33	L21DH	TU14 TU38 TC1 TE21 TE22 TE25 TM1	0	W1			X333	409	3/1-1*-1-1	M3
2870	ALUMINIUM BOROHYDRIDE IN DEVICES	4.2	SW2		4.2+4.3		0	E0	P002	PP13	MP2					0	W1			X333	409	3/1-1*-1-1	-
2871	ANTIMONY POWDER	6.1	T5	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	617	-	M3
2872	DIBROMOCHLOROPROPANES	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	605	-	-
2872	DIBROMOCHLOROPROPANES	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	605	-	-
2873	DIBUTYLAMINOETHANOL	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	614	-	M3
2874	FURFURYL ALCOHOL	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	607	-	M3
2875	HEXACHLOROPHENE	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
2876	RESORCINOL	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	620	-	M3
2878	TITANIUM SPONGE GRANULES or TITANIUM SPONGE POWDERS	4.1	F3	III	4.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	403	3/0-0-1-0	M3
2879	SELENIUM OXYCHLORIDE	8	CT1	I	8+6.1		0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1			CW13 CW28	X886	801	0-0-1-0	M3
2880	CALCIUM HYPOCHLORITE, HYDRATED or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, with not less than 5.5% but not more than 16% water	5.1	O2	II	5.1	314 322	1kg	E2	P002 IBC08	B4 B13	MP10			SGAN	TU3	2	W11		CW24 CW35	50	501	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2880	CALCIUM HYPOCHLORITE, HYDRATED or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, with not less than 5.5% but not more than 16% water	5.1	O2	III	5.1	314	5kg	E1	P002 IBC08 R001	B4 B13	MP10			SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24 CW35	50	501	-	M3
2881	METAL CATALYST, DRY	4.2	S4	I	4.2	274	0	E0	P404		MP13	T21	TP7 TP33			0	W1			43	405	3/0-0-1-0	M3
2881	METAL CATALYST, DRY	4.2	S4	II	4.2	274	0	E0	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
2881	METAL CATALYST, DRY	4.2	S4	III	4.2	274	0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	M3
2900	INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only	6.2	I2		6.2	318	0	E0	P620		MP5					0	W9		CW13 CW18 CW26 CW28 CW46	606	623	-	-
2900	INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only, in refrigerated liquid nitrogen	6.2	I2		6.2+ 2.2	318	0	E0	P620		MP5					0	W9		CW13 CW18 CW26 CW28 CW46	606	623	-	-
2900	INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only (animal material only)	6.2	I2		6.2	318	0	E0	P620		MP5	BK1 BK2				0	W9		CW13 CW18 CW26 CW28 CW46	606	623	-	-
2901	BROMINE CHLORIDE	2	2TOC		2.3+ 5.1+ 8 (4.1.2)	0	E0	P200		MP9	(M)			PxBH(M)	TU38 TE22 TE21	1			CW9 CW10 CW28	265	211	1-1-1-1 1-1-3-1	M2 M1
2902	PESTICIDE, LIQUID, TOXIC, N.O.S.	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	3/1-1-1-1	M3
2902	PESTICIDE, LIQUID, TOXIC, N.O.S.	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	3/1-1-1-1	M3
2902	PESTICIDE, LIQUID, TOXIC, N.O.S.	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	3/1-1-1-1	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 0		E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	1-1*-1-1	M3
2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	1-1*-1-1	M3
2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5l	E1	P001 IBC03 R001		MP19	T7	TP2	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	1-1*-1-1	M3
2904	CHLOROPHENOLATES, LIQUID or PHENOLATES, LIQUID	8	C9	III	8		5l	E1	P001 IBC03 LP01 R001		MP19			L4BN		3	W12			80	804	-	M3
2905	CHLOROPHENOLATES, SOLID or PHENOLATES, SOLID	8	C10	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	804	-	M3
2907	ISOSORBIDE DINITRATE MIXTURE with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	4.1	D	II	4.1	28 127	0	E0	P406 IBC06	PP26 PP80 B12	MP2					2	W1		CW70	40	404	3/0-0-1-0	M3
2908	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING	7				290	0	E0	See glasy 1.7	See 4.1.9.1.3						4			CW33 (See n. 1.7.1.5.1)	70			
2909	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM	7				290	0	E0	See glasy 1.7	See 4.1.9.1.3						4			CW33 (See n. 1.7.1.5.1)	70			
2910	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL	7				290 368	0	E0	See glasy 1.7	See 4.1.9.1.3						4			CW33 (See n. 1.7.1.5.1)	70			
2911	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS or ARTICLES	7				290	0	E0	See glasy 1.7	See 4.1.9.1.3						4			CW33 (See n. 1.7.1.5.1)	70			
2912	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non fissile or fissile-excepted	7			7X	172 317 325	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3		T5 See 4.1.9.2.4	TP4	S2,65AN(+) L2,65CN(+)	TU36 TT7 TM7	0		See 4.1.9.2.4	CW33	70			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2913	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I, SCO-II or SCO-III), non fissile or fissile excepted	7			7X	172 317 336	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3		See 4.1.9.2.4				0		See 4.1.9.2.4	CW33	70			
2915	RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non fissile or fissile-excepted	7			7X	172 317 325	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
2916	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non fissile or fissile-excepted	7			7X	172 317 325 337	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
2917	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non fissile or fissile-excepted	7			7X	172 317 325 337	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
2919	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non fissile or fissile- excepted	7			7X	172 317 325	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S.	8	CF1	I	8+3	274	0	E0	P001		MP8 MP17	T14 TP27	TP2 TP27	L10BH	TU38 TE22	1				883	825	3/1-1*-1-1	M3
2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S.	8	CF1	II	8+3	274	1l	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				83	825	3/1-1*-1-1	M3
2921	CORROSIVE SOLID, FLAMMABLE, N.O.S.	8	CF2	I	8+4.1	274	0	E0	P002 IBC05		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1	W10		CW70	884	824	3/0-0-1-0	M3
2921	CORROSIVE SOLID, FLAMMABLE, N.O.S.	8	CF2	II	8+4.1	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11		CW70	84	824	3/0-0-1-0	M3
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	CT1	I	8+6.1	274	0	E0	P001		MP8 MP17	T14	TP2 TP27	L10BH	TU38 TE22	1			CW13 CW28	886	833	0-0-1-0	M3
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	CT1	II	8+6.1	274	1l	E2	P001 IBC02		MP15	T7	TP2	L4BN		2			CW13 CW28 CW65	86	833	0-0-1-0	M3
2922	CORROSIVE LIQUID, TOXIC, N.O.S.	8	CT1	III	8+6.1	274	5l	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BN		3	W12		CW13 CW28	86	833	0-0-1-0	M3
2923	CORROSIVE SOLID, TOXIC, N.O.S.	8	CT2	I	8+6.1	274	0	E0	P002 IBC05		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1	W10		CW13 CW28	886	832	0-0-1-0	M3
2923	CORROSIVE SOLID, TOXIC, N.O.S.	8	CT2	II	8+6.1	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		3	W11		CW13 CW28 CW65	86	832	0-0-1-0	M3
2923	CORROSIVE SOLID, TOXIC, N.O.S.	8	CT2	III	8+6.1	274	5kg	E1	P002 IBC08 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7	CW13 CW28 CW65	86	832	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	I	3+8	274	0	E0	P001		MP7 MP17	T14	TP2	L10CH	TU14 TU38 TE21 TE22	1			CW65	338	328	3/0-0-1-0	M3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	II	3+8	274	1l	E2	P001 IBC02		MP19	T11	TP2 TP27	L4BH		2				338	328	3/0-0-1-0	M3
2924	FLAMMABLE LIQUID, CORROSIVE, N.O.S.	3	FC	III	3+8	274	5l	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BN		3	W12			38	328	3/0-0-1-0	M3
2925	FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.	4.1	FC1	II	4.1+8	274	1kg	E2	P002 IBC06		MP10	T3	TP33	SGAN		2	W1			48	414	3/0-0-1-0	M3
2925	FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.	4.1	FC1	III	4.1+8	274	5kg	E1	P002 IBC06 R001		MP10	T1	TP33	SGAN		3	W1			48	414	3/0-0-1-0	M3
2926	FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.	4.1	FT1	II	4.1+6.1	274	1kg	E2	P002 IBC06		MP10	T3	TP33	SGAN		2	W1		CW28	46	413	3/0-0-1-0	M3
2926	FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.	4.1	FT1	III	4.1+6.1	274	5kg	E1	P002 IBC06 R001		MP10	T1	TP33	SGAN		3	W1		CW28	46	413	3/0-0-1-0	M3
2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC1	I	6.1+8	274 315	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW60 CW64	668	640	1-1*-1-1	-
2927	TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC1	II	6.1+8	274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	68	640	1-1*-1-1	-
2928	TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC2	I	6.1+8	274	0	E5	P002 IBC05		MP18	T6	TP33	S10AH	TU14 TU15 TE21	1	W10		CW13 CW28 CW31	668	640	1-1*-1-1	-
2928	TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.	6.1	TC2	II	6.1+8	274	500g	E4	P002 IBC06		MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	68	640	1-1*-1-1	-
2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF1	I	6.1+3	274 315	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	636	3/0-0-1-0	-
2929	TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF1	II	6.1+3	274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	63	636	3/0-0-1-0	-
2930	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF3	I	6.1+4.1	274	0	E5	P002 IBC05		MP18	T6	TP33			1	W10		CW13 CW28 CW31	664	644	3/0-0-1-0	-
2930	TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.	6.1	TF3	II	6.1+4.1	274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	64	644	3/0-0-1-0	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4		7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11		Emergenc y card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2931	VANADYL SULPHATE	6.1	T5	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	603	-	-
2933	METHYL 2-CHLOROPROPIONATE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	327	3/0-0-1-0	M3
2934	ISOPROPYL 2-CHLOROPROPIONATE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	327	3/0-0-1-0	M3
2935	ETHYL 2-CHLOROPROPIONATE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	327	3/0-0-1-0	M3
2936	THIOLACTIC ACID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	612	-	-
2937	alpha-METHYLBENZYL ALCOHOL, LIQUID	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	607	-	M3
2940	9-PHOSPHABICYCLO-NONANES (CYCLOOCTADIENE PHOSPHINES)	4.2	S2	II	4.2		0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	M3
2941	FLUOROANILINES	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2942	2-TRIFLUOROMETHYLANILINE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
2943	TETRAHYDROFURFURYLAMINE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	326	3/0-0-1-0	M3
2945	N-METHYLBUTYLAMINE	3	FC	II	3+8		1l	E2	P001 IBC02		MP19	T7	TP1	L4BH		2				338	311	3/0-0-1-0	M3
2946	2-AMINO-5-DIETHYLAMINOPENTANE	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	614	-	M3
2947	ISOPROPYL CHLOROACETATE	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	327	3/0-0-1-0	M3
2948	3-TRIFLUOROMETHYLANILINE	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	616	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2949	SODIUM HYDROSULPHIDE, HYDRATED with not less than 25% water of crystallization	8	C6	II	8	523	1kg	E2	P002 IBC08	B4	MP10	T7	TP2	SGAN L4BN		2	W11			80	808	-	M3
2950	MAGNESIUM GRANULES, COATED, particle size not less than 149 microns	4.3	W2	III	4.3		1kg	E1	P410 IBC08 R001	B4	MP14	T1 BK2	TP33	SGAN		3	W1	VC2 AP4 AP5	CW23	423	409	3/0-0-1-0	M3
2956	5-tert-BUTYL-2,4,6-TRINITRO-m- XYLENE (MUSK XYLENE)	4.1	SR1	III	4.1	638	5kg	E0	P409		MP2					3	W1		CW14	40	404	3/0-0-1-0	-
2965	BORON TRIFLUORIDE DIMETHYL ETHERATE	4.3	WFC	I	4.3+3+8		0	E0	P401		MP2	T10	TP2 TP7	L10DH	TU4 TU14 TU22 TU38 TE21 TE22 TM2	0	W1		CW23	382	407	3/1-1*-1-1	M3
2966	THIOGLYCOL	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	612	-	-
2967	SULPHAMIC ACID	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	806	-	M3
2968	MANEB, STABILIZED or MANEB PREPARATION, STABILIZED against self-heating	4.3	W2	III	4.3	547	1kg	E1	P002 IBC08 R001	B4	MP14	T1	TP33	SGAN		0	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	409	3/0-0-1-0	M3
2969	CASTOR BEANS or CASTOR MEAL or CASTOR POMACE or CASTOR FLAKE	9	M11	II	9	141	5kg	E2	P002 IBC08	PP34 B4	MP10	T3 BK1 BK2	TP33	SGAV		2	W11	VC1 VC2	CW31	90	902	-	-
2977	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSION	7			7X+7E+8		0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	78			
2978	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non fissile or fissile- excepted	7			7X+8	317	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	78			
2983	ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide	3	FT1	I	3+6.1		0	E0	P001		MP7 MP17	T14	TP2 TP7	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	302	3/0-0-1-0	M3
2984	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 8% but less than 20% hydrogen peroxide (stabilized as necessary)	5.1	O1	III	5.1	65	Sl	E1	P504 IBC02 R001	PP10 B5	MP15	T4	TP1 TP6 TP24	LGBV	TU3 TC2 TE8 TE11 TT1	3			CW24	50	505	0-0-1-0	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humming 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2985	CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	3	FC	II	3+8	274 548	0	E0	P010		MP19	T14	TP2 TP7 TP27	L4BH		2			CW65	X338	321	3/0-0-1-0	M3
2986	CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.	8	CF1	II	8+3	274 548	0	E0	P010		MP15	T14	TP2 TP7 TP27	L4BN		2				X83	805	3/0-0-1-0	M3
2987	CHLOROSILANES, CORROSIVE, N.O.S.	8	C3	II	8	548	0	E0	P010		MP15	T14	TP2 TP7 TP27	L4BN		2				X80	817	1-1*-1-1	M3
2988	CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	4.3	WFC	I	4.3+3+8	274 549	0	E0	P401	RR7	MP2	T14	TP2 TP7	L10DH	TU14 TU26 TU38 TE21 TE22 TM2 TM3	0	W1		CW23 CW65	X338	431	3/0-0-1-0	-
2989	LEAD PHOSPHITE, DIBASIC	4.1	F3	II	4.1		1kg	E2	P002 IBC08	B4	MP11	T3	TP33	SGAN		2	W1			40	404	3/0-0-1-0	M3
2989	LEAD PHOSPHITE, DIBASIC	4.1	F3	III	4.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	404	3/0-0-1-0	M3
2990	LIFE-SAVING APPLIANCES, SELF- INFLATING	9	M5		9	296 635	0	E0	P905							3				90	907	-	-
2991	CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
2991	CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
2991	CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5l	E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
2992	CARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
2992	CARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2992	CARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
2993	ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5I	E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
2994	ARSENICAL PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
2994	ARSENICAL PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
2994	ARSENICAL PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
2995	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5l	E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
2996	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
2996	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
2996	ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	3	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
2997	TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5l	E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
2998	TRIAZINE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
2998	TRIAZINE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
2998	TRIAZINE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	3	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 0		E5	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3005	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5l	E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3006	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
3006	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3006	THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 0		E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3009	COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5l	E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3010	COPPER BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3010	COPPER BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3010	COPPER BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 0		E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 100 ml		E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3011	MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 5l		E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3012	MERCURY BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
3012	MERCURY BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3012	MERCURY BASED PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 0		E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 100 ml		E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3013	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 5l		E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3014	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
3014	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3014	SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	-	M3
3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 0		E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 100 ml		E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3015	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 5l		E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3016	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
3016	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3016	BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3017	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 0		E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
3017	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 100 ml		E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3017	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 5l		E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3018	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
3018	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3018	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274 0		E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274 100 ml		E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3019	ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274 5l		E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3020	ORGANOTIN PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3020	ORGANOTIN PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3020	ORGANOTIN PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3021	PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S., flash-point less than 23 °C	3	FT2	I	3+6.1	61 274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
3021	PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S., flash-point less than 23 °C	3	FT2	II	3+6.1	61 274	1l	E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
3022	1,2-BUTYLENE OXIDE, STABILIZED	3	F1	II	3	386 676	1l	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				339	306	3/1-1*-1-1	M3
3023	2-METHYL-2-HEPTANETHIOL	6.1	TF1	I	6.1+3	354	0	E0	P602		MP8 MP17	T20	TP2 TP35	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/1-1*-1-1	-
3024	COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
3024	COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274	1l	E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3025	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5l	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3026	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
3026	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3026	COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3027	COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
3027	COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
3027	COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3
3028	BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	8	C11		8	295 304 598	2kg	E0	P801							3		VC1 VC2 AP8		80	835	-	-
3048	ALUMINIUM PHOSPHIDE PESTICIDE	6.1	T7	I	6.1	153 648	0	E0	P002 IBC07		MP18	T6	TP33	S10AH	TU15	1	W10		CW13 CW28 CW31 CW48	642	613	-	-
3054	CYCLOHEXYL MERCAPTAN	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	326	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3055	2-(2-AMINOETHOXY)ETHANOL	8	C7	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	807	-	M3
3056	n-HEPTALDEHYDE	3	F1	III	3		5I	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
3057	TRIFLUOROACETYL CHLORIDE	2	2TC		2.3+8 (+13)		0	E0	P200		MP9	T50	TP21	PxBH(M)	TU38 TE22	1			CW9 CW10	268	203	1-1-1-1 1-1-3-1	M1 M1
3064	NITROGLYCERIN, SOLUTION IN ALCOHOL with more than 1% but not more than 5% nitroglycerin	3	D	II	3	28 359	0	E0	P300		MP2					1				33	308	3/0-0-1-0	M3
3065	ALCOHOLIC BEVERAGES, with more than 70% alcohol by volume	3	F1	II	3		5I	E2	P001 IBC02 R001	PP2	MP19	T4	TP1	LGBF		1				33	308	3/0-0-1-0	M3
3065	ALCOHOLIC BEVERAGES, with more than 24% but not more than 70% alcohol by volume	3	F1	III	3	144 145 247	5I	E1	P001 IBC03 R001	PP2	MP19	T2	TP1	LGBF		3	W12			30	308	3/0-0-1-0	M3
3066	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound)	8	C9	II	8	163 367	1I	E2	P001 IBC02		MP15	T7	TP2 TP28	L4BN		2				80	823	-	M3
3066	PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL (including paint thinning and reducing compound)	8	C9	III	8	163 367	5I	E1	P001 IBC03 R001		MP19	T4	TP1 TP29	L4BN		3	W12			80	823	-	M3
3070	ETHYLENE OXIDE AND DICHLORODIFLUOROMETHANE MIXTURE with	2	2A		2.2(+13)	392 662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10	20	207	0-0-1-0 0-0-3-0	M2 M1
3071	MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	II	6.1+3	274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	63	643	3/0-0-1-0	-
3072	LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment	9	M5		9	296 635	0	E0	P905							3				90	907	-	-
3073	VINYLPYRIDINES, STABILIZED	6.1	TFC	II	6.1+3+8	386 676	100 ml	E4	P001 IBC01		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31 CW55	638	609	3/0-0-1-0	-
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	9	M7	III	9	274 335 375 601	5kg	E1	P002 IBC08 LP02 R001	PP12 B3	MP10	T1 BK1 BK2	TP33	SGAV LGBV		3	W13	VC1 VC2	CW13 CW31	90	906	-	-
3078	CERIUM, turnings or gritty powder	4.3	W2	II	4.3	550	500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1		CW23	423	409	3/0-0-1-0	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3079	METHACRYLONITRILE, STABILIZED	6.1	TF1	I	6.1+3	354 386 676	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	609	3/0-0-1-0	M3
3080	ISOCYANATES, TOXIC, FLAMMABLE, N.O.S. or ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	II	6.1+3	274 551	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	63	649	3/0-0-1-0	-
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9	M6	III	9	274 335 375 601 650	5l	E1	P001 IBC03 LP01 R001	PP1	MP19	T4	TP1 TP29	LGBV		3	W12		CW13 CW31	90	906	-	-
3083	PERCHLORYL FLUORIDE	2	2TO		2.3+ 5.1 (+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TE22	1			CW9 CW10	265	203	0-0-1-0 0-0-3-0	M2 M1
3084	CORROSIVE SOLID, OXIDIZING, N.O.S.	8	CO2	I	8+5.1	274	0	E0	P002		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1			CW24	885	830	0-0-1-0	M3
3084	CORROSIVE SOLID, OXIDIZING, N.O.S.	8	CO2	II	8+5.1	274	1kg	E2	P002 IBC06		MP10	T3	TP33	SGAN L4BN		2	W11		CW24	85	830	0-0-1-0	M3
3085	CORROSIVE SOLID, OXIDIZING, N.O.S.	5.1	OC2	I	5.1+8	274	0	E0	P503		MP2					1			CW24	558	515	-	M3
3085	CORROSIVE SOLID, OXIDIZING, N.O.S.	5.1	OC2	II	5.1+8	274	1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24	58	515	-	M3
3085	CORROSIVE SOLID, OXIDIZING, N.O.S.	5.1	OC2	III	5.1+8	274	5kg	E1	P002 IBC08 R001	B3	MP2	T1	TP33	SGAN	TU3	3			CW24	58	515	-	M3
3086	CORROSIVE SOLID, OXIDIZING, N.O.S.	6.1	TO2	I	6.1+5.1	274	0	E5	P002		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	665	657	1-1*-1-1	-
3086	CORROSIVE SOLID, OXIDIZING, N.O.S.	6.1	TO2	II	6.1+5.1	274	500g	E4	P002 IBC06		MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	65	657	1-1*-1-1	-
3087	OXIDIZING SOLID, TOXIC, N.O.S.	5.1	OT2	I	5.1+6.1	274	0	E0	P503		MP2					3			CW24 CW28	556	503	1-1*-1-1	M3
3087	OXIDIZING SOLID, TOXIC, N.O.S.	5.1	OT2	II	5.1+6.1	274	1kg	E2	P002 IBC06		MP2	T3	TP33	SGAN	TU3	2	W11		CW24 CW28	56	503	1-1*-1-1	M3
3087	OXIDIZING SOLID, TOXIC, N.O.S.	5.1	OT2	III	5.1+6.1	274	5kg	E1	P002 IBC08 R001	B3	MP2	T1	TP33	SGAN	TU3	3			CW24 CW28	56	503	1-1*-1-1	M3
3088	SELF-HEATING SOLID, ORGANIC, N.O.S.	4.2	S2	II	4.2	274	0	E2	P410 IBC06		MP14	T3	TP33	SGAV		2	W1			40	415	3/0-0-1-0	-
3088	SELF-HEATING SOLID, ORGANIC, N.O.S.	4.2	S2	III	4.2	274 665	0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAV		3	W1			40	415	3/0-0-1-0	-
3089	METAL POWDER, FLAMMABLE, N.O.S.	4.1	F3	II	4.1	552	1kg	E2	P002 IBC08	B4	MP11	T3	TP33	SGAN		2	W1			40	401	3/0-0-1-0	M3

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3089	METAL POWDER, FLAMMABLE, N.O.S.	4.1	F3	III	4.1	552	5kg	E1	P002 IBC08 R001	B4	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	401	3/0-0-1-0	M3
3090	LITHIUM METAL BATTERIES (including lithium alloy batteries)	9	M4		9	188 230 310 376 377 387 636 677	0	E0	P903 P908 P909 LP903 LP904							2				90	905	-	-
3091	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries)	9	M4		9	188 230 310 360 376 377 387 390 670 677	0	E0	P903 P908 P909 LP903 LP904							2				90	905	-	-
3092	1-METHOXY-2-PROPANOL	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T2	TP1	LGBF		3	W12			30	316	3/0-0-1-0	M3
3093	CORROSIVE LIQUID, OXIDIZING, N.O.S.	8	CO1	I	8+5.1	274	0	E0	P001		MP8 MP17			L10BH	TU38 TE22	1			CW24	885	831	0-0-1-0	M3
3093	CORROSIVE LIQUID, OXIDIZING, N.O.S.	8	CO1	II	8+5.1	274	1l	E2	P001 IBC02		MP15			L4BN		2			CW24	85	831	0-0-1-0	M3
3094	CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.	8	CW1	I	8+4.3	274	0	E0	P001		MP8 MP17			L10BH	TU38 TE22	1			CW70	823	829	3/0-0-1-0	M3
3094	CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.	8	CW1	II	8+4.3	274	1l	E2	P001		MP15			L4BN		2			CW70	823	829	3/0-0-1-0	M3
3095	CORROSIVE SOLID, SELF-HEATING, N.O.S.	8	CS2	I	8+4.2	274	0	E0	P002		MP18	T6	TP33	S10AN		1			CW70	884	826	3/0-0-1-0	M3
3095	CORROSIVE SOLID, SELF-HEATING, N.O.S.	8	CS2	II	8+4.2	274	1kg	E2	P002 IBC06		MP10	T3	TP33	SGAN		2	W11		CW70	84	826	3/0-0-1-0	M3
3096	CORROSIVE SOLID, WATER-REACTIVE, N.O.S.	8	CW2	I	8+4.3	274	0	E0	P002		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1			CW70	842	828	3/0-0-1-0	M3
3096	CORROSIVE SOLID, WATER-REACTIVE, N.O.S.	8	CW2	II	8+4.3	274	1kg	E2	P002 IBC06		MP10	T3	TP33	SGAN L4BN		2	W11		CW70	842	828	3/0-0-1-0	M3
3097	FLAMMABLE SOLID, OXIDIZING, N.O.S.	4.1	FO	CARRIAGE PROHIBITED																			
3098	OXIDIZING LIQUID, CORROSIVE, N.O.S.	5.1	OC1	I	5.1+8	274	0	E0	P502		MP2					1			CW24	558	513	-	M3
3098	OXIDIZING LIQUID, CORROSIVE, N.O.S.	5.1	OC1	II	5.1+8	274	1l	E2	P504 IBC01		MP2					2			CW24	58	513	-	M3
3098	OXIDIZING LIQUID, CORROSIVE, N.O.S.	5.1	OC1	III	5.1+8	274	5l	E1	P504 IBC02 R001		MP2					3			CW24	58	513	-	M3

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humpling
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21b)
3099	OXIDIZING LIQUID, TOXIC, N.O.S.	5.1	OT1	I	5.1+6.1	274	0	E0	P502		MP2					1			CW24 CW28	556	512	0-0-1-0	M3
3099	OXIDIZING LIQUID, TOXIC, N.O.S.	5.1	OT1	II	5.1+6.1	274	1I	E2	P504 IBC01		MP2					2			CW24 CW28	56	512	0-0-1-0	M3
3099	OXIDIZING LIQUID, TOXIC, N.O.S.	5.1	OT1	III	5.1+6.1	274	5I	E1	P504 IBC02 R001		MP2					3			CW24 CW28	56	512	0-0-1-0	M3
3100	OXIDIZING SOLID, SELF-HEATING, N.O.S.	5.1	OS	CARRIAGE PROHIBITED																			
3101	ORGANIC PEROXIDE TYPE B, LIQUID	5.2	P1		5.2+1	122 181 274	25ml	E0	P520		MP4					1	W5 W7 W8		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1
3102	ORGANIC PEROXIDE TYPE B, SOLID	5.2	P1		5.2+1	122 181 274	100g	E0	P520		MP4					1	W5 W7 W8		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1
3103	ORGANIC PEROXIDE TYPE C, LIQUID	5.2	P1		5.2	122 274	25ml	E0	P520		MP4					1	W7		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1
3104	ORGANIC PEROXIDE TYPE C, SOLID	5.2	P1		5.2	122 274	100g	E0	P520		MP4					1	W7		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1
3105	ORGANIC PEROXIDE TYPE D, LIQUID	5.2	P1		5.2	122 274	125 ml	E0	P520		MP4					2	W7		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1
3106	ORGANIC PEROXIDE TYPE D, SOLID	5.2	P1		5.2	122 274	500g	E0	P520		MP4					2	W7		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3107	ORGANIC PEROXIDE TYPE E, LIQUID	5.2	P1		5.2	122 274	125 ml	E0	P520		MP4					2	W7		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1
3108	ORGANIC PEROXIDE TYPE E, SOLID	5.2	P1		5.2	122 274	500g	E0	P520		MP4					2	W7		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1
3109	ORGANIC PEROXIDE TYPE F, LIQUID	5.2	P1		5.2	122 274	125 ml	E0	P520 IBC520		MP4	T23		L4BN(+)	TU3 TU13 TU30 TE12 TA2 TM4	2	W7		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1
3110	ORGANIC PEROXIDE TYPE F, SOLID	5.2	P1		5.2	122 274	500g	E0	P520 IBC520		MP4	T23	TP33	S4AN(+)	TU3 TU13 TU30 TE12 TA2 TM4	2	W7		CW22 CW24 CW29 CW47 CW57 CW70	539	506	3/1-1*-1-1	M1
3111	ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3112	ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3113	ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3114	ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3115	ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3116	ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3117	ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3118	ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3119	ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3120	ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED	5.2	P2	CARRIAGE PROHIBITED																			
3121	OXIDIZING SOLID, WATER-REACTIVE, N.O.S.	5.1	OW	CARRIAGE PROHIBITED																			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21b)
3122	TOXIC LIQUID, OXIDIZING, N.O.S.	6.1	TO1	I	6.1+5.1	274 315	0	E0	P001		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	665	655	1-1*-1-1	-
3122	TOXIC LIQUID, OXIDIZING, N.O.S.	6.1	TO1	II	6.1+5.1	274	100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	65	655	1-1*-1-1	-
3123	TOXIC LIQUID, WATER-REACTIVE, N.O.S.	6.1	TW1	I	6.1+4.3	274 315	0	E0	P099		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW70	623	651	3/0-0-1-0	-
3123	TOXIC LIQUID, WATER-REACTIVE, N.O.S.	6.1	TW1	II	6.1+4.3	274	100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31 CW70	623	651	3/0-0-1-0	-
3124	TOXIC SOLID, SELF-HEATING, N.O.S.	6.1	TS	I	6.1+4.2	274	0	E5	P002		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW70	664	653	3/1-1*-1-1	M2
3124	TOXIC SOLID, SELF-HEATING, N.O.S.	6.1	TS	II	6.1+4.2	274	0	E4	P002 IBC06		MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW70	64	653	3/1-1*-1-1	M2
3125	TOXIC SOLID, WATER-REACTIVE, N.O.S.	6.1	TW2	I	6.1+4.3	274	0	E5	P099		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW70	642	651	0-0-1-0	-
3125	TOXIC SOLID, WATER-REACTIVE, N.O.S.	6.1	TW2	II	6.1+4.3	274	500g	E4	P002 IBC06		MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW70	642	651	0-0-1-0	-
3126	SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.	4.2	SC2	II	4.2+8	274	0	E2	P410 IBC05		MP14	T3	TP33	SGAN		2	W1			48	417	3/0-0-1-0	M3
3126	SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.	4.2	SC2	III	4.2+8	274	0	E1	P002 IBC08 R001	B3	MP14	T1	TP33	SGAN		3	W1			48	417	3/0-0-1-0	M3
3127	SELF-HEATING SOLID, OXIDIZING, N.O.S	4.2	SO	CARRIAGE PROHIBITED																			
3128	SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.	4.2	ST2	II	4.2+6.1	274	0	E2	P410 IBC05		MP14	T3	TP33	SGAN		2	W1		CW28	46	416	3/0-0-1-0	M3
3128	SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.	4.2	ST2	III	4.2+6.1	274	0	E1	P002 IBC08 R001	B3	MP14	T1	TP33	SGAN		3	W1		CW28	46	416	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	WC1	I	4.3+8	274	0	E0	P402	RR7 RR8	MP2	T14	TP2 TP7	L10DH	TU14 TU38 TE21 TE22 TM2	0	W1		CW23	X382	428	3/1-1*-1-1	M3
3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	WC1	II	4.3+8	274	500 ml	E0	P402 IBC01	RR7 RR8	MP15	T11	TP2 TP7	L4DH	TU14 TE21 TM2	0	W1		CW23	382	428	3/0-0-1-0	M3
3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	WC1	III	4.3+8	274	1l	E1	P001 IBC02 R001		MP15	T7	TP2 TP7	L4DH	TU14 TE21 TM2	0	W1		CW23	382	428	3/0-0-1-0	M3
3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	WT1	I	4.3+6.1	274	0	E0	P402	RR4 RR8	MP2			L10DH	TU14 TU38 TE21 TE22 TM2	0	W1		CW23 CW28	X362	422	3/1-1*-1-1	M3
3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	WT1	II	4.3+6.1	274	500 ml	E0	P402 IBC01	RR4 RR8 BB1	MP15			L4DH	TU14 TE21 TM2	0	W1		CW23 CW28	362	422	3/1-1*-1-1	M3
3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	WT1	III	4.3+6.1	274	1l	E1	P001 IBC02 R001		MP15			L4DH	TU14 TE21 TM2	0	W1		CW23 CW28	362	422	3/1-1*-1-1	M3
3131	WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	4.3	WC2	I	4.3+8	274	0	E0	P403		MP2	T9	TP7 TP33	S10AN L10DH	TU4 TU14 TU22 TU38 TE21 TE22 TM2	0	W1		CW23	X482	423	0-0-1-0	-
3131	WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	4.3	WC2	II	4.3+8	274	500g	E2	P410 IBC06		MP14	T3	TP33	SGAN		0	W1		CW23	482	423	0-0-1-0	-
3131	WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	4.3	WC2	III	4.3+8	274	1kg	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		0	W1		CW23	482	423	0-0-1-0	-
3132	WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	4.3	WF2	I	4.3+ 4.1	274	0	E0	P403 IBC99		MP2					0	W1		CW23	X423			
3132	WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	4.3	WF2	II	4.3+ 4.1	274	500g	E2	P410 IBC04		MP14	T3	TP33	SGAN L4DH	TU14 TE21 TM2	0	W1		CW23	423			
3132	WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	4.3	WF2	III	4.3+ 4.1	274	1kg	E1	P410 IBC06		MP14	T1	TP33	SGAN L4DH	TU14 TE21 TM2	0	W1		CW23	423			
3133	WATER-REACTIVE SOLID, OXIDIZING, N.O.S.	4.3	WO																				
3134	WATER-REACTIVE SOLID, TOXIC, N.O.S.	4.3	WT2	I	4.3+6.1	274	0	E0	P403		MP2					0	W1		CW23 CW28	X462	429	3/0-0-1-0	M3
3134	WATER-REACTIVE SOLID, TOXIC, N.O.S.	4.3	WT2	II	4.3+6.1	274	500g	E2	P410 IBC05		MP14	T3	TP33	SGAN		0	W1		CW23 CW28	462	429	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note					
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergen cy card number	Minimum protective distance	Humpin g			
																								4.1.4	4.1.4	4.1.10
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2									1.1.3.6				5.3.2.3						
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)			
3134	WATER-REACTIVE SOLID, TOXIC, N.O.S.	4.3	WT2	III	4.3+6.1	274	1kg	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		0	W1		CW23 CW28	462	429	3/0-0-1-0	M3			
3135	WATER-REACTIVE SOLID, SELF-HEATING, N.O.S..	4.3	WS	I	4.3+ 4.2	274	0	E0	P403		MP2					1	W1		CW23	X423						
3135	WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	4.3	WS	II	4.3+ 4.2	274	0	E2	P410 IBC05		MP14	T3	TP33	SGAN L4DH	TU14 TE21 TM2	2	W1		CW23	423						
3135	WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	4.3	WS	III	4.3+ 4.2	274	0	E1	P410 IBC08	B4	MP14	T1	TP33	SGAN L4DH	TU14 TE21 TM2	3	W1		CW23	423						
3136	TRIFLUOROMETHANE, REFRIGERATED LIQUID	2	3A		2.2 (+13)	593	120 ml	E1	P203		MP9	T75	TP5	RxBN	TU19 TA4 TT9	3	W5		CW9 CW11	22	201	0-0-1-0	M2			
3137	OXIDIZING SOLID, FLAMMABLE, N.O.S.	5.1	OF						CARRIAGE PROHIBITED																	
3138	ETHYLENE, ACETYLENE AND PROPYLENE MIXTURE, REFRIGERATED LIQUID containing	2	3F		2.1 (+13)		0	E0	P203		MP9	T75	TP5	RxBN	TU18 TU38	2	W5		CW9 CW11	223	204	3/0-0-1-0	M2			
3139	OXIDIZING LIQUID, N.O.S.	5.1	O1	I	5.1	274	0	E0	P502		MP2					1			CW24	55	510	3/0-0-3-0	M1			
3139	OXIDIZING LIQUID, N.O.S.	5.1	O1	II	5.1	274	1l	E2	P504 IBC02		MP2					2			CW24	50	510	-	M3			
3139	OXIDIZING LIQUID, N.O.S.	5.1	O1	III	5.1	274	5l	E1	P504 IBC02 R001		MP2					3			CW24	50	510	-	M3			
3140	ALKALOIDS, LIQUID, N.O.S. or ALKALOID SALTS, LIQUID, N.O.S.	6.1	T1	I	6.1	43 274	0	E5	P001		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	622	-	M3			
3140	ALKALOIDS, LIQUID, N.O.S. or ALKALOID SALTS, LIQUID, N.O.S.	6.1	T1	II	6.1	43 274	100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31 CW60	60	622	-	M3			
3140	ALKALOIDS, LIQUID, N.O.S. or ALKALOID SALTS, LIQUID, N.O.S.	6.1	T1	III	6.1	43 274	5l	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	622	-	M3			
3141	ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S.	6.1	T4	III	6.1	45 274 512	5l	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3			
3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.	6.1	T1	I	6.1	274	0	E5	P001		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	615	1-1*-1-1	M3			
3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	274	100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	615	1-1*-1-1	M3			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3142	DISINFECTANT, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	274	5l	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	615	1-1*-1-1	M3
3143	DYE, SOLID, TOXIC, N.O.S. or DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	6.1	T2	I	6.1	274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU15 TU38 TE22	1	W10		CW13 CW28 CW31	66	634	1-1*-1-1	-
3143	DYE, SOLID, TOXIC, N.O.S. or DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	634	1-1*-1-1	-
3143	DYE, SOLID, TOXIC, N.O.S. or DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	634	1-1*-1-1	-
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.	6.1	T1	I	6.1	43 274	0	E5	P001		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	622	1-1*-1-1	-
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.	6.1	T1	II	6.1	43 274	100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	622	1-1*-1-1	-
3144	NICOTINE COMPOUND, LIQUID, N.O.S. or NICOTINE PREPARATION, LIQUID, N.O.S.	6.1	T1	III	6.1	43 274	5l	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	622	1-1*-1-1	-
3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C2-C12 homologues)	8	C3	I	8		0	E0	P001		MP8 MP17	T14	TP2	L10BH	TU38 TE22	1				88	804	0-0-1-0	M3
3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C2-C12 homologues)	8	C3	II	8		1l	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				80	804	0-0-1-0	M3
3145	ALKYLPHENOLS, LIQUID, N.O.S. (including C2-C12 homologues)	8	C3	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	804	0-0-1-0	M3
3146	ORGANOTIN COMPOUND, SOLID, N.O.S.	6.1	T3	I	6.1	43 274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	-
3146	ORGANOTIN COMPOUND, SOLID, N.O.S.	6.1	T3	II	6.1	43 274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	1-1*-1-1	-
3146	ORGANOTIN COMPOUND, SOLID, N.O.S.	6.1	T3	III	6.1	43 274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	1-1*-1-1	-
3147	DYE, SOLID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	8	C10	I	8	274	0	E0	P002 IBC07		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1	W10			88	822	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3147	DYE, SOLID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	8	C10	II	8	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	822	-	M3
3147	DYE, SOLID, CORROSIVE, N.O.S. or DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	8	C10	III	8	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	822	-	M3
3148	WATER-REACTIVE LIQUID, N.O.S.	4.3	W1	I	4.3	274	0	E0	P402	RR8	MP2	T13	TP2 TP7 TP38	L10DH	TU14 TU38 TE21 TE22 TM2	0	W1		CW23	X323	421	1-1*-1-1	M3
3148	WATER-REACTIVE LIQUID, N.O.S.	4.3	W1	II	4.3	274	500 ml	E2	P402 IBC01	RR8	MP15	T7	TP2 TP7	L4DH	TU14 TE21 TM2	0	W1		CW23	323	421	1-1*-1-1	M3
3148	WATER-REACTIVE LIQUID, N.O.S.	4.3	W1	III	4.3	274	1l	E1	P001 IBC02 R001		MP15	T7	TP2 TP7	L4DH	TU14 TE21 TM2	0	W1		CW23	323	421	3/0-0-1-0	M3
3149	HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE with acid(s), water and not more than 5% peroxyacetic acid, STABILIZED	5.1	OC1	II	5.1+8	196 553	1l	E2	P504 IBC02	PP10 B5	MP15	T7	TP2 TP6 TP24	L4BV(+)	TU3 TC2 TE8 TE11 TT1	2			CW24	58	505	0-0-3-0	M1
3150	DEVICES, SMALL, HYDROCARBON GAS POWERED or HYDROCARBON GAS REFILLS FOR SMALL DEVICES with release device	2	6F		2.1		0	E0	P209		MP9					2			CW9	23	214	-	-
3151	POLYHALOGENATED BIPHENYLS, LIQUID or POLYHALOGENATED TERPHENYLS, LIQUID	9	M2	II	9	203 305	1l	E2	P906 IBC02		MP15			L4BH	TU15	0		VC1 VC2 AP9	CW13 CW28 CW31	90	904	-	-
3152	POLYHALOGENATED BIPHENYLS, LIQUID or POLYHALOGENATED TERPHENYLS, LIQUID	9	M2	II	9	203 305	1kg	E2	P906 IBC08	B4	MP10	T3	TP33	S4AH L4BH	TU15	0	W11	VC1 VC2 AP9	CW13 CW28 CW31	90	904	-	-
3153	PERFLUORO(METHYL VINYL ETHER)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22	2			CW9 CW10	23	205	3/0-0-1-0 3/0-0-3-0	M2 M1
3154	PERFLUORO(ETHYL VINYL ETHER)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TE22	2			CW9 CW10	23	205	3/0-0-1-0 3/0-0-3-0	M2 M1
3155	PENTACHLOROPHENOL	6.1	T2	II	6.1	43	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	616	-	-
3156	COMPRESSED GAS, OXIDIZING, N.O.S.	2	1O		2.2+ 5.1 (+13)	274 655 662	0	E0	P200		MP9	(M)		CxBN(M)	TU50 TA4 TT9	3			CW9 CW10	25	220	1-1-1-1 1-1-3-1	M2 M1
3157	LIQUEFIED GAS, OXIDIZING, N.O.S.	2	2O		2.2+ 5.1 (+13)	274 662	0	E0	P200		MP9	(M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10	25	220	0-0-1-0 0-0-3-0	M2 M1
3158	GAS, REFRIGERATED LIQUID, N.O.S.	2	3A		2.2 (+13)	274 593	120 ml	E1	P203		MP9	T75	TP5	RxBN	TU19 TA4 TT9	3	W5		CW9 CW11	22	215	0-0-1-0 0-0-3-0	M2 M1
3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10	20	201	0-0-1-0 0-0-3-0	M2 M1
3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	2	2TF		2.3+ 2.1 (+13)	274	0	E0	P200		MP9	(M)		PxBH(M)	TU6	1			CW9	263	219	3/1-1*-1-1	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2																
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
					(+13)										TU38				CW10			3/1-1*-3-1	M1
3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.	2	2F		2.1 (+13)	274 662	0	E0	P200		MP9	T50 (M)		PxBN(M)	TU38 TE22	2			CW9 CW10	23	218	3/0-0-1-0	M2
																						3/0-0-3-0	M1
3162	LIQUEFIED GAS, TOXIC, N.O.S.	2	2T		2.3 (+13)	274	0	E0	P200		MP9	(M)		PxBH(M)	TU6 TU38	1			CW9 CW10	26	220	0-0-1-0	M2
																						0-0-3-0	M1
3163	LIQUEFIED GAS, N.O.S.	2	2A		2.2 (+13)	274 392	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10	20	215	0-0-1-0	M2
																						0-0-3-0	M1
3164	ARTICLES, PRESSURIZED, PNEUMATIC or HYDRAULIC (containing non-flammable gas)	2	6A		2.2	283 371 594	120 ml	E0	P003	PP32	MP9					3			CW9	20	213	-	-
3165	AIRCRAFT HYDRAULIC POWER UNIT FUEL TANK (containing a mixture of anhydrous hydrazine and methylhydrazine) (M86 fuel)	3	FTC		3+6.1+8		0	E0	P301		MP7					1			CW13 CW28	336	335	3/0-0-1-0	-
3166	Engine, internal combustion, flammablegas powered or engine, internalcombustion, flammable liquid powered orvehicle, flammable gas powered orvehicle, flammable liquid powered orengine, fuel cell, flammable gas poweredor engine, fuel cell, flammable liquidpowered or vehicle, fuel cell, flammablegas powered or vehicle, fuel cell, flammable liquid powered	9	M11	Not subject to the requirements of Annex 2 to SMGS																			
3167	GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid	2	7F		2.1		0	E0	P201		MP9					2			CW9	23	218	-	-
3168	GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid	2	7TF		2.3+2.1		0	E0	P201		MP9					1			CW9	263	219	-	-
3169	GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S., not refrigerated liquid	2	7T		2.3		0	E0	P201		MP9					1			CW9	26	220	-	-
3170	ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS	4.3	W2	II	4.3	244	500g	E2	P410 IBC07		MP14	T3 BK1 BK2	TP33	SGAN		2	W1	VC1 VC2 AP2	CW23 CW37	423	409	3/0-0-1-0	M3
3170	ALUMINIUM SMELTING BY-PRODUCTS or ALUMINIUM REMELTING BY-PRODUCTS	4.3	W2	III	4.3	244	1kg	E1	P002 IBC08 R001	B4	MP14	T1 BK1 BK2	TP33	SGAN		3	W1	VC1 VC2 AP2	CW23 CW37	423	409	3/0-0-1-0	M3
3171	Battery-powered vehicle or Battery-powered equipment	9	M11	NOT SUBJECT TO APPENDIX 2 to SMGS, see also special provision 240 of Chapter 3.3																			
3172	TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	6.1	T1	I	6.1	210 274	0	E5	P001		MP8 MP17			L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	623	1-1*-1-1	-
3172	TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	6.1	T1	II	6.1	210 274	100 ml	E4	P001 IBC02		MP15			L4BH	TU15	2			CW13 CW28 CW31	60	623	1-1*-1-1	-
3172	TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	6.1	T1	III	6.1	210 274	5l	E1	P001 IBC03 LP01 R001		MP19			L4BH	TU15	2	W12		CW13 CW28 CW31	60	623	1-1*-1-1	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3174	TITANIUM DISULPHIDE	4.2	S4	III	4.2		0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAN		3	W1			40	405	3/0-0-1-0	M3
3175	SOLIDS or mixtures of solids (such as preparations and wastes) CONTAINING FLAMMABLE LIQUID, N.O.S. having a flash-point up to 60 °C	4.1	F1	II	4.1	216 274 601	1kg	E2	P002 IBC06 R001	PP9	MP11	T3 BK1 BK2	TP33			2	W1	VC1 VC2 AP2		40	410	3/0-0-1-0	M3
3176	FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	4.1	F2	II	4.1	274	0	E0				T3	TP3 TP26	LGBV	TU27 TE4 TE6	2				44	411	3/0-0-1-0	M3
3176	FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	4.1	F2	III	4.1	274	0	E0				T1	TP3 TP26	LGBV	TU27 TE4 TE6	3				44	411	3/0-0-1-0	M3
3178	FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	4.1	F3	II	4.1	274	1kg	E2	P002 IBC08 R001	B4	MP11	T3	TP33	SGAN		2	W1			40	401	3/0-0-1-0	M3
3178	FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	4.1	F3	III	4.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	401	3/0-0-1-0	M3
3179	FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.	4.1	FT2	II	4.1+6.1	274	1kg	E2	P002 IBC06 R001		MP10	T3	TP33	SGAN		2	W1		CW28	46	413	3/0-0-1-0	M3
3179	FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.	4.1	FT2	III	4.1+6.1	274	5kg	E1	P002 IBC06 R001		MP10	T1	TP33	SGAN		3	W1		CW28	46	413	3/0-0-1-0	M3
3180	FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.	4.1	FC2	II	4.1+8	274	1kg	E2	P002 IBC06 R001		MP10	T3	TP33	SGAN		2	W1			48	414	3/0-0-1-0	M3
3180	FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.	4.1	FC2	III	4.1+8	274	5kg	E1	P002 IBC06 R001		MP10	T1	TP33	SGAN		3	W1			48	414	3/0-0-1-0	M3
3181	METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.	4.1	F3	II	4.1	274	1kg	E2	P002 IBC08 R001	B4	MP11	T3	TP33	SGAN		2	W1			40	401	3/0-0-1-0	M3
3181	METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.	4.1	F3	III	4.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	401	3/0-0-1-0	M3
3182	METAL HYDRIDES, FLAMMABLE, N.O.S.	4.1	F3	II	4.1	274 554	1kg	E2	P410 IBC04 R001	PP40	MP11	T3	TP33	SGAN		2	W1			40	401	3/0-0-1-0	M3
3182	METAL HYDRIDES, FLAMMABLE, N.O.S.	4.1	F3	III	4.1	274 554	5kg	E1	P002 IBC04 R001		MP11	T1	TP33	SGAV		3	W1	VC1 VC2		40	401	3/0-0-1-0	M3
3183	SELF-HEATING LIQUID, ORGANIC, N.O.S.	4.2	S1	II	4.2	274	0	E2	P001 IBC02 R001		MP15			L4DH	TU14 TE21	2	W1			30	424	3/0-0-1-0	M3
3183	SELF-HEATING LIQUID, ORGANIC, N.O.S.	4.2	S1	III	4.2	274	0	E1	P001 IBC02 R001		MP15			L4DH	TU14 TE21	3	W1			30	424	3/0-0-1-0	M3
3184	SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.	4.2	ST1	II	4.2+6.1	274	0	E2	P402 IBC02 R001		MP15			L4DH	TU14 TE21	2	W1		CW28	36	426	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3184	SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.	4.2	ST1	III	4.2+6.1	274	0	E1	P001 IBC02 R001		MP15			L4DH	TU14 TE21	3	W1		CW28	36	426	3/0-0-1-0	M3
3185	SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.	4.2	SC1	II	4.2+8	274	0	E2	P402 IBC02		MP15			L4DH	TU14 TE21	2	W1			38	425	3/0-0-1-0	M3
3185	SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.	4.2	SC1	III	4.2+8	274	0	E1	P001 IBC02 R001		MP15			L4DH	TU14 TE21	3	W1			38	425	3/0-0-1-0	M3
3186	SELF-HEATING LIQUID, INORGANIC, N.O.S.	4.2	S3	II	4.2	274	0	E2	P001 IBC02		MP15			L4DH	TU14 TE21	2	W1			30	424	3/0-0-1-0	M3
3186	SELF-HEATING LIQUID, INORGANIC, N.O.S.	4.2	S3	III	4.2	274	0	E1	P001 IBC02 R001		MP15			L4DH	TU14 TE21	3	W1			30	424	3/0-0-1-0	M3
3187	SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.	4.2	ST3	II	4.2+6.1	274	0	E2	P402 IBC02		MP15			L4DH	TU14 TE21	2	W1		CW28	36	426	3/0-0-1-0	M3
3187	SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.	4.2	ST3	III	4.2+6.1	274	0	E1	P001 IBC02 R001		MP15			L4DH	TU14 TE21	3	W1		CW28	36	426	3/0-0-1-0	M3
3188	SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.	4.2	SC3	II	4.2+8	274	0	E2	P402 IBC02		MP15			L4DH	TU14 TE21	2	W1			38	425	3/0-0-1-0	M3
3188	SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.	4.2	SC3	III	4.2+8	274	0	E1	P001 IBC02 R001		MP15			L4DH	TU14 TE21	3	W1			38	425	3/0-0-1-0	M3
3189	METAL POWDER, SELF-HEATING, N.O.S.	4.2	S4	II	4.2	274 555	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	415	3/0-0-1-0	M3
3189	METAL POWDER, SELF-HEATING, N.O.S.	4.2	S4	III	4.2	274 555	0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP1		40	415	3/0-0-1-0	M3
3190	SELF-HEATING SOLID, INORGANIC, N.O.S.	4.2	S4	II	4.2	274	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	415	3/0-0-1-0	M3
3190	SELF-HEATING SOLID, INORGANIC, N.O.S.	4.2	S4	III	4.2	274	0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP1		40	415	3/0-0-1-0	M3
3191	SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.	4.2	ST4	II	4.2+6.1	274	0	E2	P410 IBC05		MP14	T3	TP33	SGAN		2	W1		CW28	46	416	3/0-0-1-0	M3
3191	SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.	4.2	ST4	III	4.2+6.1	274	0	E1	P002 IBC08 R001	B3	MP14	T1	TP33	SGAN		3	W1		CW28	46	416	3/0-0-1-0	M3
3192	SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.	4.2	SC4	II	4.2+8	274	0	E2	P410 IBC05		MP14	T3	TP33	SGAN		2	W1			48	417	3/0-0-1-0	M3
3192	SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.	4.2	SC4	III	4.2+8	274	0	E1	P002 IBC08 R001	B3	MP14	T1	TP33	SGAN		3	W1			48	417	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3194	PYROPHORIC LIQUID, INORGANIC, N.O.S.	4.2	S3	I	4.2	274	0	E0	P400		MP2			L21DH	TU14 TU38 TC1 TE21 TE22 TE25 TM1	0	W1			333	424	3/1-1*-1-1	M3
3200	PYROPHORIC SOLID, INORGANIC, N.O.S.	4.2	S4	I	4.2	274	0	E0	P404		MP13	T21	TP7 TP33			0	W1			43	415	3/0-0-1-0	M3
3205	ALKALINE EARTH METAL ALCOHOLATES, N.O.S.	4.2	S4	II	4.2	183 274	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	418	3/0-0-1-0	M3
3205	ALKALINE EARTH METAL ALCOHOLATES, N.O.S.	4.2	S4	III	4.2	183 274	0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAN		3	W1			40	418	3/0-0-1-0	M3
3206	ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.	4.2	SC4	II	4.2+8	182 274	0	E2	P410 IBC05		MP14	T3	TP33	SGAN		2	W1			48	418	3/0-0-1-0	M3
3206	ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.	4.2	SC4	III	4.2+8	182 274	0	E1	P002 IBC08 R001	B3	MP14	T1	TP33	SGAN		3	W1			48	418	3/0-0-1-0	M3
3208	METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	4.3	W2	I	4.3	274 557	0	E0	P403 IBC99		MP2					1	W1		CW23	X423	421	3/0-0-1-0	M3
3208	METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	4.3	W2	II	4.3	274 557	500g	E2	P410 IBC07		MP14	T3	TP33	SGAN		2	W1		CW23	423	421	3/0-0-1-0	M3
3208	METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	4.3	W2	III	4.3	274 557	1kg	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	421	3/0-0-1-0	M3
3209	METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	4.3	WS	I	4.3+ 4.2	274 558	0	E0	P403		MP2					1	W1		CW23	X423	427	3/0-0-1-0	-
3209	METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	4.3	WS	II	4.3+4.2	274 558	0	E0	P410 IBC05		MP14	T3	TP33	SGAN		2	W1		CW23	423	427	3/0-0-1-0	-
3209	METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	4.3	WS	III	4.3+ 4.2	274 558	0	E1	P410 IBC08 R001	B4	MP14	T1	TP33	SGAN		3	W1	VC1 VC2 AP3 AP4 AP5	CW23	423	427	3/0-0-1-0	-
3210	CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	274 351	1l	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24	50	510	-	M3
3210	CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1	274 351	5l	E1	P504 IBC02 R001		MP2	T4	TP1	LGBV	TU3	3			CW24	50	510	-	M3
3211	PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1		1l	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24	50	510	-	M3
3211	PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1		5l	E1	P504 IBC02 R001		MP2	T4	TP1	LGBV	TU3	3			CW24	50	510	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3212	HYPOCHLORITES, INORGANIC, N.O.S.	5.1	O2	II	5.1	274 349	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
3213	BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	274 350	1l	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24	50	510	-	M3
3213	BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1	274 350	5l	E1	P504 IBC02 R001		MP15	T4	TP1	LGBV	TU3	3			CW24	50	510	-	M3
3214	PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	274 353	1l	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24	50	510	-	M3
3215	PERSULPHATES, INORGANIC, N.O.S.	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3
3216	PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1		5l	E1	P504 IBC02 R001		MP15	T4	TP1 TP29	LGBV	TU3	3			CW24	50	510	-	M3
3218	NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	270 511	1l	E2	P504 IBC02		MP15	T4	TP1	L4BN	TU3	2			CW24	50	510	-	-
3218	NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1	270 511	5l	E1	P504 IBC02 R001		MP15	T4	TP1	LGBV	TU3	3			CW24	50	510	-	-
3219	NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	II	5.1	103 274	1l	E2	P504 IBC01		MP15	T4	TP1	L4BN	TU3	2			CW24	50	510	-	M3
3219	NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	O1	III	5.1	103 274	5l	E1	P504 IBC02 R001		MP15	T4	TP1	LGBV	TU3	3			CW24	50	510	-	M3
3220	PENTAFLUOROETHANE (REFRIGERANT GAS R 125)	2	2A		2.2(+13)	662	120 ml	E1	P200		MP9	T50 (M)	TP60	PxBN(M)	TU50 TA4 TT9 TA4	3			CW9 CW10 CW22	20	201	0-0-1-0 0-0-3-0	M2 M1
3221	SELF-REACTIVE LIQUID TYPE B	4.1	SR1		4.1+1	181 194 274	25 ml	E0	P520	PP21	MP2					1	W5 W7 W8		CW22 CW58 CW70	40	424	3/0-0-1-0	M3
3222	SELF-REACTIVE SOLID TYPE B	4.1	SR1		4.1+1	181 194 274	100g	E0	P520	PP21	MP2					1	W5 W7 W8		CW22 CW58 CW70	40	415	3/0-0-1-0	-
3223	SELF-REACTIVE LIQUID TYPE C	4.1	SR1		4.1	194 274	25 ml	E0	P520	PP21	MP2					1	W7		CW22 CW58 CW70	40	424	3/0-0-1-0	M3
3224	SELF-REACTIVE SOLID TYPE C	4.1	SR1		4.1	194 274	100g	E0	P520	PP21	MP2					1	W7		CW22 CW58 CW70	40	415	3/0-0-1-0	-
3225	SELF-REACTIVE LIQUID TYPE D	4.1	SR1		4.1	194 274	125 ml	E0	P520		MP2					2	W7		CW22 CW58 CW70	40	424	3/0-0-1-0	M3
3226	SELF-REACTIVE SOLID TYPE D	4.1	SR1		4.1	194 274	500g	E0	P520		MP2					2	W7		CW22 CW58 CW70	40	415	3/0-0-1-0	-
3227	SELF-REACTIVE LIQUID TYPE E	4.1	SR1		4.1	194 274	125 ml	E0	P520		MP2					2	W7		CW22 CW58 CW70	40	424	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21b)
3228	SELF-REACTIVE SOLID TYPE E	4.1	SR1		4.1	194 274	500g	E0	P520		MP2					2	W7		CW22 CW58 CW70	40	415	3/0-0-1-0	-
3229	SELF-REACTIVE LIQUID TYPE F	4.1	SR1		4.1	194 274	125 ml	E0	P520 IBC99		MP2	T23				2	W7		CW22 CW58 CW70	40	424	3/0-0-1-0	M3
3230	SELF-REACTIVE SOLID TYPE F	4.1	SR1		4.1	194 274	500g	E0	P520 IBC99		MP2	T23				2	W7		CW22 CW58 CW70	40	415	3/0-0-1-0	-
3231	SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3232	SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3233	SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3234	SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3235	SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3236	SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3237	SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3238	SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3239	SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3240	SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED	4.1	SR2	CARRIAGE PROHIBITED																			
3241	2-BROMO-2-NITROPROPANE-1,3-DIOL	4.1	SR1	III	4.1	638	5kg	E1	P520 IBC08	PP22 B3	MP2					3	W1		CW14	40	404	3/0-0-1-0	-
3242	AZODICARBONAMIDE	4.1	SR1	II	4.1	215 638	1kg	E0	P409		MP2	T3	TP33			2	W1		CW14	40	404	3/0-0-1-0	-
3243	SOLIDS CONTAINING TOXIC LIQUID, N.O.S.	6.1	T9	II	6.1	217 274 601	500g	E4	P002 IBC02	PP9	MP10	T3 BK1 BK2	TP33	SGAH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	-
3244	SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.	8	C10	II	8	218 274	1kg	E2	P002 IBC05	PP9	MP10	T3 BK1 BK2	TP33	SGAV		2		VC1 VC2 AP7		80	822	0-0-1-0	M3
3245	GENETICALLY MODIFIED MICROORGANISMS or GENETICALLY MODIFIED ORGANISMS	9	M8		9	219 637	0	E0	P904 IBC08		MP6					2			CW13 CW17 CW18 CW26 CW28 CW31	90	906	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3245	GENETICALLY MODIFIED MICROORGANISMS or GENETICALLY MODIFIED ORGANISMS, in refrigerated liquid nitrogen	9	M8		9+2.2	219 637	0	E0	P904 IBC08		MP6					2			CW13 CW17 CW18 CW26 CW28 CW31	90	906	-	-
3246	METHANESULPHONYL CHLORIDE	6.1	TC1	I	6.1+8	354	0	E0	P602		MP8 MP17	T20	TP2 TP37	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	668	624	1-1*-1-1	-
3247	SODIUM PEROXOBORATE, ANHYDROUS	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP2	T3	TP33	SGAN	TU3	2	W11		CW24	50	501	-	M3
3248	MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	220 221 601	1l	E2	P001		MP19			L4BH	TU15	2			CW13 CW28	336	328	3/0-0-1-0	M3
3248	MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3	FT1	III	3+6.1	220 221 601	5l	E1	P001 R001		MP19			L4BH	TU15	3			CW13 CW28	36	328	3/0-0-1-0	M3
3249	MEDICINE, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	221 601	500g	E4	P002		MP10	T3	TP33	SGAH L4BH	TU15	2			CW13 CW28 CW31	60	620	-	M3
3249	MEDICINE, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	221 601	5kg	E1	P002 LP02 R001		MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	620	-	M3
3250	CHLOROACETIC ACID, MOLTEN	6.1	TC1	II	6.1+8		0	E0				T7	TP3 TP28	L4BH	TU15 TC4	0			CW13 CW31	68	611	-	-
3251	SOSORBIDE-5-MONONITRATE	4.1	SR1	III	4.1	226 638	5kg	E0	P409		MP2					3	W1		CW14	40	404	3/0-0-1-0	-
3252	DIFLUOROMETHANE (REFRIGERANT GAS R 32)	2	2F		2.1 (+13)	662	0	E0	P200		MP9	T50 (M)	TP60	PxBN(M)	TU38 TU50	2			CW9 CW10	23	205	3/0-0-1-0 3/0-0-3-0	M2 M1
3253	DISODIUM TRIOXOSILICATE	8	C6	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	808	-	M3
3254	TRIBUTYLPHOSPHANE	4.2	S1	I	4.2		0	E0	P400		MP2	T21	TP2 TP7			0	W1			333	405	3/0-0-1-0	M3
3255	tert-BUTYL HYPOCHLORITE	4.2	SC1																				
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flashpoint above 60 °C, at or above its flashpoint and below 100 °C	3	F2	III	3	274 560	0	E0	P099 IBC99		MP2	T3	TP3 TP29	LGAV	TU35	3				30	334	3/0-0-1-0	M3
3256	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flashpoint above 60 °C, at or above its flashpoint and at or above 100 °C	3	F2	III	3	274 560	0	E0	P099 IBC99		MP2	T3	TP3 TP29	LGAV	TU35	3				30	334	3/0-0-1-0	M3

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3257	ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100 °C and below its flash-point (including molten metals, molten salts, etc.)	9	M9	III	9	274 643	0	E0	P099 IBC99			T3	TP3 TP29	LGAV	TU35 TE6 TE14	3		VC3 AP11	CW17 CW31	99	908	-	-
3258	ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C	9	M10	III	9	274 643	0	E0	P099 IBC99							3		VC3	CW31	99	908	-	-
3259	AMINES, SOLID, CORROSIVE, N.O.S. or POLYAMINES, SOLID, CORROSIVE, N.O.S.	8	C8	I	8	274	0	E0	P002 IBC07		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1	W10			88	820	0-0-1-0	M3
3259	AMINES, SOLID, CORROSIVE, N.O.S. or POLYAMINES, SOLID, CORROSIVE, N.O.S.	8	C8	II	8	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	820	0-0-1-0	M3
3259	AMINES, SOLID, CORROSIVE, N.O.S. or POLYAMINES, SOLID, CORROSIVE, N.O.S.	8	C8	III	8	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	820	0-0-1-0	M3
3260	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	8	C2	I	8	274	0	E0	P002 IBC07		MP18	T6	TP33	S10AN		1	W10			88	815	0-0-1-0	M3
3260	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	8	C2	II	8	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN		2	W11			80	815	0-0-1-0	M3
3260	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	8	C2	III	8	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV		3		VC1 VC2 AP7		80	815	0-0-1-0	M3
3261	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	8	C4	I	8	274	0	E0	P002 IBC07		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1	W10			88	803	0-0-1-0	M3
3261	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	8	C4	II	8	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	803	0-0-1-0	M3
3261	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	8	C4	III	8	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	803	0-0-1-0	M3
3262	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	8	C6	I	8	274	0	E0	P002 IBC07		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1	W10			88	819	0-0-1-0	M3
3262	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	8	C6	II	8	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	819	0-0-1-0	M3
3262	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	8	C6	III	8	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	819	0-0-1-0	M3
3263	CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	8	C8	I	8	274	0	E0	P002 IBC07		MP18	T6	TP33	S10AN L10BH	TU38 TE22	1	W10			88	819	0-0-1-0	M3
3263	CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	8	C8	II	8	274	1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	819	0-0-1-0	M3
3263	CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	8	C8	III	8	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	819	0-0-1-0	M3
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	C1	I	8	274	0	E0	P001		MP8 MP17	T14	TP2 TP27	L10BH	TU38 TE22	1				88	816	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	C1	II	8	274	1I	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				80	816	0-0-1-0	M3
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S..	8	C1	III	8	274	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	816	0-0-1-0	M3
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	C3	I	8	274	0	E0	P001		MP8 MP17	T14	TP2 TP27	L10BH	TU38 TE22	1				88	803	0-0-1-0	M3
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	C3	II	8	274	1I	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				80	803	0-0-1-0	M3
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	C3	III	8	274	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	803	0-0-1-0	M3
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	C5	I	8	274	0	E0	P001		MP8 MP17	T14	TP2 TP27	L10BH	TU38 TE22	1				88	818	0-0-1-0	M3
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	C5	II	8	274	1I	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				80	818	0-0-1-0	M3
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	C5	III	8	274	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	818	0-0-1-0	M3
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	C7	I	8	274	0	E0	P001		MP8 MP17	T14	TP2 TP27	L10BH	TU38 TE22	1				88	818	0-0-1-0	M3
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	C7	II	8	274	1I	E2	P001 IBC02		MP15	T11	TP2 TP27	L4BN		2				80	818	0-0-1-0	M3
3267	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	8	C7	III	8	274	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BN		3	W12			80	818	0-0-1-0	M3
3268	SAFETY DEVICES, electrically initiated	9	M5		9	280 289	0	E0	P902 LP902							4				90	907	-	-
3269	POLYESTER RESIN KIT	3	F1	II	3	236 340	5I	See SP 340	P302 R001							2				33	328	3/0-0-1-0	M3
3269	POLYESTER RESIN KIT (viscous according to 2.2.3.1.4)	3	F1	III	3	236 340	5I	See SP 340	P302 R001							3				33	328	3/0-0-1-0	M3
3269	POLYESTER RESIN KIT (not viscous)	3	F1	III	3	236 340	5I	See SP 340	P302 R001							3				30	328	3/0-0-1-0	M3
3270	NITROCELLULOSE MEMBRANE FILTERS, with not more than 12.6% nitrogen, by dry mass	4.1	F1	II	4.1	237 286 403	1kg	E2	P411		MP11					2	W1			40	402	3/0-0-1-0	M3
3271	ETHERS, N.O.S.	3	F1	II	3	274	1I	E2	P001 IBC02 R001		MP19	T7	TP1 TP8 TP28	LGBF		2				33	331	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3271	ETHERS, N.O.S.	3	F1	III	3	274	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	331	3/0-0-1-0	M3
3272	ESTERS, N.O.S.	3	F1	II	3	274 601	1I	E2	P001 IBC02 R001		MP19	T7	TP1 TP8 TP28	LGBF		2				33	306	3/0-0-1-0	M3
3272	ESTERS, N.O.S.	3	F1	III	3	274 601	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	306	3/0-0-1-0	M3
3273	NITRILES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	I	3+6.1	274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	333	3/0-0-1-0	M3
3273	NITRILES, FLAMMABLE, TOXIC, N.O.S.	3	FT1	II	3+6.1	274	1I	E2	P001 IBC02		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28	336	333	3/0-0-1-0	M3
3274	ALCOHOLATES SOLUTION, N.O.S., in alcohol	3	FC	II	3+8	274	1I	E2	P001 IBC02		MP19			L4BH		2				338	328	3/0-0-1-0	M3
3275	NITRILES, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	I	6.1+3	274 315	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	649	3/1-1*-1-1	M2
3275	NITRILES, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	II	6.1+3	274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	63	649	3/0-0-1-0	M2
3276	NITRILES, LIQUID, TOXIC, N.O.S.	6.1	T1	I	6.1	274 315	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	632	1-1*-1-1	M3
3276	NITRILES, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	632	-	M3
3276	NITRILES, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	274	5I	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	632	-	M3
3277	CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.	6.1	TC1	II	6.1+8	274 561	100 ml	E4	P001 IBC02		MP15	T8	TP2 TP28	L4BH	TU15	2			CW13 CW28 CW31	68	640	-	-
3278	ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T1	I	6.1	43 274 315	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	630	1-1*-1-1	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packag es	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humpin g
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3278	ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T1	II	6.1	43 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	630	-	M3
3278	ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T1	III	6.1	43 274	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3
3279	ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	I	6.1+3	43 274 315	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	663	644	3/0-0-1-0	M3
3279	ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.	6.1	TF1	II	6.1+3	43 274	100 ml	E4	P001		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	63	644	3/0-0-1-0	M3
3280	ORGANOARSENIC COMPOUND, LIQUID, N.O.S.	6.1	T3	I	6.1	274 315	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	630	1-1*-1-1	M3
3280	ORGANOARSENIC COMPOUND, LIQUID, N.O.S.	6.1	T3	II	6.1	274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	630	-	M3
3280	ORGANOARSENIC COMPOUND, LIQUID, N.O.S.	6.1	T3	III	6.1	274	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3
3281	METAL CARBONYLS, LIQUID, N.O.S.	6.1	T3	I	6.1	274 315 562	0	E5	P601		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	630	1-1*-1-1	M3
3281	METAL CARBONYLS, LIQUID, N.O.S.	6.1	T3	II	6.1	274 562	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	630	-	M3
3281	METAL CARBONYLS, LIQUID, N.O.S.	6.1	T3	III	6.1	274 562	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3
3282	ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T3	I	6.1	274 562	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	630	1-1*-1-1	M3
3282	ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T3	II	6.1	274 562	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	630	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3282	ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.	6.1	T3	III	6.1	274 562	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3
3283	SELENIUM COMPOUND, SOLID, N.O.S.	6.1	T5	I	6.1	274 563	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	M3
3283	SELENIUM COMPOUND, SOLID, N.O.S.	6.1	T5	II	6.1	274 563	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	-	M3
3283	SELENIUM COMPOUND, SOLID, N.O.S.	6.1	T5	III	6.1	274 563	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3
3284	TELLURIUM COMPOUND, N.O.S.	6.1	T5	I	6.1	274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	-	M3
3284	TELLURIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	-	M3
3284	TELLURIUM COMPOUND, N.O.S.	6.1	T5	III	6.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3
3285	VANADIUM COMPOUND, N.O.S.	6.1	T5	I	6.1	274 564	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	-	M3
3285	VANADIUM COMPOUND, N.O.S.	6.1	T5	II	6.1	274 564	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	-	M3
3285	VANADIUM COMPOUND, N.O.S..	6.1	T5	III	6.1	274 564	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	I	3+6.1+8	274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW61 CW64 CW68	368	328	3/1-1*-1-1	M2/M1
3286	FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3	FTC	II	3+6.1+8	274	1l	E2	P001 IBC02		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW61 CW64	368	328	3/1-1*-1-1	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1	T4	I	6.1	274 315	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	630	1-1*-1-1	M3
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1	T4	II	6.1	274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	630	-	M3
3287	TOXIC LIQUID, INORGANIC, N.O.S.	6.1	T4	III	6.1	274	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3
3288	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S..	6.1	T5	I	6.1	274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	M3
3288	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	6.1	T5	II	6.1	274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	-	M3
3288	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	6.1	T5	III	6.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	-	M3
3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.	6.1	TC3	I	6.1+8	274 315	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	668	640	1-1*-1-1	M3
3289	TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.	6.1	TC3	II	6.1+8	274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	68	640	1-1*-1-1	M3
3290	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	6.1	TC4	I	6.1+8	274	0	E5	P002 IBC05		MP18	T6	TP33	S10AH L10CH	TU15 TU38 TE22	1	W10		CW13 CW28 CW31	668	640	1-1*-1-1	M3
3290	TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	6.1	TC4	II	6.1+8	274	500g	E4	P002 IBC06		MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	68	640	1-1*-1-1	M3
3291	CLINICAL WASTE, UNSPECIFIED, N.O.S. or (BIO) MEDICAL WASTE, N.O.S. or REGULATED MEDICAL WASTE, N.O.S.	6.2	I3		6.2	565	0	E0	P621 IBC620 LP621		MP6	BK2				2	W9	VC3	CW13 CW18 CW28	606	623	-	-
3291	CLINICAL WASTE, UNSPECIFIED, N.O.S. or (BIO) MEDICAL WASTE, N.O.S. or REGULATED MEDICAL WASTE, N.O.S., in refrigerated liquid nitrogen	6.2	I3		6.2+2.2	565	0	E0	P621 IBC620 LP621		MP6					2	W9		CW13 CW18 CW28	606	623	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3292	БАТАРЕИ, СОДЕРЖАЩИЕ МЕТАЛЛИЧЕСКИЙ НАТРИЙ ИЛИ НАТРИЕВЫЙ СПЛАВ, или ЭЛЕМЕНТЫ, СОДЕРЖАЩИЕ МЕТАЛЛИЧЕСКИЙ НАТРИЙ ИЛИ НАТРИЕВЫЙ СПЛАВ	4.3	W3		4.3	239 295 401	0	E0	P408							2	W1		CW23	423	430	0-0-1-0	-
3293	HYDRAZINE, AQUEOUS SOLUTION with not more than 37% hydrazine, by mass	6.1	T4	III	6.1	566	SI	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	622	-	M3
3294	HYDROGEN CYANIDE, SOLUTION IN ALCOHOL with not more than 45% hydrogen cyanide	6.1	TF1	I	6.1+3	610	0	E0	P601		MP8 MP17	T14	TP2	L15DH(+)	TU14 TU15 TU38 TE21 TE22 TE25	0			CW13 CW28 CW31 CW47 CW55	663	602	3/0-0-1-0	M1
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	I	3		500 ml	E3	P001		MP7 MP17	T11	TP1 TP8 TP28	L4BN		1				33	328	3/0-0-1-0	M3
3295	HYDROCARBONS, LIQUID, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640C	1l	E2	P001		MP19	T7	TP1 TP8 TP28	L1,5BN		2				33	328	3/0-0-1-0	M3
3295	HYDROCARBONS, LIQUID, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	640D	1l	E2	P001 IBC02 R001		MP19	T7	TP1 TP8 TP28	LGBF		2				33	328	3/0-0-1-0	M3
3295	HYDROCARBONS, LIQUID, N.O.S.	3	F1	III	3		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	328	3/0-0-1-0	M3
3296	HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10	20	201	0-0-1-0 0-0-3-0	M2 M1
3297	ETHYLENE OXIDE AND CHLOROTETRAFLUOROETHANE MIXTURE	2	2A		2.2 (+13)	392 662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10	20	207	0-0-1-0 0-0-3-0	M2 M1
3298	ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE with not	2	2A		2.2 (+13)	392 662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10	20	207	0-0-1-0 0-0-3-0	M2 M1
3299	ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE with not	2	2A		2.2 (+13)	392 662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10	20	207	0-0-1-0 0-0-3-0	M2 M1
3300	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	2	2TF		2.3+ 2.1 (+13)		0	E0	P200		MP9	(M)		PxBH(M)	TU38 TE22	1			CW9 CW10	263	207	3/1-1*-1-1 3/1-1*-3-1	M2 M1
3301	CORROSIVE LIQUID, SELF-HEATING, N.O.S.	8	CS1	I	8+4.2	274	0	E0	P001		MP8 MP17			L10BH	TU38 TE22	1			CW70	884	827	3/0-0-1-0	M3
3301	CORROSIVE LIQUID, SELF-HEATING, N.O.S.	8	CS1	II	8+4.2	274	0	E2	P001		MP15			L4BN		2			CW70	84	827	3/0-0-1-0	M3
3302	2-DIMETHYLAMINOETHYL ACRYLATE	6.1	T1	II	6.1	386 676	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	614	-	-
3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	2	1TO		2.3+ 5.1 (+13)	274	0	E0	P200		MP9	(M)		CxBH(M)	TU6 TU38	1			CW9 CW10	265	220	1-1*-1-1 1-1*-3-1	M2 M1
3304	COMPRESSED GAS, TOXIC, CORROSIVE,	2	1TC		2.3+8	274	0	E0	P200		MP9	(M)		CxBH(M)	TU6	1			CW9	268	220	0-0-1-0	M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
	N.O.S.				(+13)										TU38				CW10			0-0-3-0	M1
3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2	1TFC		2.3+ 2.1+8	274	0	E0	P200		MP9	(M)		CxBH(M)	TU6 TU38	1			CW9 CW10	263	219	3/1-1*-1-1	M2
																						3/1-1*-3-1	M1
3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2	1TOC		2.3+ 5.1+8	274	0	E0	P200		MP9	(M)		CxBH(M)	TU6 TU38	1			CW9 CW10	265	220	1-1*-1-1	M2
																						1-1*-3-1	M1
3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	2	2TO		2.3+ 5.1 (+13)	274	0	E0	P200		MP9	(M)		PxBH(M)	TU6 TU38	1			CW9 CW10	265	220	0-0-1-0	M2
																						0-0-3-0	M1
3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	2	2TC		2.3+8 (+13)	274	0	E0	P200		MP9	(M)		PxBH(M)	TU6 TU38	1			CW9 CW10	268	220	1-1*-1-1	M1
																						1-1-3-1	M1
3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2	2TFC		2.3+ 2.1+8	274	0	E0	P200		MP9	(M)		PxBH(M)	TU6 TU38	1			CW9 CW10	263	219	3/1-1-1-1	M1
																						3/1-1-3-1	M1
3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2	2TOC		2.3+ 5.1+8	274	0	E0	P200		MP9	(M)		PxBH(M)	TU6 TU38	1			CW9 CW10	265	220	1-1-1-1	M2
																						1-1-3-1	M1
3311	GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.	2	3O		2.2+ 5.1 (+13)	274	0	E0	P203		MP9	T75	TP5 TP22	RxBN	TU7 TU19	3	W5		CW9 CW11	225	220	0-0-1-0	M2
																						0-0-3-0	M1
3312	GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.	2	3F		2.1 (+13)	274	0	E0	P203		MP9	T75	TP5	RxBN	TU18 TU38	2	W5		CW9 CW11	223	218	3/0-0-1-0	M2
																						3/0-0-3-0	M1
3313	ORGANIC PIGMENTS, SELF-HEATING	4.2	S2	II	4.2		0	E2	P002 IBC08	B4	MP14	T3	TP33	SGAV		2	W1			40	405	3/0-0-1-0	M3
3313	ORGANIC PIGMENTS, SELF-HEATING	4.2	S2	III	4.2		0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAV		3	W1			40	405	3/0-0-1-0	M3
3314	PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour	9	M3	III	NONE	207 633 675	5kg	E1	P002 IBC08 R001	PP14 B3 B6	MP10					3		VC1 VC2 AP2	CW31	90	902	-	-
3315	CHEMICAL SAMPLE, TOXIC	6.1	T8	I	6.1	250	0	E0	P099		MP8 MP17					1			CW13 CW28 CW31 CW47	66	616	1-1-1-1	-
3316	CHEMICAL KIT or FIRST AID KIT	9	M11	II	9	251 340	See SP 251	See SP 340	P901							2				90	906	-	-
3316	CHEMICAL KIT or FIRST AID KIT	9	M11	III	9	251 340	See SP 251	See SP 340	P901							3				90	906	-	-
3317	2-AMINO-4,6-DINITROPHENOL, WETTED with not less than 20% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP26	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
3318	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50%	2	4TC		2.3+8 (+13)	23	0	E0	P200		MP9	T50 (M)		PxBH(M)	TU38 TE22	1			CW9 CW10	268	208	1-1*-1-1	M1
																						1-1*-3-1	M1
3319	NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin, by mass	4.1	D	II	4.1	28 272 274	0	E0	P099 IBC99		MP2					2	W1		CW70	40	404	3/0-0-1-0	-

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3320	SODIUM BOROHYDRIDE AND SODIUM HYDROXIDE SOLUTION, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide bymass	8	C5	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	809	-	-
3320	SODIUM BOROHYDRIDE AND SODIUM HYDROXIDE SOLUTION, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide bymass	8	C5	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP2	L4BN		3	W12			80	809	-	-
3321	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non fissile or fissile-excepted	7			7X	172 317 325 336	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3		T5	TP4	S2,65AN(+) L2,65CN(+)	TU36 TT7 TM7	0			CW33	70			
3322	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted	7			7X	172 317 325 336	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3		T5	TP4	S2,65AN(+) L2,65CN(+)	TU36 TT7 TM7	0			CW33	70			
3323	RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted	7			7X	172 317 325	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3324	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE	7			7X+7E	172 326 336	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3325	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY, (LSA-III), FISSILE	7			7X+7E	172 326 336	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3326	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE	7			7X+7E	172 336	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3327	RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form	7			7X+7E	172 326	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3328	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE	7			7X+7E	172 326 337	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3329	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE	7			7X+7E	172 326 337	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3330	RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE	7			7X+7E	172 326	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3331	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE	7			7X+7E	172 326	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3332	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile-excepted	7			7X	172 317	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3333	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE	7			7X+7E	172	0	E0	See 2.2.7 and 4.1.9	See 4.1.9.1.3						0			CW33	70			
3334	Aviation regulated liquid, n.o.s.	9	M11	NOT SUBJECT TO APPENDIX 2 to SMGS																			
3335	Aviation regulated solid, n.o.s.	9	M11	NOT SUBJECT TO APPENDIX 2 to SMGS																			
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S.	3	F1	I	3	274	0	E0	P001		MP7 MP17	T11	TP2	L4BN		1				33	332	3/1-1*-1-1	M3
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S. (vapour pressure at 50 °C more than 110 kPa)	3	F1	II	3	274 640C	1I	E2	P001		MP19	T7	TP1 TP8 TP28	L1,5BN		2				33	332	3/1-1*-1-1	M3
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	II	3	274 640D	1I	E2	P001 IBC02 R001		MP19	T7	TP1 TP8 TP28	LGBF		3				33	332	3/1-1*-1-1	M3
3336	MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S. (vapour pressure at 50 °C not more than 110 kPa)	3	F1	III	3	274	5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1 TP29	LGBF		3	W12			30	332	3/1-1*-1-1	M3
3337	REFRIGERANT GAS R 404A (Pentafluoroethane, 1,1,1-trifluoroethane, and	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW11	20	201	0-0-1-0 0-0-3-0	M2 M1
3338	REFRIGERANT GAS R 407A (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW11	20	201	0-0-1-0 0-0-3-0	M2 M1
3339	REFRIGERANT GAS R 407B (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW11	20	201	0-0-1-0 0-0-3-0	M2 M1
3340	REFRIGERANT GAS R 407C (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane	2	2A		2.2 (+13)	662	120 ml	E1	P200		MP9	T50 (M)		PxBN(M)	TA4 TT9 TM6	3			CW9 CW10 CW11	20	201	0-0-1-0 0-0-3-0	M2 M1
3341	THIOUREA DIOXIDE	4.2	S2	II	4.2		0	E2	P002 IBC06		MP14	T3	TP33	SGAV		2	W1			40	405	3/0-0-1-0	M3
3341	THIOUREA DIOXIDE	4.2	S2	III	4.2		0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAV		3	W1			40	405	3/0-0-1-0	M3
3342	XANTHATES	4.2	S2	II	4.2		0	E2	P002 IBC06		MP14	T3	TP33	SGAV		2	W1			40	405	3/0-0-1-0	M3

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									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3342	XANTHATES	4.2	S2	III	4.2		0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAV		3	W1			40	405	3/0-0-1-0	M3
3343	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin, by mass	3	D		3	28 274 278	0	E0	P099		MP2					0			CW70	30/33	311	3/0-0-1-0	M3
3344	PENTAERYTHRITOL TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN) MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	4.1	D	II	4.1	28 272 274	0	E0	P099		MP2					2	W1		CW70	40	404	3/0-0-1-0	M3
3345	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
3345	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
3345	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3
3346	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
3346	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274	1l	E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	3/0-0-1-0	M3
3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	3/0-0-1-0	M3
3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packages 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergency card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humping 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3347	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5l	E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	3/0-0-1-0	M3
3348	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
3348	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3348	PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3349	PYRETHROID PESTICIDE, SOLID, TOXIC	6.1	T7	I	6.1	61 274 648	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31 CW48	66	613	-	M3
3349	PYRETHROID PESTICIDE, SOLID, TOXIC	6.1	T7	II	6.1	61 274 648	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31 CW48	60	613	-	M3
3349	PYRETHROID PESTICIDE, SOLID, TOXIC	6.1	T7	III	6.1	61 274 648	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31 CW48	60	613	-	M3
3350	PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	I	3+6.1	61 274	0	E0	P001		MP7 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW48	336	336	0-0-1-0	M3
3350	PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3	FT2	II	3+6.1	61 274	1l	E2	P001 IBC02 R001		MP19	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW48	336	336	0-0-1-0	M3
3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	I	6.1+3	61 274	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	663	610	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	II	6.1+3	61 274	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	63	610	0-0-1-0	M3
3351	PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	6.1	TF2	III	6.1+3	61 274	5l	E1	P001 IBC03 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	63	610	0-0-1-0	M3
3352	PYRETHROID PESTICIDE, LIQUID, TOXIC	6.1	T6	I	6.1	61 274 648	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW48	66	604	0-0-1-0	M3
3352	PYRETHROID PESTICIDE, LIQUID, TOXIC	6.1	T6	II	6.1	61 274 648	100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3352	PYRETHROID PESTICIDE, LIQUID, TOXIC	6.1	T6	III	6.1	61 274 648	5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW48	60	604	0-0-1-0	M3
3354	INSECTICIDE GAS, FLAMMABLE, N.O.S.	2	2F		2.1 (+13)	274 662	0	E0	P200		MP9	(M)		PxBN(M)	TU38 TE22	2			CW9 CW10 CW28	23	218	3/0-0-1-0 3/0-0-3-0	M2 M1
3355	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	2	2TF		2.3+ 2.1 (+13)	274	0	E0	P200		MP9	(M)		PxBH(M)	TU6 TU38	1			CW9 CW10 CW28	263	219	3/1-1-1-1 3/1-1-3-1	M2 M1
3356	OXYGEN GENERATOR, CHEMICAL	5.1	O3		5.1	284	0	E0	P500		MP2					2			CW24	50	514	-	M3
3357	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin, by mass	3	D	II	3	28 274 288	0	E0	P099		MP2					2			CW70	33	311	3/0-0-1-0	M3
3358	REFRIGERATING MACHINES containing flammable, non-toxic, liquefied gas	2	6F		2.1	291	0	E0	P003	PP32	MP9					2			CW9	23	218	-	-
3359	FUMIGATED CARGO TRANSPORT UNIT	9	M11			302															909	-	-
3360	Fibres, vegetable, dry	4.1	F1	Not subject to the requirements of Annex 2 to SMGS except for special provisions of CW54 (See 7.5.11)																			
3361	CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	6.1	TC1	II	6.1+8	274	0	E0	P010		MP15	T14	TP2 TP7 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	68	640	-	-
3362	CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	6.1	TFC	II	6.1+3+8	274	0	E0	P010		MP15	T14	TP2 TP7 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW48	638	637	3/0-0-1-0	M3
3363	DANGEROUS GOODS IN ARTICLES or DANGEROUS GOODS IN MACHINERY or DANGEROUS GOODS IN	9	M11	Not subject to the requirements of Annex 2 to SMGS (See 1.1.3.1b)																			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3364	TRINITROPHENOL (PICRIC ACID), WETTED with not less than 10% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP24	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
3365	TRINITROCHLOROBENZENE (PICRYL CHLORIDE), WETTED with not less than 10% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP24	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
3366	TRINITROTOLUENE (TNT), WETTED with not less than 10% water, by mass не менее 10%	4.1	D	I	4.1	28	0	E0	P406	PP24	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
3367	TRINITROBENZENE, WETTED with not less than 10% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP24	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
3368	TRINITROBENZOIC ACID, WETTED with not less than 10% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP24	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
3369	SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 10% water, by mass не менее 10%	4.1	DT	I	4.1 +6.1	28	0	E0	P406	PP24	MP2					1	W1		CW13 CW28	46	404	3/0-0-1-0	-
3370	UREA NITRATE, WETTED with not less than 10% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP78	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
3371	2-METHYLBUTANAL	3	F1	II	3		1I	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
3373	BIOLOGICAL SUBSTANCE, CATEGORY B	6.2	I4		6.2	319	0	E0	P650			T1	TP1	L4BH	TU15 TU37	-				606	623	-	-
3373	BIOLOGICAL SUBSTANCE, CATEGORY B (animal material only)	6.2	I4		6.2	319	0	E0	P650			T1 BK1 BK2	TP1	L4BH	TU15 TU37	-				606	623	-	-
3374	ACETYLENE, SOLVENT FREE	2	2F		2.1	662	0	E0	P200		MP9					2			CW9 CW10 CW36	239	204	3/0-0-3-0	M1
3375	AMMONIUM NITRATE EMULSION or SUSPENSION or GEL, intermediate for blasting explosives, liquid	5.1	O1	II	5.1	309	0	E2	P505 IBC02	B16	MP2	T1	TP1 TP9 TP17 TP32	LGAV(+)	TU3 TU12 TU39 TE10 TE23 TA1 TA3	2			CW24	50	505	0-0-1-0	-
3375	AMMONIUM NITRATE EMULSION or SUSPENSION or GEL, intermediate for blasting explosives, solid	5.1	O2	II	5.1	309	0	E2	P505 IBC02	B16	MP2	T1	TP1 TP9 TP17 TP32	SGAV(+)	TU3 TU12 TU39 TE10 TE23 TA1 TA3	2			CW24	50	505	0-0-1-0	-
3376	4-NITROPHENYLHYDRAZINE, with not less than 30% water, by mass	4.1	D	I	4.1	28	0	E0	P406	PP26	MP2					1	W1		CW70	40	404	3/0-0-1-0	M3
3377	SODIUM PERBORATE MONOHYDRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3378	SODIUM CARBONATE PEROXYHYDRATE	5.1	O2	II	5.1		1kg	E2	P002 IBC08	B4	MP10	T3 BK1 BK2	TP33	SGAV	TU3	2	W11	VC1 VC2 AP6 AP7	CW24	50	501	-	-
3378	SODIUM CARBONATE PEROXYHYDRATE	5.1	O2	III	5.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1 BK1 BK2	TP33	SGAV	TU3	3		VC1 VC2 AP6 AP7	CW24	50	501	-	-
3379	DESENSITIZED EXPLOSIVE, LIQUID, N.O.S.	3	D	I	3	274 311	0	E0	P099		MP2					1				33	328	3/1-1*-1-0	M3
3380	DESENSITIZED EXPLOSIVE, SOLID, N.O.S.	4.1	D	I	4.1	274 311 394	0	E0	P099		MP2					1	W1		CW70	40	404	3/1-1*-1-0	M3
3381	TOXIC BY INHALATION LIQUID, N.O.S. with an LC50 lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC50	6.1	T1 and T4	I	6.1	274	0	E0	P601		MP8 MP17	T22	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW55	66	623	1-1*-1-1	-
3382	TOXIC BY INHALATION LIQUID, N.O.S. with an LC50 lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC50	6.1	T1 and T4	I	6.1	274	0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	66	623	1-1*-1-1	-
3383	TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC50 lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC50	6.1	TF1	I	6.1+3	274	0	E0	P601		MP8 MP17	T22	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW55	663	636	3/0-0-1-0	-
3384	TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC50 lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC50	6.1	TF1	I	6.1+3	274	0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	663	636	3/0-0-1-0	-
3385	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC50 lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC50	6.1	TW1	I	6.1+4.3	274	0	E0	P601		MP8 MP17	T22	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW55 CW70	623	651	0-0-1-0	-
3386	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC50 lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC50	6.1	TW1	I	6.1+4.3	274	0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55 CW70	623	651	0-0-1-0	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3387	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC50 lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC50	6.1	TO1	I	6.1+5.1	274	0	E0	P601		MP8 MP17	T22	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW55	665	655	1-1*-1-1	-
3388	TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC50 lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC50	6.1	TO1	,	6.1+5.1	274	0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	665	655	1-1*-1-1	-
3389	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC50 lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC50	6.1	TC1 and TC3	I	6.1+8	274	0	E0	P601		MP8 MP17	T22	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31 CW55	668	640	1-1*-1-1	-
3390	TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC50 lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC50	6.1	TC1 and TC3	I	6.1+8	274	0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW55	668	640	1-1*-1-1	-
3391	ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC	4.2	S5	I	4.2	274	0	E0	P404	PP86	MP2	T21	TP7 TP33 TP36	L21DH	TU4 TU14 TU22 TU38 TC1 TE21 TE22 TE25 TM1	0	W1			43	415	3/0-0-1-0	-
3392	ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC	4.2	S5	I	4.2	274	0	E0	P400	PP86	MP2	T21	TP2 TP7 TP36	L21DH	TU4 TU14 TU22 TU38 TC1 TE21 TE22 TE25 TM1	0	W1			333	424	3/0-0-1-0	-
3393	ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC, WATER-REACTIVE	4.2	SW1	I	4.2+4.3	274	0	E0	P404	PP86	MP2	T21	TP7 TP33 TP36 TP41	L21DH	TU4 TU14 TU22 TU38 TC1 TE21 TE22 TE25 TM1	0	W1			X432	419	3/0-0-1-0	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3394	ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE	4.2	SW1	I	4.2+4.3	274	0	E0	P400	PP86	MP2	T21	TP2 TP7 TP36 TP41	L21DH	TU4 TU14 TU22 TU38 TC1 TE21 TE22 TE25 TM1	0	W1			X333	419	3/0-0-1-0	-
3395	ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE	4.3	W2	I	4.3	274	0	E0	P403		MP2	T9	TP7 TP33 TP36 TP41	S10AN L10DH	TU4 TU14 TU22 TU38 TE21 TE22 TM2	1	W1		CW23	X423	421	0-0-1-0	-
3395	ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE	4.3	W2	II	4.3	274	500g	E2	P410 IBC04		MP14	T3	TP33 TP36 TP41	SGAN L4DH	TU14 TE21 TM2	2	W1		CW23	423	421	0-0-1-0	-
3395	ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE	4.3	W2	III	4.3	274	1kg	E1	P410 IBC06		MP14	T1	TP33 TP36 TP41	SGAN L4DH	TU14 TE21 TM2	3	W1		CW23	423	421	0-0-1-0	-
3396	ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, FLAMMABLE	4.3	WF2	I	4.3+4.1	274	0	E0	P403		MP2	T9	TP7 TP33 TP36 TP41	S10AN L10DH	TU4 TU14 TU22 TU38 TE21 TE22 TM2	0	W1		CW23	X423	409	3/0-0-1-0	-
3396	ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, FLAMMABLE	4.3	WF2	II	4.3+4.1	274	500g	E2	P410 IBC04		MP14	T3	TP33 TP36 TP41	SGAN L4DH	TU14 TE21 TM2	0	W1		CW23	423	409	3/0-0-1-0	-
3396	ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, FLAMMABLE	4.3	WF2	III	4.3+4.1	274	1kg	E1	P410 IBC06		MP14	T1	TP33 TP36 TP41	SGAN L4DH	TU14 TE21 TM2	0	W1		CW23	423	409	3/0-0-1-0	-
3397	ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, SELF-HEATING	4.3	WS	I	4.3+4.2	274	0	E0	P403		MP2	T9	TP7 TP33 TP36 TP41	S10AN L10DH	TU14 TU38 TE21 TE22 TM2	1	W1		CW23	X423	419	0-0-1-0	-
3397	ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, SELF-HEATING	4.3	WS	II	4.3+4.2	274	500g	E2	P410 IBC04		MP14	T3	TP33 TP36 TP41	SGAN L4DH		2	W1		CW23	423	419	0-0-1-0	-
3397	ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, SELF-HEATING	4.3	WS	III	4.3+4.2	274	1kg	E1	P410 IBC06		MP14	T1	TP33 TP36 TP41	SGAN L4DH		3	W1		CW23	423	419	0-0-1-0	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3398	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE	4.3	W1	I	4.3	274	0	E0	P402		MP2	T13	TP2 TP7 TP36 TP41	L10DH	TU4 TU14 TU22 TU38 TE21 TE22 TM2	0	W1		CW23	X323	409	3/0-0-1-0	-
3398	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE	4.3	W1	II	4.3	274	500 ml	E2	P001 IBC01		MP15	T7	TP2 TP7 TP36 TP41	L4DH	TU14 TE21 TM2	0	W1		CW23	323	409	3/0-0-1-0	-
3398	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE	4.3	W1	III	4.3	274	1l	E1	P001 IBC02		MP15	T7	TP2 TP7 TP36 TP41	L4DH	TU14 TE21 TM2	0	W1		CW23	323	409	3/0-0-1-0	-
3399	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE	4.3	WF1	I	4.3 +3	274	0	E0	P402		MP2	T13	TP2 TP7 TP36 TP41	L10DH	TU4 TU14 TU22 TU38 TE21 TE22 TM2	0	W1		CW23	X323	407	3/0-0-1-0	-
3399	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE	4.3	WF1	II	4.3 +3	274	500 ml	E2	P001 IBC01		MP15	T7	TP2 TP7 TP36 TP41	L4DH	TU4 TU14 TU22 TE21 TM2	0	W1		CW23	323	407	3/0-0-1-0	-
3399	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE	4.3	WF1	III	4.3 +3	274	1l	E1	P001 IBC02 R001		MP15	T7	TP2 TP7 TP36 TP41	L4DH	TU14 TE21 TM2	0	W1		CW23	323	407	3/0-0-1-0	-
3400	ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING	4.2	S5	II	4.2	274	500g	E2	P410 IBC06		MP14	T3	TP33 TP36	SGAN L4BN		2	W1			40	415	3/0-0-1-0	-
3400	ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING	4.2	S5	III	4.2	274	1kg	E1	P002 IBC08		MP14	T1	TP33 TP36	SGAN L4BN		3	W1			40	415	3/0-0-1-0	-
3401	ALKALI METAL AMALGAM, SOLID	4.3	W2	I	4.3	182	0	E0	P403		MP2	T9	TP7 TP33	L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X423	421	0-0-1-0	M3
3402	ALKALINE EARTH METAL AMALGAM, SOLID	4.3	W2	I	4.3	183 506	0	E0	P403		MP2	T9	TP7 TP33	L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X423	421	0-0-1-0	M3
3403	POTASSIUM METAL ALLOYS, SOLID	4.3	W2	I	4.3		0	E0	P403		MP2	T9	TP7 TP33	L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X423	409	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3404	POTASSIUM SODIUM ALLOYS, SOLID	4.3	W2	I	4.3		0	E0	P403		MP2	T9	TP7 TP33	L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X423	409	3/0-0-1-0	M3
3405	BARIUM CHLORATE SOLUTION	5.1	OT1	II	5.1+6.1		1I	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24 CW28	56	512	-	M3
3405	BARIUM CHLORATE SOLUTION	5.1	OT1	III	5.1+6.1		5I	E1	P001 IBC02		MP2	T4	TP1	LGBV	TU3	3			CW24 CW28	56	512	-	M3
3406	BARIUM PERCHLORATE SOLUTION	5.1	OT1	II	5.1+6.1		1I	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24 CW28	56	512	-	M3
3406	BARIUM PERCHLORATE SOLUTION	5.1	OT1	III	5.1+6.1		5I	E1	P001 IBC02		MP2	T4	TP1	LGBV	TU3	3			CW24 CW28	56	512	-	M3
3407	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE SOLUTION	5.1	O1	II	5.1		1I	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24	50	501	-	M3
3407	CHLORATE AND MAGNESIUM CHLORIDE MIXTURE SOLUTION	5.1	O1	III	5.1		5I	E1	P504 IBC02		MP2	T4	TP1	LGBV	TU3	3			CW24	50	501	-	M3
3408	LEAD PERCHLORATE SOLUTION	5.1	OT1	II	5.1+6.1		1I	E2	P504 IBC02		MP2	T4	TP1	L4BN	TU3	2			CW24 CW28	56	512	-	M3
3408	LEAD PERCHLORATE SOLUTION	5.1	OT1	III	5.1+6.1		5I	E1	P001 IBC02		MP2	T4	TP1	LGBV	TU3	3			CW24 CW28	56	512	-	M3
3409	CHLORONITROBENZENES, LIQUID	6.1	T1	II	6.1	279	100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	616	-	-
3410	4-CHLORO-o-TOLUIDINE HYDROCHLORIDE SOLUTION	6.1	T1	III	6.1		5I	E1	P001 IBC03 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	616	-	M3
3411	beta-NAPHTHYLAMINE SOLUTION	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
3411	beta-NAPHTHYLAMINE SOLUTION	6.1	T1	III	6.1		5I	E1	P001 IBC02		MP19	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
3412	FORMIC ACID with not less than 10% but not more than 85% acid by mass	8	C3	II	8		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				80	803	0-0-1-0	M3
3412	FORMIC ACID with not less than 5% but less than 10% acid by mass	8	C3	III	8		5I	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	0-0-1-0	M3
3413	POTASSIUM CYANIDE SOLUTION	6.1	T4	I	6.1		0	E5	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW47 CW55	66	630	0-0-3-0	M1
3413	POTASSIUM CYANIDE SOLUTION	6.1	T4	II	6.1		100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW47 CW55	60	630	0-0-3-0	M1

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3413	POTASSIUM CYANIDE SOLUTION	6.1	T4	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW47 CW55	60	630	0-0-3-0	M1
3414	SODIUM CYANIDE SOLUTION	6.1	T4	I	6.1		0	E5	P001		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31 CW47 CW55	66	630	0-0-3-0	M1
3414	SODIUM CYANIDE SOLUTION	6.1	T4	II	6.1		100 ml	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31 CW47 CW55	60	630	0-0-3-0	M1
3414	SODIUM CYANIDE SOLUTION	6.1	T4	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T7	TP2 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31 CW47 CW55	60	630	0-0-3-0	M1
3415	SODIUM FLUORIDE SOLUTION	6.1	T4	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3
3416	CHLOROACETOPHENONE, LIQUID	6.1	T1	II	6.1		0	E0	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	616	0-0-1-0	-
3417	XYLYL BROMIDE, SOLID	6.1	T2	II	6.1		0	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	605	-	-
3418	2,4-TOLUYLENEDIAMINE SOLUTION	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
3419	BORON TRIFLUORIDE ACETIC ACID COMPLEX, SOLID	8	C4	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	803	-	M3
3420	BORON TRIFLUORIDE PROPIONIC ACID COMPLEX, SOLID	8	C4	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			80	803	-	M3
3421	POTASSIUM HYDROGENDIFLUORIDE SOLUTION	8	CT1	II	8+ 6.1		1l	E2	P001 IBC02		MP15	T7	TP2	L4DH	TU14 TE17 TE21	2			CW13 CW28	86	801	-	M3
3421	POTASSIUM HYDROGENDIFLUORIDE SOLUTION	8	CT1	III	8+ 6.1		5l	E1	P001 IBC03 R001		MP19	T4	TP1	L4DH	TU14 TE21	3	W12		CW13 CW28	86	801	-	M3
3422	POTASSIUM FLUORIDE SOLUTION	6.1	T4	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3423	TETRAMETHYLAMMONIUM HYDROXIDE, SOLID	6.1	TC2	I	6.1 + 8	279	0	E5	P002 IBC99		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W11		CW13 CW28 CW31	668	807	-	M3
3424	AMMONIUM DINITRO-o-CRESOLATE SOLUTION	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
3424	AMMONIUM DINITRO-o-CRESOLATE SOLUTION	6.1	T1	III	6.1		5l	E1	P001 IBC02		MP19	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	608	-	-
3425	BROMOACETIC ACID, SOLID	8	C4	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BN		2	W11			80	803	-	M3
3426	ACRYLAMIDE SOLUTION	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
3427	CHLOROBENZYL CHLORIDES, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
3428	3-CHLORO-4-METHYLPHENYL ISOCYANATE, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	609	-	-
3429	CHLOROTOLUIDINES, LIQUID	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	616	-	M3
3430	XYLENOLS, LIQUID	6.1	T1	II	6.1		100 ml	E4	P001 IBC02		MP15	T7	TP2	L4BH	TU15	2			CW13 CW28 CW31	60	616	-	-
3431	NITROBENZOTRIFLUORIDES, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
3432	POLYCHLORINATED BIPHENYLS, SOLID	9	M2	II	9	305	1kg	E2	P906 IBC08	B4	MP10	T3	TP33	S4AH L4BH	TU15	0	W11	VC1 VC2 AP9	CW13 CW28 CW31	90	904	-	-
3434	NITROCREOLS, LIQUID	6.1	T1	III	6.1		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BH	TU15	2	W12		CW13 CW28 CW31	60	608	-	M3
3436	HEXAFLUOROACETONE HYDRATE, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	625	-	-
3437	CHLOROCRESOLS, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	616	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3438	alpha-METHYLBENZYL ALCOHOL, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
3439	NITRILES, SOLID, TOXIC, N.O.S.	6.1	T2	I	6.1	274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	632	1-1*-1-1	M3
3439	NITRILES, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	1	W11		CW13 CW28 CW31	60	632	1-1*-1-1	M3
3439	NITRILES, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	632	1-1*-1-1	M3
3440	SELENIUM COMPOUND, LIQUID, N.O.S.	6.1	T4	I	6.1	274 563	0	E5	P001		MP8 MP17	T14	TP2 TP27	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	630	1-1*-1-1	-
3440	SELENIUM COMPOUND, LIQUID, N.O.S.	6.1	T4	II	6.1	274 563	100g	E4	P001 IBC02		MP15	T11	TP2 TP27	L4BH	TU15	2			CW13 CW28 CW31	60	630	1-1*-1-1	-
3440	SELENIUM COMPOUND, LIQUID, N.O.S.	6.1	T4	III	6.1	274 563	5l	E1	P001 IBC03 R001		MP19	T7	TP1 TP28	L4BH	TU15	2	W12		CW13 CW28 CW31	60	630	1-1*-1-1	-
3441	CHLORODINITROBENZENES, SOLID	6.1	T2	II	6.1	279	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
3442	DICHLOROANILINES, SOLID	6.1	T2	II	6.1	279	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
3443	DINITROBENZENES, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
3444	NICOTINE HYDROCHLORIDE, SOLID	6.1	T2	II	6.1	43	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	620	-	-
3445	NICOTINE SULPHATE, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31	60	620	-	-
3446	NITROTOLUENES, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
3447	NITROXYLENES, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3448	TEAR GAS SUBSTANCE, SOLID, N.O.S.	6.1	T2	I	6.1	274	0	E0	P002		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	66	634	0-0-1-0	-
3448	TEAR GAS SUBSTANCE, SOLID, N.O.S.	6.1	T2	II	6.1	274	0	E0	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	634	0-0-1-0	-
3449	BROMOBENZYL CYANIDES, SOLID	6.1	T2	I	6.1	138	0	E5	P002		MP18	T6	TP33	S10AH L10CH	TU15 TU38 TE22	1			CW13 CW28 CW31	66	616	1-1*-1-1	-
3450	DIPHENYLCHLOROARSINE, SOLID	6.1	T3	I	6.1		0	E0	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU15 TU38 TE22	1	W10		CW13 CW28 CW31	66	617	1-1*-1-1	-
3451	TOLUIDINES, SOLID	6.1	T2	II	6.1	279	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	616	-	-
3452	XYLIDINES, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
3453	PHOSPHORIC ACID, SOLID	8	C2	III	8		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7		80	806	-	-
3454	DINITROTOLUENES, SOLID	6.1	T2	II	6.1		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	608	-	-
3455	CRESOLS, SOLID	6.1	TC2	II	6.1+8		500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	68	608	-	-
3456	NITROSYLSULPHURIC ACID, SOLID	8	C2	II	8		1kg	E2	P002 IBC08	B4	MP10	T3	TP33	SGAN L4BN		2	W11			X80	806	-	M3
3457	CHLORONITROTOLUENES, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
3458	NITROANISOLES, SOLID	6.1	T2	III	6.1	279	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	616	-	M3
3459	NITROBROMOBENZENES, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3
3460	N-ETHYLBENZYL TOLUIDINES, SOLID	6.1	T2	III	6.1		5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	608	-	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3462	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	6.1	T2	I	6.1	210 274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU15 TU38 TE22	1	W10		CW13 CW28 CW31	66	623	1-1*-1-1	-
3462	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	6.1	T2	II	6.1	210 274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	623	1-1*-1-1	-
3462	TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	6.1	T2	III	6.1	210 274	5kg	E1	P002 IBC08 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	623	1-1*-1-1	-
3463	PROPIONIC ACID with not less than 90% acid by mass	8	CF1	II	8+3		1I	E2	P001 IBC02		MP15	T7	TP2	L4BN		2				83	803	0-0-1-0	M3
3464	ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T2	I	6.1	43 274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	-
3464	ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T2	II	6.1	43 274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	1-1*-1-1	-
3464	ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T2	III	6.1	43 274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	1-1*-1-1	-
3465	ORGANOARSENIC COMPOUND, SOLID, N.O.S.	6.1	T3	I	6.1	274	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	-
3465	ORGANOARSENIC COMPOUND, SOLID, N.O.S.	6.1	T3	II	6.1	274	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	1-1*-1-1	-
3465	ORGANOARSENIC COMPOUND, SOLID, N.O.S.	6.1	T3	III	6.1	274	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	1-1*-1-1	-
3466	METAL CARBONYLS, SOLID, N.O.S.	6.1	T3	I	6.1	274 562	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	-
3466	METAL CARBONYLS, SOLID, N.O.S.	6.1	T3	II	6.1	274 562	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	1-1*-1-1	-
3466	METAL CARBONYLS, SOLID, N.O.S.	6.1	T3	III	6.1	274 562	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	1-1*-1-1	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		Packages	Bulk	Loading, unloading and handling		Emergency card number	Minimum protective distance	Humping
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		4.1.4	4.1.4	4.1.10	4.2.5.2, 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	1.1.3.6	7.2.4	7.3.3	7.5.11	5.3.2.3	5.4.1 5.4.3.12	5.4.1 7.5.3.2	5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3467	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T3	I	6.1	274 562	0	E5	P002 IBC07		MP18	T6	TP33	S10AH L10CH	TU14 TU15 TU38 TE21 TE22	1	W10		CW13 CW28 CW31	66	630	1-1*-1-1	-
3467	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T3	II	6.1	274 562	500g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH L4BH	TU15	2	W11		CW13 CW28 CW31	60	630	1-1*-1-1	-
3467	ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.	6.1	T3	III	6.1	274 562	5kg	E1	P002 IBC08 LP02 R001	B3	MP10	T1	TP33	SGAH L4BH	TU15	2		VC1 VC2 AP7	CW13 CW28 CW31	60	630	1-1*-1-1	-
3468	HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM or HYDROGEN IN AMETAL HYDRIDE STORAGE SYSTEM	2	1F		2.1	321 356	0	E0	P205		MP9					2			CW9 CW10 CW28	23	204	3/0-0-1-0	M2
3469	PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning and reducing compound)	3	FC	I	3+8	163 367	0	E0	P001		MP7 MP17	T11	TP2 TP27	L10CH	TU14 TU38 TE21 TE22	1				338	328	3/0-0-1-0	M3
3469	PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning and reducing compound)	3	FC	II	3+8	163 367	1l	E2	P001 IBC02		MP19	T7	TP2 TP8 TP28	L4BH		2				338	328	3/0-0-1-0	M3
3469	PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning and reducing compound)	3	FC	III	3+8	163 367	5l	E1	P001 IBC03 R001		MP19	T4	TP1 TP29	L4BN		3	W12			38	328	3/0-0-1-0	M3
3470	PAINT, CORROSIVE, FLAMMABLE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or PAINT RELATED MATERIAL, CORROSIVE, FLAMMABLE (including paint thinning and reducing compound)	8	CF1	II	8+3	163 367	1l	E2	P001 IBC02		MP15	T7	TP2 TP8 TP28	L4BN		2				83	825	0-0-1-0	M3
3471	HYDROGEN DIFLUORIDES SOLUTION, N.O.S.	8	CT1	II	8+6.1		1l	E2	P001 IBC02		MP15	T7	TP2	L4DH	TU14 TE17 TE21	2			CW13 CW28	86	801	0-0-1-0	M3
3471	HYDROGEN DIFLUORIDES SOLUTION, N.O.S.	8	CT1	III	8+6.1		5l	E1	P001 IBC03 R001		MP19	T4	TP1	L4DH	TU14 TE21	3	W12		CW13 CW28	86	801	0-0-1-0	M3
3472	CROTONIC ACID, LIQUID	8	C3	III	8		5l	E1	P001 IBC03 LP01 R001		MP19	T4	TP1	L4BN		3	W12			80	803	0-0-1-0	M3

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3473	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT containing flammable liquids	3	F3		3	328	1l	E0	P004							3				30	335	3/0-0-1-0	-
3474	1-HYDROXYBENZOTRIAZOLE MONOHYDRATE	4.1	D	I	4.1		0	E0	P406	PP48	MP2					1	W1			40	404	3/0-0-1-0	-
3475	ETHANOL AND GASOLINE MIXTURE or ETHANOL AND MOTOR SPIRIT MIXTURE or ETHANOL AND PETROL MIXTURE, with more than 10% ethanol	3	F1	II	3	333 363	1l	E2	P001 IBC02		MP19	T4	TP1	LGBF		2				33	305	3/0-0-1-0	M3
3476	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing water-reactive substances	4.3	W3		4.3	328 334	500 ml and 500 g	E0	P004							3	W1		CW23	423	430	0-0-1-0	-
3477	FUEL CELL CARTRIDGES or FUELCELL CARTRIDGES CONTAINED INEQUIPMENT or FUEL CELLCARTRIDGES PACKED WITHEQUIPMENT, containing corrosivesubstances	8	C11		8	328 334	1l and 1kg	E0	P004							3				80	835	0-0-1-0	-
3478	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas	2	6F		2.1	328 338	120 ml	E0	P004							2			CW9 CW12	23	220	0-0-1-0	-
3479	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride	2	6F		2.1	328 339	120 ml	E0	P004							2			CW9 CW12	23	204	0-0-1-0	-
3480	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	9	M4		9	188 230 310 348 376 377 636	0	E0	P903 P908 P909 LP903 LP904							2				90	905	-	-
3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)	9	M4		9	188 230 348 360 376 377 387 390 636	0	E0	P903 P908 P909 LP903 LP904							2				90	905	-	-

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3482	ALKALI METAL DISPERSION, FLAMMABLE or ALKALINE EARTH METAL DISPERSION, FLAMMABLE	4.3	WF1	I	4.3+3	182 183 506	0	E0	P402	RR8	MP2			L10BN(+)	TU1 TE5 TT3 TM2	1	W1		CW23	X323	409	3/0-0-1-0	M3
3483	MOTOR FUEL ANTI-KNOCK MIXTURE, FLAMMABLE	6.1	TF1	I	6.1+3		0	E0	P602		MP8 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22 TT6	1			CW13 CW28 CW31 CW47 CW48 CW55	663	601	3/1-1-1-1	M1
3484	HYDRAZINE AQUEOUS SOLUTION, FLAMMABLE with more than 37% hydrazine, by mass	8	CFT	I	8+3+ 6.1	530	0	E0	P001		MP8 MP17	T10	TP2	L10BH	TU38 TE22	1			CW13 CW28 CW46 CW47 CW55 CW69	886	807	3/1-1*-1-1	M2/M1
3485	CALCIUM HYPOCHLORITE, DRY, CORROSIVE or CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 39% available chlorine (8.8% available oxygen)	5.1	OC2	II	5.1+8	314	1kg	E2	P002 IBC08	B4 B13	MP2			SGAN	TU3	2	W11		CW24 CW35	58	501	0-0-1-0	M3
3486	CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 10% but not more than 39% available chlorine	5.1	OC2	III	5.1+8	314	5kg	E1	P002 IBC08 LP02 R001	B3B13 L3	MP2			SGAN	TU3	3			CW24 CW35	58	501	0-0-1-0	M3
3487	CALCIUM HYPOCHLORITE, HYDRATED, CORROSIVE or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, CORROSIVE with not less than 5.5% but not more than 16% water	5.1	OC2	II	5.1+8	314 322	1kg	E2	P002 IBC08	B4 B13	MP2			SGAN	TU3	2	W11		CW24 CW35	58	501	0-0-1-0	M3
3487	CALCIUM HYPOCHLORITE, HYDRATED, CORROSIVE or CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, CORROSIVE with not less than 5.5% but not more than 16% water	5.1	OC2	III	5.1+8	314	5kg	E1	P002 IBC08 R001	B4 B13	MP2			SGAN	TU3	3			CW24 CW35	58	501	0-0-1-0	M3
3488	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC50 lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC50	6.1	TFC	I	6.1+3+8	274	0	E0	P601		MP8 MP17	T22	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31	663	640	3/1-1*-1-1	M2
3489	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC50 lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC50	6.1	TFC	I	6.1+3+8	274	0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	663	640	3/1-1*-1-1	M2

UN No	Name and description	Class	Classifi- cation code	Packing group	Labels	Special provi- sions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transp ort categor y	Special provisions for carriage			Hazard identifi- cation No.	Additional remarks in consignment note		
									Packing instructio ns	Special packing provision s	Mixed packing provision s	Instruc tions	Special provisio ns	Tank code	Special provisio ns		Packag es	Bulk	Loading, unloading and handling		Emergen cy card number	Minimum protective distance	Humpin g
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2									1.1.3.6				5.3.2.3			
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3490	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC50 lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC50	6.1	TFW	I	6.1+3+4.3	274	0	E0	P601		MP8 MP17	T22	TP2	L15CH	TU14 TU15 TU38 TE21 TE22 TE25	1			CW13 CW28 CW31	623	651	3/1-1*-1-1	M2
3491	TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC50 lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC50	6.1	TFW	I	6.1+3+4.3	274	0	E0	P602		MP8 MP17	T20	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28 CW31	623	651	3/1-1*-1-1	M2
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	I	3+6.1	343	0	E0	P001		MP7 MP17	T14	TP2	L10CH	TU14 TU15 TU38 TE21 TE22	1			CW13 CW28	336	337	3/0-0-1-0	M3
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	II	3+6.1	343	1I	E2	P001 IBC02		MP19	T7	TP2	L4BH	TU15	2			CW13 CW28	336	337	3/0-0-1-0	M3
3494	PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3	FT1	III	3+6.1	343	5I	E1	P001 IBC03 R001		MP19	T4	TP1	L4BH	TU15	3	W12		CW13 CW28	36	337	3/0-0-1-0	M3
3495	IODINE	8	CT2	III	8+6.1	279	5kg	E1	P002 IBC08 R001	B3	MP10	T1	TP33	SGAV L4BN		3		VC1 VC2 AP7	CW13 CW28	86	832	- ----- 0-0-1-0	M3
3496	Batteries, nickel-metal hydride	9	M11	Not subject to the requirements of Annex 2 to SMGS																			
3497	KRILL MEAL	4.2.	S2	II	4.2.	300	0	E2	P410 IBC06		MP14	T3	TP33	SGAN		2	W1			40	405	3/0-0-1-0	-
3497	KRILL MEAL	4.2.	S2	III	4.2.	300	0	E1	P002 IBC08 LP02 R001	B3	MP14	T1	TP33	SGAV		3	W1	VC1 VC2 AP1		40	405	3/0-0-1-0	-
3498	IODINE MONOCHLORIDE, LIQUID	8	C1	II	8		1I	E0	P001 IBC02		MP15	T7	TP2	L4BN		2				80	802	-	M3
3499	CAPACITOR, ELECTRIC DOUBLE LAYER (with an energy storage capacity greater than 0.3 Wh)	9	M11		9	361	0	E0	P003							4				90	910	-	-
3500	CHEMICAL UNDER PRESSURE, N.O.S.	2	8A		2.2.	274 659	0	E0	P206	PP97	MP9	T50	TP4 TP40			3			CW9 CW10 CW12 CW36	20		0-0-1-0	M2
3501	CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.	2	8F		2.1.	274 659	0	E0	P206	PP89	MP9	T50	TP4 TP40			2			CW9 CW10 CW12 CW36	23		0-0-1-0	M2
3502	CHEMICAL UNDER PRESSURE, TOXIC, N.O.S.	2	8T		2.2 +6.1	274 659	0	E0	P206	PP89	MP9	T50	TP4 TP40			1			CW9 CW10 CW12 CW28 CW36	26		0-0-1-0	M2

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3503	CHEMICAL UNDER PRESSURE, CORROSIVE, N.O.S.	2	8C		2.2 +8	274 659	0	E0	P206	PP89	MP9	T50	TP4 TP40			1			CW9 CW10 CW12 CW36	28		0-0-1-0	M2
3504	CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.	2	8TF		2.1 +6.1	274 659	0	E0	P206	PP89	MP9	T50	TP4 TP40			1			CW9 CW10 CW12 CW28 CW36	263		0-0-1-0	M2
3505	CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.	2	8FC		2.1 +8	274 659	0	E0	P206	PP89	MP9	T50	TP4 TP40			1			CW9 CW10 CW12 CW36	238		0-0-1-0	M2
3506	MERCURY CONTAINED IN MANUFACTURED ARTICLES	8	CT3		8 + 6.1	366	5kg	E0	P003	PP90	MP15					3			CW13 CW28	86	811	-	-
3507	URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EX-CEPTED PACKAGE, less than 0.1 kg per package, non-fissile or fissile-excepted	8		I	8	317 369	0	E0	P805							1			See SP 369	87			
3508	CAPACITOR, ASYMMETRIC (with an energy storage capacity greater than 0.3 Wh)	9	M11		9	372	0	E0	P003							4				90			
3509	PACKAGINGS, DISCARDED, EMPTY, UNCLEANED	9	M11		9	663	0	E0	P003 IBC08 LP02	RR9 BB3 LL1		BK2				4		VC1 VC2 AP10		90			
3510	ADSORBED GAS, FLAMMABLE, N.O.S.	2	9F		2.1	274	0	E0	P208	3510	MP9					2			CW9 CW10 CW36	23	220		
3511	ADSORBED GAS, N.O.S.	2	9A		2.2	274	0	E0	P208		MP9					3			CW9 CW10 CW36	20	220		
3512	ADSORBED GAS, TOXIC, N.O.S.	2	9T		2.3	274	0	E0	P208		MP9					1			CW9 CW10 CW36	26	220		
3513	ADSORBED GAS, OXIDIZING, N.O.S.	2	9O		2.2+5.1	274	0	E0	P208		MP9					3			CW9 CW10 CW36	25	220		
3514	ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.	2	9TF		2.3+2.1	274	0	E0	P208		MP9					1			CW9 CW10 CW36	263	220		
3515	ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.	2	9TO		2.3+5.1	274	0	E0	P208		MP9					1			CW9 CW10 CW36	265	220		
3516	ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.	2	9TC		2.3+8	274	0	E0	P208		MP9					1			CW9 CW10 CW36	268	220		

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	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3517	ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2	9TFC		2.3+2.1+8	274	0	E0	P208		MP9					1			CW9 CW10 CW36	263	220		
3518	ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2	9TOC		2.3+5.1+8	274	0	E0	P208		MP9					1			CW9 CW10 CW36	265	220		
3519	BORON TRIFLUORIDE, ADSORBED АДСОРБИРОВАННЫЙ	2	9TC		2.3+8		0	E0	P208		MP9					1			CW9 CW10 CW36	268	203		
3520	CHLORINE, ADSORBED	2	9TOC		2.3+5.1+8		0	E0	P208		MP9					1			CW9 CW10 CW36	265	203		
3521	SILICON TETRAFLUORIDE, ADSORBED	2	9TC		2.3+8		0	E0	P208		MP9					1			CW9 CW10 CW36	268	203		
3522	ARSINE, ADSORBED	2	9TF		2.3+2.1		0	E0	P208		MP9					1			CW9 CW10 CW36	263	209		
3523	GERMANE, ADSORBED	2	9TF		2.3+2.1		0	E0	P208		MP9					1			CW9 CW10 CW36	263	209		
3524	PHOSPHORUS PENTAFLUORIDE, ADSORBED	2	9TC		2.3+8		0	E0	P208		MP9					1			CW9 CW10 CW36	268	203		
3525	PHOSPHINE, ADSORBED	2	9TF		2.3+2.1		0	E0	P208		MP9					1			CW9 CW10 CW36	263	209		
3526	HYDROGEN SELENIDE, ADSORBED	2	9TF		2.3+2.1		0	E0	P208		MP9					1			CW9 CW10 CW36	263	209		
3527	POLYESTER RESIN KIT, solid base material	4.1	F4	II	4.1	236 340	5 KG	See SP 340	P412							2				CE10	40		
3527	POLYESTER RESIN KIT, solid base material	4.1	F4	III	4.1	236 340	5 KG	See SP 340	P412							3				CE11	40		
3528	ENGINE, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or MACHINERY, FUEL CELL, FLAMMABLE LIQUID POWERED	3	F3		3	363 667 669	0	E0	P005												30		

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3529	ENGINE, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or MACHINERY, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED	2	6F		2.1	363 667 669	0	EO	P005												23		
3530	ENGINE, INTERNAL COMBUSTION or MACHINERY, INTERNAL COMBUSTION	9	M11		9	363 667 669	0	EO	P005												90		
3531	POLYMERIZING SUBSTANCE, SOLID, STABILIZED, N.O.S.	4.1	PM1	III	4.1	274 386 676	0	EO	P002 IBC07	PP92 B18		T7	TP4 TP6 TP33	SGAN (+)	TU30 TE11	2	W7		CW22	CE10	40		
3532	POLYMERIZING SUBSTANCE, LIQUID, STABILIZED, N.O.S	4.1	PM1	III	4.1	274 386 676	0	E0	P001 IBC03	PP93 B19		T7	TP4 TP6	L4BN(+)	TU30 TE11	2	W7		CW22	CE6	40		
3533	POLYMERIZING SUBSTANCE, SOLID, TEMPERATURE CONTROLLED, N.O.S.	4.1	PM2	CARRI GE PROHIBI TED	CARRI GE PROHIBI TED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRIAGE PROHIBITE D	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED	CARRI AGE PROHI BITED		
3534	POLYMERIZING SUBSTANCE, LIQUID, TEMPERATURE CONTROLLED, N.O.S.	4.1	PM2	CARRI GE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE	CARRIAGE PROHIBITE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE	CARRI AGE		
3535	TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S	6.1	TF3	I	6.1+4.1	274	0	E5	P002 IBC99		MP18	T6	TP33			1	W10		CW13 CW28 CW31		664		
3535	OXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.	6.1	TF3	II	6.1+4.1	274	500 g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15	2	W11		CW13 CW28 CW31		64		
3536	LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries	9	M4		9	389	0	EO	P006 LP03							2					90		
3537	ARTICLES CONTAINING FLAMMABLE GAS, N.O.S.	2	6F		See 5.2.2.1.1 2	274 673	0	E0	P006 LP03							4			CW13 CW28	CE3			
3538	ICLES CONTAINING NON FLAMMABLE, NON TOXIC GAS, N.O.S.	2	6A		See 5.2.2.1.1 2	274 396 673	0	EO	P006 LP03							4			CW13 CW28	CE3			
3539	ARTICLES CONTAINING TOXIC GAS, N.O.S.	2	6T		See 5.2.2.1.1 2	274 673		E0	P006 LP03							4			CW13 CW28	CE3			
3540	ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.	3	F3		See 5.2.2.1.1 2	274 673	0	EO	P006 LP03							4			CW13 CW28	CE3			
3541	ARTICLES CONTAINING FLAMMABLE SOLID, N.O.S.	4.1	F4		See 5.2.2.1.1 2	274 673	0	EO	P006 LP03							4			CW13 CW28	CE3			
3542	ARTICLES CONTAINING A SUBSTANCE LIABLE TO SPONTANEOUS COMBUSTION, N.O.S.	4.2	S6		See 5.2.2.1.1 2	274 673	0	EO	P006 LP03							4			CW13 CW28	CE3			

UN No	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		Appendix 2 to SMGS Tanks		Transport category	Special provisions for carriage			Hazard identification No.	Additional remarks in consignment note		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/ 3.5.1.2		Packing instructions 4.1.4	Special packing provisions 4.1.4	Mixed packing provisions 4.1.10	Instructions 4.2.5.2, 7.3.2	Special provisions 4.2.5.3	Tank code 4.3	Special provisions 4.3.5, 6.8.4	1.1.3.6	Packag es 7.2.4	Bulk 7.3.3	Loading, unloading and handling 7.5.11	5.3.2.3	Emergen cy card number 5.4.1 5.4.3.12	Minimum protective distance 5.4.1 7.5.3.2	Humpin g 5.4.1 7.5.6
1	2	3a)	3b)	4	5	6	7a)	7b)	8	9a)	9b)	10	11	12	13	15	16	17	18	20	21a)	21b)	21a)
3543	ARTICLES CONTAINING A SUBSTANCE WHICH IN CONTACT WITH WATER EMITS FLAMMABLE GASES, N.O.S	4.3	W3		See 5.2.2.1.1 2	274 673	0	E0	P006 LP03							4			CW13 CW28	CE3			
3544	ARTICLES CONTAINING OXIDIZING SUBSTANCE, N.O.S	5.1	O3		See 5.2.2.1.1 2	274 673	0	E0	P006 LP03							4			CW13 CW28	CE3			
3545	ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.	5.2	P1		See 5.2.2.1.1 2	274 673	0	E0	P006 LP03							4			CW13 CW28	CE3			
3546	ARTICLES CONTAINING TOXIC SUBSTANCE, N.O.S.	6.1	T10		See 5.2.2.1.1 2	274 673	0	E0	P006 LP03							4			CW13 CW28	CE3			
3547	ARTICLES CONTAINING CORROSIVE SUBSTANCE, N.O.S.	8	C11		See 5.2.2.1.1 2	274 673	0	E0	P006 LP03							4			CW13 CW28	CE3			
3548	ARTICLES CONTAINING MISCELLANEOUS DANGEROUS GOODS, N.O.S.	9	M11		See 5.2.2.1.1 2	274 673	0	E0	P006 LP03							4			CW13 CW28	CE3			
3549	MEDICAL WASTE, CATEGORY A, AFFECTING HUMANS, solid or MEDICAL WASTE, CATEGORY A, AFFECTING ANIMALS only, solid	6.2	I3		6.2	395	0	E0	P622 LP622		MP2					0	W9		CW 13 CW 18 CW 26 CW 28	CE14	606		

3.2.2 TABLE B. ALPHABETICAL LIST OF DANGEROUS GOODS

The column "Name and description of cargo" contains an alphabetical list of hazardous materials and articles. Numbers and letters of the Greek alphabet, prefixes sec-, tert-, the letters "N" (nitrogen), "n" (normal), "o" (ortho), "m" (meta), "p" (para), and "N.O.S." (not otherwise specified) are ignored for the purposes of alphabetical listing. However, the prefixes "bis-" and "iso-" are counted for arranging items in alphabetical order. Technical or trade names of hazardous materials and articles are set in *italics*.

The column "UN number" contains the UN number of the corresponding substance or article.

Table B

ALPHABETICAL INDEX OF DANGEROUS GOODS

		Note
1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	3159	
1,1,1-TRICHLOROETHANE	2831	
1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)	2035	
1,1-DICHLORO-1-NITROETHANE	2650	
1,1-DICHLOROETHANE	2362	
1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	1030	
1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)	1959	
1,1-DIMETHOXYETHANE	2377	
1,2,3,6-TETRAHYDROBENZALDEHYDE	2498	
1,2,3,6-TETRAHYDROPYRIDINE	2410	
1,2-BUTYLENE OXIDE, STABILIZED	3022	
1,2-DI-(DIMETHYLAMINO) ETHANE	2372	
1,2-DIBROMOBUTAN-3-ONE	2648	
1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 114)	1958	
1,2-DICHLOROETHYLENE	1150	
1,2-DICHLOROPROPANE	1279	
1,2-DIMETHOXYETHANE	2252	
1,2-EPOXY-3-ETHOXYPROPANE	2752	
1,2-PROPYLENEDIAMINE	2258	
1,3,5-TRIMETHYLBENZENE	2325	
1,3-DICHLOROACETONE	2649	
1,3-DICHLOROPROPANOL-2	2750	
1,3-DIMETHYLBUTYLAMINE	2379	
1,4-BUTYNE DIOL	2716	
1,5,9-CYCLODODECATRIENE	2518	
1-BROMO-3-CHLOROPROPANE	2688	
1-BROMO-3-METHYLBUTANE	2341	
1-BROMOBUTANE	1126	
BUTYLENE	1012	
1-Butylene, see: BUTYLENE	1012	
Butylenes mixture: see BUTYLENE	1012	
1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b)	2517	
1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)	1021	
1-CHLORO-2,2,2-TRIFLUOROETHANE (REFRIGERANT GAS R 133a)	1983	
1-CHLOROPROPANE	1278	
1-ETHYLPIPERIDINE	2386	
1-HEXENE	2370	
1H-TETRAZOLE	0504	
1-HYDROXYBENZOTRIAZOLE MONOHYDRATE	3474	
1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, dry or wetted with less than 20% water, by mass	0508	
1-METHOXY-2-PROPANOL	3092	
1-METHYLPIPERIDINE	2399	
1-PENTENE (n-AMYLENE)	1108	
1-PENTOL	2705	
2-METHYLBUTANAL	3371	
2-(2-AMINOETHOXY)ETHANOL	3055	
2,2'-DICHLORODIETHYL ETHER	1916	
2,2-DIMETHYLPROPANE	2044	
2,3-DIHYDROPYRAN	2376	
2,3-DIMETHYLBUTANE	2457	
2,4-TOLUYLENEDIAMINE SOLUTION	3418	
2,4-TOLUYLENEDIAMINE, SOLID	1709	
2-AMINO-4,6-DINITROPHENOL, WETTED with not less than 20% water, by mass	3317	
2-AMINO-4-CHLOROPHENOL	2673	

from Russian

2-AMINO-5-DIETHYLAMINOPENTANE	2946	
2-BROMO-2-NITROPROPANE-1,3-DIOL	3241	
2-BROMOBUTANE	2339	
2-BROMOETHYL ETHYL ETHER	2340	
2-BROMOPENTANE	2343	
2-CHLOROETHANAL	2232	
2-CHLOROPROPANE	2356	
2-CHLOROPROPENE	2456	
2-CHLOROPROPIONIC ACID	2511	
2-CHLOROPYRIDINE	2822	
2-DIETHYLAMINOETHANOL	2686	
2-DIMETHYLAMINOACETONITRILE	2378	
2-DIMETHYLAMINOETHANOL	2051	
2-DIMETHYLAMINOETHYL ACRYLATE	3302	
2-DIMETHYLAMINOETHYL METHACRYLATE, STABILIZED	2522	
2-ETHYLANILINE	2273	
2-ETHYLBUTANOL	2275	
2-ETHYLBUTYL ACETATE	1177	
2-ETHYLBUTYRALDEHYDE	1178	
2-ETHYLHEXYL CHLOROFORMATE	2748	
2-ETHYLHEXYLAMINE	2276	
2-IODOBUTANE	2390	
2-METHYL-1-BUTENE	2459	
2-METHYL-2-BUTENE	2460	
2-METHYL-2-HEPTANETHIOL	3023	
2-METHYL-5-ETHYLPYRIDINE	2300	
2-METHYLFURAN	2301	
2-METHYLPENTAN-2-OL	2560	
2-TRIFLUOROMETHYLANILINE	2942	
3,3-DIETHOXYPROPENE	2374	
3,3'-IMINODIPROPYLAMINE	2269	
3-BROMOPROPYNE	2345	
3-CHLORO-4-METHYLPHENYL ISOCYANATE, LIQUID	2236	
3-CHLORO-4-METHYLPHENYL ISOCYANATE, SOLID	3428	
3-CHLOROPROPANOL-1	2849	
3-DIETHYLAMINOPROPYLAMINE	2684	
3-METHYL-1-BUTENE	2561	
3-METHYLBUTAN-2-ONE	2397	
3-NITRO-4-CHLORO-BENZOTRIFLUORIDE	2307	
3-TRIFLUOROMETHYLANILINE	2948	
4,4'-DIAMINODIPHENYLMETHANE	2651	
4-CHLORO-o-TOLUIDINE HYDROCHLORIDE SOLUTION	3410	
4-CHLORO-o-TOLUIDINE HYDROCHLORIDE, SOLID	1579	
4-METHOXY-4-METHYLPENTAN-2-ONE	2293	
4-METHYLMORPHOLINE (N-METHYLMORPHOLINE)	2535	
4-NITROPHENYLHYDRAZINE, with not less than 30% water, by mass	3376	
4-THIAPENTANAL	2785	
5-MERCAPTOTETRAZOL-1-ACETIC ACID	0448	
5-METHYLHEXAN-2-ONE	2302	
5-NITROBENZOTRIAZOL	0385	
5-tert-BUTYL-2,4,6-TRINITRO-m-XYLENE (MUSK XYLENE)	2956	
9-PHOSPHABICYCLO-NONANES (CYCLOOCTADIENE PHOSPHINES)	2940	
ACETAL	1088	
ACETALDEHYDE	1089	
ACETALDEHYDE AMMONIA	1841	
ACETALDEHYDE OXIME	2332	
ACETIC ACID SOLUTION	2790	
ACETIC ACID SOLUTION, more than 10% but not more than 80% acid, by mass	2789	

ACETIC ACID, GLACIAL	2789	
ACETIC ANHYDRIDE	1715	
ACETONE	1090	
ACETONE CYANOHYDRIN, STABILIZED	1541	
ACETONE OILS	1091	
ACETONITRILE	1648	
ACETYL BROMIDE	1716	
ACETYL CHLORIDE	1717	
ACETYL IODIDE	1898	
ACETYL METHYL CARBINOL	2621	
Acetyl peroxide solution: see ORGANIC PEROXIDE TYPE B, LIQUID	3101	
ACETYLENE, DISSOLVED	1001	
ACETYLENE, SOLVENT FREE	3374	
ACRIDINE	2713	
ACROLEIN DIMER, STABILIZED	2607	
ACROLEIN, STABILIZED	1092	
ACRYLAMIDE SOLUTION	3426	
ACRYLAMIDE, SOLID	2074	
ACRYLIC ACID, STABILIZED	2218	
ACRYLONITRILE, STABILIZED	1093	
Actinolite: see ASBESTOS, AMPHIBOLE	2212	
ADHESIVES containing flammable liquid	1133	
ADIPONITRILE	2205	
ADSORBED GAS, FLAMMABLE, N.O.S.	3510	
ADSORBED GAS, N.O.S.	3511	
ADSORBED GAS, OXIDIZING, N.O.S.	3513	
ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.	3516	
ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	3517	
ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.	3514	
ADSORBED GAS, TOXIC, N.O.S.	3512	
ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	3518	
ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.	3515	
AEROSOLS, asphyxiating	1950	
AEROSOLS, corrosive	1950	
AEROSOLS, corrosive, oxidizing	1950	
AEROSOLS, highly flammable	1950	
AEROSOLS, highly flammable, corrosive	1950	
AEROSOLS, oxidizing	1950	
AEROSOLS, toxic	1950	
AEROSOLS, toxic, corrosive	1950	
AEROSOLS, toxic, highly flammable	1950	
AEROSOLS, toxic, highly flammable, corrosive	1950	
AEROSOLS, toxic, oxidizing	1950	
AEROSOLS, toxic, oxidizing, corrosive	1950	
Air bag inflators, see SAFETY DEVICES, electrically initiated	3268	
Air bag inflators, see SAFETY DEVICES, electrically initiated	3268	
Air bag inflators, see SAFETY DEVICES, PYROTECHNIC	0503	
Air bag inflators, see SAFETY DEVICES, PYROTECHNIC	0503	
AIR, COMPRESSED	1002	
AIR, REFRIGERATED LIQUID	1003	
AIRCRAFT HYDRAULIC POWER UNIT FUEL TANK (containing a mixture of anhydrous hydrazine and methylhydrazine) (M86 fuel)	3165	
ALCOHOLATES SOLUTION, N.O.S., in alcohol	3274	
ALCOHOLIC BEVERAGES	3065	
ALCOHOLS, FLAMMABLE, TOXIC, N.O.S.	1986	
ALCOHOLS, N.O.S.	1987	
ALDEHYDES, FLAMMABLE, TOXIC, N.O.S.	1988	
ALDEHYDES, N.O.S.	1989	

ALDOL	2839	
ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.	3206	
ALKALI METAL AMALGAM, LIQUID	1389	
ALKALI METAL AMALGAM, SOLID	3401	
ALKALI METAL AMIDES	1390	
ALKALI METAL DISPERSION	1391	
ALKALI METAL DISPERSION	1391	
ALKALI METAL DISPERSION, FLAMMABLE	3482	
ALKALI METAL DISPERSION, FLAMMABLE	3482	
ALKALINE EARTH METAL ALCOHOLATES, N.O.S.	3205	
ALKALINE EARTH METAL ALLOY, N.O.S.	1393	
ALKALINE EARTH METAL AMALGAM, LIQUID	1392	
ALKALINE EARTH METAL AMALGAM, LIQUID	1421	
ALKALINE EARTH METAL AMALGAM, SOLID	3402	
ALKALOID SALTS, LIQUID, N.O.S.	3140	
ALKALOID SALTS, SOLID, N.O.S.	1544	
ALKALOIDS, LIQUID, N.O.S.	3140	
ALKALOIDS, SOLID, N.O.S.	1544	
ALKYLPHENOLS, LIQUID, N.O.S. (including C2-C12 homologues)	3145	
ALKYLPHENOLS, SOLID, N.O.S. (including C2-C12 homologues)	2430	
ALKYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid	2584	
ALKYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid	2586	
ALKYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid	2583	
ALKYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid	2585	
ALKYLSULPHURIC ACIDS	2571	
ALLYL ACETATE	2333	
ALLYL ALCOHOL	1098	
ALLYL BROMIDE	1099	
ALLYL CHLORIDE	1100	
ALLYL CHLOROFORMATE	1722	
ALLYL ETHYL ETHER	2335	
ALLYL FORMATE	2336	
ALLYL GLYCIDYL ETHER	2219	
ALLYL IODIDE	1723	
ALLYL ISOTHIOCYANATE, STABILIZED	1545	
ALLYLAMINE	2334	
ALLYLTRICHLOROSILANE, STABILIZED	1724	
alpha-METHYLBENZYL ALCOHOL, LIQUID	2937	
alpha-METHYLBENZYL ALCOHOL, SOLID	3438	
alpha-METHYLVALERALDEHYDE	2367	
alpha-NAPHTHYLAMINE	2077	
alpha-PINENE	2368	
ALUMINIUM BOROHYDRIDE	2870	
ALUMINIUM BOROHYDRIDE IN DEVICES	2870	
ALUMINIUM BROMIDE SOLUTION	2580	
ALUMINIUM BROMIDE, ANHYDROUS	1725	
ALUMINIUM CARBIDE	1394	
ALUMINIUM CHLORIDE SOLUTION	2581	
ALUMINIUM CHLORIDE, ANHYDROUS	1726	
ALUMINIUM FERROSILICON POWDER	1395	
ALUMINIUM HYDRIDE	2463	
ALUMINIUM MELTING BY-PRODUCTS	3170	
ALUMINIUM NITRATE	1438	
ALUMINIUM PHOSPHIDE	1397	
ALUMINIUM PHOSPHIDE PESTICIDE	3048	
ALUMINIUM POWDER, COATED	1309	
ALUMINIUM POWDER, UNCOATED	1396	
ALUMINIUM REMELTING BY-PRODUCTS	3170	

ALUMINIUM RESINATE	2715	
ALUMINIUM SILICON POWDER, UNCOATED	1398	
AMINES, FLAMMABLE, CORROSIVE, N.O.S.	2733	
AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	2734	
AMINES, LIQUID, CORROSIVE, N.O.S.	2735	
AMINOPHENOLS (o-, m-, p-)	2512	
AMINOPYRIDINES (o-, m-, p-)	2671	
AMMONIA SOLUTION, relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia	2672	
AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 35% but not more than 50% ammonia	2073	
AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	3318	
AMMONIA, ANHYDROUS	1005	
AMMONIUM ARSENATE	1546	
AMMONIUM DICHROMATE	1439	
AMMONIUM DINITRO-o-CRESOLATE SOLUTION	3424	
AMMONIUM DINITRO-o-CRESOLATE, SOLID	1843	
AMMONIUM FLUORIDE	2505	
AMMONIUM FLUOROSILICATE	2854	
AMMONIUM HYDROGEN SULPHATE	2506	
AMMONIUM HYDROGENDIFLUORIDE SOLUTION	2817	
AMMONIUM HYDROGENDIFLUORIDE, SOLID	1727	
AMMONIUM METAVANADATE	2859	
AMMONIUM NITRATE	0222	
AMMONIUM NITRATE BASED FERTILIZER	2067	
Ammonium nitrate based-fertilizer, uniform mixtures of the nitrogen/phosphate, nitrogen/potash or nitrogen/phosphate/potash type, containing not more than 70% ammonium nitrate and not more than 0.4% total combustible/organic material calculated as carbon	2071	Exempt from SMGS Annex 2
AMMONIUM NITRATE EMULSION, intermediate for blasting explosives, liquid	3375	
AMMONIUM NITRATE EMULSION, intermediate for blasting explosives, solid	3375	
AMMONIUM NITRATE GEL, intermediate for blasting explosives, liquid	3375	
AMMONIUM NITRATE GEL, intermediate for blasting explosives, solid	3375	
AMMONIUM NITRATE SUSPENSION, intermediate for blasting explosives, liquid	3375	
AMMONIUM NITRATE SUSPENSION, intermediate for blasting explosives, solid	3375	
AMMONIUM NITRATE with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance	1942	
AMMONIUM NITRATE, LIQUID (hot concentrated solution)	2426	
AMMONIUM PERCHLORATE	0402	
AMMONIUM PERCHLORATE	1442	
AMMONIUM PERSULPHATE	1444	
AMMONIUM PICRATE dry or wetted with less than 10% water, by mass	0004	
AMMONIUM PICRATE, WETTED with not less than 10% water, by mass	1310	
AMMONIUM POLYSULPHIDE SOLUTION	2818	
AMMONIUM POLYVANADATE	2861	
AMMONIUM SULPHIDE SOLUTION	2683	
AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	0171	
AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	0297	
AMMUNITION, ILLUMINATING with or without burster, expelling charge or propelling charge	0254	
AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	0300	
AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	0009	
AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge	0010	
AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge	0247	
AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	0244	

AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	0243	
AMMUNITION, PRACTICE	0362	
AMMUNITION, PRACTICE	0488	
AMMUNITION, PROOF	0363	
AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	0303	
AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	0016	
AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge	0015	
AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	0246	
AMMUNITION, SMOKE, WHITE PHOSPHORUS with burster, expelling charge or propelling charge	0245	
AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	0301	
AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	0019	
AMMUNITION, TEAR-PRODUCING with burster, expelling charge or propelling charge	0018	
AMMUNITION, TEAR-PRODUCING, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	2017	
AMMUNITION, TOXIC with burster, expelling charge or propelling charge	0020	Prohibited
AMMUNITION, TOXIC with burster, expelling charge or propelling charge	0021	Prohibited
AMMUNITION, TOXIC, NON-EXPLOSIVE without burster or expelling charge, non-fuzed	2016	
Amosite: see ASBESTOS, AMPHIBOLE	2212	
AMYL ACETATES	1104	
AMYL ACID PHOSPHATE	2819	
AMYL BUTYRATES	2620	
AMYL CHLORIDE	1107	
AMYL FORMATES	1109	
AMYL MERCAPTAN	1111	
AMYL NITRATE	1112	
AMYL NITRITE	1113	
AMYLAMINE	1106	
Amylines: see CORROSIVE LIQUID, OXIDIZING, N.O.S.	3093	
AMYLTRICHLOROSILANE	1728	
Anabasine sulphate, solid: see ALKALOIDS, SOLID, N.O.S.	1544	
Anabasine sulphate, solid: see ALKALOIDS, SOLID, N.O.S., or ALKALOID SALTS, SOLID, N.O.S.	1544	
Anabasine sulphate, solution: see ALKALOID SALTS, LIQUID, N.O.S.	3140	
ANILINE	1547	
ANILINE HYDROCHLORIDE	1548	
ANISIDINES	2431	
ANISOLE	2222	
ANISOYL CHLORIDE	1729	
Anosite: see AMMONIUM PERCHLORATE	1442	
Anthophyllite: see ASBESTOS, AMPHIBOLE	2212	
Anthracene: see ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	3077	
ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S.	3141	
ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S.	1549	
ANTIMONY LACTATE	1550	
ANTIMONY PENTACHLORIDE SOLUTION	1731	
ANTIMONY PENTACHLORIDE, LIQUID	1730	
ANTIMONY PENTAFLUORIDE	1732	
ANTIMONY POTASSIUM TARTRATE	1551	
ANTIMONY POWDER	2871	
ANTIMONY TRICHLORIDE	1733	
Aquanite: see TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S..	2927	
ARGON, COMPRESSED	1006	
ARGON, REFRIGERATED LIQUID	1951	
Arsenates, liquid, n.o.s., see liquid, n.o.s.: see ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	1556	
Arsenates, solid, n.o.s., see ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	1557	
ARSENIC	1558	

ARSENIC ACID, LIQUID	1553	
ARSENIC ACID, SOLID	1554	
ARSENIC BROMIDE	1555	
ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s	1556	
ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	1557	
ARSENIC PENTOXIDE	1559	
Arsenic sulphides, liquid, n.o.s., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s	1556	
Arsenic sulphides, solid, n.o.s.: see ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s	1557	
ARSENIC TRICHLORIDE	1560	
ARSENIC TRIOXIDE	1561	
ARSENICAL DUST	1562	
ARSENICAL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2760	
ARSENICAL PESTICIDE, LIQUID, TOXIC	2994	
ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	2993	
ARSENICAL PESTICIDE, SOLID, TOXIC	2759	
Arsenites, liquid, n.o.s.: see ARSENIC COMPOUND, LIQUID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	1556	
Arsenites, solid, n.o.s.: see ARSENIC COMPOUND, SOLID, N.O.S., inorganic, including: Arsenates, n.o.s., Arsenites, n.o.s., and Arsenic sulphides, n.o.s.	1557	
ARSINE	2188	
ARSINE, ADSORBED	3522	
ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE	0486	
ARTICLES, EXPLOSIVE, N.O.S.	0352	
ARTICLES, EXPLOSIVE, N.O.S.	0351	
ARTICLES, EXPLOSIVE, N.O.S.	0353	
ARTICLES, EXPLOSIVE, N.O.S.	0462	
ARTICLES, EXPLOSIVE, N.O.S.	0464	
ARTICLES, EXPLOSIVE, N.O.S.	0463	
ARTICLES, EXPLOSIVE, N.O.S.	0354	
ARTICLES, EXPLOSIVE, N.O.S.	0465	
ARTICLES, EXPLOSIVE, N.O.S.	0355	
ARTICLES, EXPLOSIVE, N.O.S.	0471	
ARTICLES, EXPLOSIVE, N.O.S.	0470	
ARTICLES, EXPLOSIVE, N.O.S.	0469	
ARTICLES, EXPLOSIVE, N.O.S.	0356	
ARTICLES, EXPLOSIVE, N.O.S.	0468	
ARTICLES, EXPLOSIVE, N.O.S.	0349	
ARTICLES, EXPLOSIVE, N.O.S.	0467	
ARTICLES, EXPLOSIVE, N.O.S.	0472	
ARTICLES, EXPLOSIVE, N.O.S.	0466	
ARTICLES, EXPLOSIVE, N.O.S.	0350	
ARTICLES, PRESSURIZED, HYDRAULIC (containing non-flammable gas)	3164	
ARTICLES, PRESSURIZED, PNEUMATIC (containing non-flammable gas)	3164	
ARTICLES, PYROPHORIC	0380	
ARTICLES, PYROTECHNIC for technical purposes	0431	
ARTICLES, PYROTECHNIC for technical purposes	0429	
ARTICLES, PYROTECHNIC for technical purposes	0428	
ARTICLES, PYROTECHNIC for technical purposes	0432	
ARTICLES, PYROTECHNIC for technical purposes	0430	
ARYLSULPHONIC ACIDS, LIQUID with more than 5% free sulphuric acid	2584	
ARYLSULPHONIC ACIDS, LIQUID with not more than 5% free sulphuric acid	2586	
ARYLSULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid	2583	
ARYLSULPHONIC ACIDS, SOLID with not more than 5% free sulphuric acid	2585	
ASBESTOS, AMPHIBOLE	2212	
ASBESTOS, CHRYSOTILE	2590	
Aviation regulated liquid, n.o.s.	3334	Exempt from SMGS

		Annex 2
Aviation regulated solid, n.o.s.	3335	Exempt from SMGS Annex 2
AZODICARBONAMIDE	3242	
BARIUM	1400	
BARIUM ALLOYS, PYROPHORIC	1854	
BARIUM AZIDE, dry or wetted with less than 50% water, by mass	0224	Prohibited
BARIUM AZIDE, WETTED with not less than 50% water, by mass	1571	
BARIUM BROMATE	2719	
BARIUM CHLORATE, SOLID	1445	
BARIUM COMPOUND, N.O.S.	1564	
BARIUM CYANIDE	1565	
BARIUM HYPOCHLORITE with more than 22% available chlorine	2741	
BARIUM NITRATE	1446	
BARIUM OXIDE	1884	
BARIUM PERCHLORATE SOLUTION	3406	
BARIUM PERCHLORATE SOLUTION	3405	
BARIUM PERCHLORATE, SOLID	1447	
BARIUM PERMANGANATE	1448	
BARIUM PEROXIDE	1449	
BATTERIES, CONTAINING SODIUM	3292	
BATTERIES, CONTAINING METALLIC SODIUM OR SODIUM ALLOY	3292	
BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	3028	
Batteries, nickel-metal hydride	3496	Exempt from SMGS Annex 2
Batteries, sodium nickel chloride: see	3292	
BATTERIES, WET, FILLED WITH ACID, electric storage	2794	
BATTERIES, WET, FILLED WITH ALKALI, electric storage	2795	
BATTERIES, WET, NON-SPILLABLE, electric storage	2800	
BATTERY FLUID, ACID	2796	
BATTERY FLUID, ALKALI	2797	
Battery-powered vehicle or battery-powered equipment	3171	Exempt from SMGS Annex 2
Batteries, sodium nickel chloride: see	3292	
BENZALDEHYDE	1990	
BENZENE	1114	
BENZENESULPHONYL CHLORIDE	2225	
BENZIDINE	1885	
BENZONITRILE	2224	
BENZOQUINONE	2587	
BENZOTRICHLORIDE	2226	
BENZOTRIFLUORIDE	2338	
BENZOYL CHLORIDE	1736	
Benzoyl peroxide below 77%, with water: see ORGANIC PEROXIDE TYPE C, SOLID	3104	
Benzoyl peroxide over 77% but below 95%, with water: see ORGANIC PEROXIDE TYPE B, SOLID	3102	
Benzoyl peroxide with inert solid substance: see ORGANIC PEROXIDE TYPE D, SOLID	3106	
Benzoyl peroxide, paste: see ORGANIC PEROXIDE TYPE D, SOLID	3106	
BENZYL BROMIDE	1737	
BENZYL CHLORIDE	1738	
BENZYL CHLOROFORMATE	1739	
BENZYL IODIDE	2653	
BENZYLIDENE CHLORIDE	1886	
BERYLLIUM COMPOUND, N.O.S.	1566	
BERYLLIUM NITRATE	2464	
BERYLLIUM POWDER	1567	
beta-NAPHTHYLAMINE SOLUTION	3411	
beta-NAPHTHYLAMINE, SOLID	1650	
BICYCLO[2.2.1]HEPTA-2,5-DIENE, STABILIZED (2,5-NORBORNADIENE, STABILIZED)	2251	

BIOLOGICAL SUBSTANCE, CATEGORY B	3373	
BIOMEDICAL WASTE, N.O.S.	3291	
BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2782	
BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC	3016	
BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3015	
BIPYRIDILIUM PESTICIDE, SOLID, TOXIC	2781	
BISULPHATES, AQUEOUS SOLUTION	2837	
BISULPHITES, AQUEOUS SOLUTION, N.O.S.	2693	
Black cyanide: see CYANIDES, INORGANIC, SOLID, N.O.S.	1588	
BOMBS with bursting charge	0035	
BOMBS with bursting charge	0291	
BOMBS with bursting charge	0034	
BOMBS with bursting charge	0033	
BOMBS WITH FLAMMABLE LIQUID with bursting charge	0399	
BOMBS WITH FLAMMABLE LIQUID with bursting charge	0400	
BOMBS, PHOTO-FLASH	0039	
BOMBS, PHOTO-FLASH	0037	
BOMBS, PHOTO-FLASH	0038	
BOMBS, PHOTO-FLASH	0299	
BOMBS, SMOKE, NON-EXPLOSIVE with corrosive liquid, without initiating device	2028	
BOOSTERS WITH DETONATOR	0268	
BOOSTERS WITH DETONATOR	0225	
BOOSTERS without detonator	0283	
BOOSTERS without detonator	0042	
BORNEOL	1312	
BORON TRIBROMIDE	2692	
BORON TRICHLORIDE	1741	
BORON TRIFLUORIDE	1008	
BORON TRIFLUORIDE ACETIC ACID COMPLEX, LIQUID	1743	
BORON TRIFLUORIDE ACETIC ACID COMPLEX, LIQUID	1742	
BORON TRIFLUORIDE ACETIC ACID COMPLEX, SOLID	3419	
BORON TRIFLUORIDE DIETHYL ETHERATE	2604	
BORON TRIFLUORIDE DIHYDRATE	2851	
BORON TRIFLUORIDE DIMETHYL ETHERATE	2965	
BORON TRIFLUORIDE PROPIONIC ACID COMPLEX, SOLID	3420	
BORON TRIFLUORIDE, ADSORBED	3519	
BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3213	
BROMATES, INORGANIC, N.O.S.	1450	
BROMINE	1744	
BROMINE CHLORIDE	2901	
BROMINE PENTAFLUORIDE	1745	
BROMINE SOLUTION	1744	
BROMINE TRIFLUORIDE	1746	
BROMOACETIC ACID SOLUTION	1938	
BROMOACETIC ACID, SOLID	3425	
BROMOACETONE	1569	
BROMOACETYL BROMIDE	2513	
BROMOBENZENE	2514	
BROMOBENZYL CYANIDES, LIQUID	1694	
BROMOBENZYL CYANIDES, SOLID	3449	
BROMOCHLOROMETHANE	1887	
BROMOFORM	2515	
BROMOMETHYLPROPANES	2342	
BROMOPROPANES	2344	
BROMOTRIFLUOROETHYLENE	2419	
BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)	1009	
BRUCINE	1570	
BURSTERS, explosive	0043	

BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 20% butadienes	1010	
BUTADIENES, STABILIZED (1,2-butadiene)		
BUTADIENES, STABILIZED (1,3-butadiene)	1010	
BUTANE	1011	
BUTANEDIONE	2346	
BUTANOIC ANHYDRIDE	2739	
BUTANOLS	1120	
BUTYL ACETATES	1123	
BUTYL ACID PHOSPHATE	1718	
BUTYL ACRYLATES, STABILIZED	2348	
BUTYL MERCAPTAN	2347	
BUTYL METHYL ETHER	2350	
BUTYL NITRITES	2351	
BUTYL PROPIONATES	1914	
BUTYL VINYL ETHER, STABILIZED	2352	
BUTYLBENZENES	2709	
BUTYLTOLUENES	2667	
BUTYLTRICHLOROSILANE	1747	
BUTYRALDEHYDE	1129	
BUTYRALDOXIME	2840	
BUTYRIC ACID	2820	
BUTYRONITRILE	2411	
BUTYRYL CHLORIDE	2353	
CACODYLIC ACID	1572	
CADMIUM COMPOUND	2570	
Cadmium cyanide: see CYANIDES, INORGANIC, SOLID, N.O.S.	1588	
CAESIUM	1407	
CAESIUM HYDROXIDE	2682	
CAESIUM HYDROXIDE SOLUTION	2681	
CAESIUM NITRATE	1451	
CALCIUM ALLOYS, PYROPHORIC	1855	
CALCIUM ARSENATE	1573	
CALCIUM ARSENATE AND CALCIUM ARSENITE MIXTURE, SOLID	1574	
CALCIUM CARBIDE	1402	
CALCIUM CHLORATE	1452	
CALCIUM CHLORATE, AQUEOUS SOLUTION	2429	
CALCIUM CHLORITE	1453	
CALCIUM CYANAMIDE with more than 0.1% calcium carbide	1403	
CALCIUM CYANIDE	1575	
CALCIUM DITHIONITE (CALCIUM HYDROSULPHITE)	1923	
CALCIUM HYDRIDE	1404	
CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 10% but not more than 39% available chlorine	2208	
CALCIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)	1748	
CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 10% but not more than 39% available chlorine	3486	
CALCIUM HYPOCHLORITE MIXTURE, DRY, CORROSIVE with more than 39% available chlorine (8.8% available oxygen)	3485	
CALCIUM HYPOCHLORITE, DRY	1748	
CALCIUM HYPOCHLORITE, DRY, CORROSIVE	3485	
CALCIUM HYPOCHLORITE, HYDRATED	2880	
CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, CORROSIVE with not less than 5.5% but not more than 16% water	3487	
CALCIUM HYPOCHLORITE, HYDRATED MIXTURE, with not less than 5.5% but not more than 16% water	2880	
CALCIUM HYPOCHLORITE, HYDRATED, CORROSIVE with not less than 5.5% but not more than 16% water	3487	
CALCIUM MANGANESE SILICON	2844	

CALCIUM NITRATE	1454	
Calcium oxide	1910	Exempt from SMGS Annex 2
CALCIUM PERCHLORATE	1455	
CALCIUM PERMANGANATE	1456	
CALCIUM PEROXIDE	1457	
CALCIUM PHOSPHIDE	1360	
CALCIUM RESINATE	1313	
CALCIUM RESINATE, FUSED	1314	
CALCIUM SILICIDE	1405	
CALCIUM, PYROPHORIC	1855	
CAMPBOR OIL	1130	
CAMPBOR, synthetic	2717	
CAPACITOR, ASYMMETRIC (with an energy storage capacity greater than 0.3 Wh)	3508	
CAPACITOR, ELECTRIC DOUBLE LAYER (with an energy storage capacity greater than 0.3 Wh)	3499	
CAPROIC ACID	2829	
CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2758	
CARBAMATE PESTICIDE, LIQUID, TOXIC	2992	
CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	2991	
CARBAMATE PESTICIDE, SOLID, TOXIC	2757	
Carbamide peroxide: see UREA HYDROGEN PEROXIDE	1511	
CARBON	1361	
CARBON DIOXIDE	1013	
CARBON DIOXIDE, REFRIGERATED LIQUID	2187	
Carbon dioxide, solid (dry ice)	1845	Exempt from SMGS Annex 2
CARBON DISULPHIDE	1131	
CARBON MONOXIDE, COMPRESSED	1016	
CARBON TETRABROMIDE	2516	
CARBON TETRACHLORIDE	1846	
CARBON, ACTIVATED	1362	
CARBON, animal or vegetable origin	1361	
CARBONYL FLUORIDE	2417	
CARBONYL SULPHIDE	2204	
CARTRIDGES FOR TOOLS, BLANK	0014	
CARTRIDGES FOR WEAPONS with bursting charge	0006	
CARTRIDGES FOR WEAPONS with bursting charge	0412	
CARTRIDGES FOR WEAPONS with bursting charge	0348	
CARTRIDGES FOR WEAPONS with bursting charge	0005	
CARTRIDGES FOR WEAPONS with bursting charge	0007	
CARTRIDGES FOR WEAPONS with bursting charge	0321	
CARTRIDGES FOR WEAPONS, BLANK	0326	
CARTRIDGES FOR WEAPONS, BLANK	0413	
CARTRIDGES FOR WEAPONS, BLANK	0338	
CARTRIDGES FOR WEAPONS, BLANK	0014	
CARTRIDGES FOR WEAPONS, BLANK	0327	
CARTRIDGES FOR WEAPONS, INERT PROJECTILE	0012	
CARTRIDGES FOR WEAPONS, INERT PROJECTILE	0339	
CARTRIDGES FOR WEAPONS, INERT PROJECTILE	0417	
CARTRIDGES FOR WEAPONS, INERT PROJECTILE	0328	
CARTRIDGES, FLASH	0049	
CARTRIDGES, FLASH	0050	
CARTRIDGES, OIL WELL	0278	
CARTRIDGES, OIL WELL	0277	
CARTRIDGES, POWER DEVICE	0381	
CARTRIDGES, POWER DEVICE	0323	
CARTRIDGES, POWER DEVICE	0276	
CARTRIDGES, POWER DEVICE	0275	

CARTRIDGES, SIGNAL	0312	
CARTRIDGES, SIGNAL	0054	
CARTRIDGES, SIGNAL	0405	
CARTRIDGES, SMALL ARMS	0012	
CARTRIDGES, SMALL ARMS	0417	
CARTRIDGES, SMALL ARMS	0339	
CARTRIDGES, SMALL ARMS, BLANK	0014	
CARTRIDGES, SMALL ARMS, BLANK	0338	
CARTRIDGES, SMALL ARMS, BLANK	0327	
CASES, CARTRIDGE, EMPTY, WITH PRIMER	0379	
CASES, CARTRIDGE, EMPTY, WITH PRIMER	0055	
CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	0447	
CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	0446	
CASTOR BEANS	2969	
CASTOR FLAKE	2969	
CASTOR MEAL	2969	
CASTOR POMACE	2969	
CAUSTIC ALKALI LIQUID, N.O.S.	1719	
CELLS, CONTAINING METALLIC SODIUM OR SODIUM ALLOY	3292	
CELLS, CONTAINING SODIUM	3292	
CELLULOID in block, rods, rolls, sheets, tubes, etc., except scrap	2000	
CELLULOID, SCRAP	2002	
CERIUM, slabs, ingots or rods	1333	
CERIUM, turnings or gritty powder	3078	
CHARGES, BURSTING, PLASTICS BONDED	0460	
CHARGES, BURSTING, PLASTICS BONDED	0457	
CHARGES, BURSTING, PLASTICS BONDED	0458	
CHARGES, BURSTING, PLASTICS BONDED	0459	
CHARGES, DEMOLITION	0048	
CHARGES, DEPTH	0056	
CHARGES, EXPLOSIVE, COMMERCIAL without detonator	0442	
CHARGES, EXPLOSIVE, COMMERCIAL without detonator	0443	
CHARGES, EXPLOSIVE, COMMERCIAL without detonator	0444	
CHARGES, EXPLOSIVE, COMMERCIAL without detonator	0445	
CHARGES, PROPELLING	0415	
CHARGES, PROPELLING	0491	
CHARGES, PROPELLING	0271	
CHARGES, PROPELLING	0272	
CHARGES, PROPELLING, FOR CANNON	0414	
CHARGES, PROPELLING, FOR CANNON	0279	
CHARGES, PROPELLING, FOR CANNON	0242	
CHARGES, SHAPED, FLEXIBLE, LINEAR	0288	
CHARGES, SHAPED, FLEXIBLE, LINEAR	0237	
CHARGES, SHAPED, without detonator	0441	
CHARGES, SHAPED, without detonator	0059	
CHARGES, SHAPED, without detonator	0439	
CHARGES, SHAPED, without detonator	0440	
CHARGES, SUPPLEMENTARY, EXPLOSIVE	0060	
CHEMICAL KIT	3316	
CHEMICAL SAMPLE, TOXIC	3315	
CHEMICAL UNDER PRESSURE, CORROSIVE, N.O.S.	3503	
CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.	3505	
CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.	3501	
CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.	3504	
CHEMICAL UNDER PRESSURE, N.O.S.	3500	
CHEMICAL UNDER PRESSURE, TOXIC, N.O.S.	3502	
CHLORAL, ANHYDROUS, STABILIZED	2075	
CHLORATE AND BORATE MIXTURE	1458	

CHLORATE AND MAGNESIUM CHLORIDE MIXTURE SOLUTION	3407	
CHLORATE AND MAGNESIUM CHLORIDE MIXTURE, SOLID	1459	
CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3210	
CHLORIC ACID, AQUEOUS SOLUTION with not more than 10% chloric acid	2626	
CHLORINE	1017	
CHLORINE PENTAFLUORIDE	2548	
CHLORINE TRIFLUORIDE	1749	
CHLORINE, ADSORBED	3520	
CHLORITE SOLUTION	1908	
CHLORITES, INORGANIC, N.O.S.	1461	
CHLORITES, INORGANIC, N.O.S.	1462	
CHLOROACETIC ACID SOLUTION	1750	
CHLOROACETIC ACID, MOLTEN	3250	
CHLOROACETIC ACID, SOLID	1751	
CHLOROACETONE, STABILIZED	1695	
CHLOROACETONITRILE	2668	
CHLOROACETOPHENONE, LIQUID	3416	
CHLOROACETOPHENONE, SOLID	1697	
CHLOROACETYL CHLORIDE	1752	
CHLOROANILINES, LIQUID	2019	
CHLOROANILINES, SOLID	2018	
CHLOROANISIDINES	2233	
CHLOROBENZENE	1134	
CHLOROBENZOTRIFLUORIDES	2234	
CHLOROBENZYL CHLORIDES, LIQUID	2235	
CHLOROBENZYL CHLORIDES, SOLID	3427	
CHLOROBUTANES	1127	
CHLOROCRESOLS SOLUTION	2669	
CHLOROCRESOLS, SOLID	3437	
CHLORODIFLUOROBROMOMETHANE (REFRIGERANT GAS R 12B1)	1974	
CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)	1018	
CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	1973	
Chlorodimethylsilane: see FLAMMABLE LIQUID, CORROSIVE, N.O.S.	2924	
Chlorodimethylsilane: see FLAMMABLE LIQUID, CORROSIVE, N.O.S.	2924	
CHLORODINITROBENZENES, LIQUID	1577	
CHLORODINITROBENZENES, SOLID	3441	
CHLOROFORM	1888	
CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	2742	
CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.	3277	
CHLOROMETHYL CHLOROFORMATE	2745	
CHLOROMETHYL ETHYL ETHER	2354	
CHLORONITROANILINES	2237	
CHLORONITROBENZENES, LIQUID	3409	
CHLORONITROBENZENES, SOLID	1578	
CHLORONITROTOLUENES, LIQUID	2433	
CHLORONITROTOLUENES, SOLID	3457	
CHLOROPENTAFLUOROETHANE (REFRIGERANT GAS R 115)	1020	
CHLOROPHENOLATES, LIQUID	2904	
CHLOROPHENOLATES, SOLID	2905	
CHLOROPHENOLS, LIQUID	2021	
CHLOROPHENOLS, SOLID	2020	
CHLOROPHENYLTRICHLOROSILANE	1753	
CHLOROPICRIN	1580	
CHLOROPICRIN AND METHYL BROMIDE MIXTURE with more than 2% chloropicrin	1581	
CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	1582	
CHLOROPICRIN MIXTURE, N.O.S.	1583	
CHLOROPLATINIC ACID, SOLID	2507	

CHLOROPRENE, STABILIZED	1991	
CHLOROSILANES, CORROSIVE, FLAMMABLE, N.O.S.	2986	
CHLOROSILANES, CORROSIVE, N.O.S.	2987	
CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	2985	
CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.	3362	
CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.	3361	
CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	2988	
CHLOROSULPHONIC ACID (with or without sulphur trioxide)	1754	
CHLOROTOLUENES	2238	
CHLOROTOLUIDINES, LIQUID	3429	
CHLOROTOLUIDINES, SOLID	2239	
CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13)	1022	
CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chlorotrifluoromethane (REFRIGERANT GAS R 503)	2599	
CHROMIC ACID SOLUTION	1755	
CHROMIC FLUORIDE SOLUTION	1757	
CHROMIC FLUORIDE, SOLID	1756	
CHROMIUM NITRATE	2720	
CHROMIUM OXYCHLORIDE	1758	
CHROMIUM TRIOXIDE, ANHYDROUS	1463	
CHROMOSULPHURIC ACID	2240	
Chrysotile: see ASBESTOS, CHRYSOTILE	2590	
Cinchonine: see ALKALOIDS, SOLID, N.O.S. or ALKALOID SALTS, SOLID, N.O.S.,	1544	
cis-2-Butylene, see: BUTYLENE	1012	
CLINICAL WASTE, UNSPECIFIED, N.O.S.	3291	
CN catalyst: see WATER-REACTIVE SOLID, N.O.S.	2813	
COAL GAS, COMPRESSED	1023	
COAL TAR DISTILLATES, FLAMMABLE	1136	
Coal tar pitch: see TOXIC SOLID, ORGANIC, N.O.S.	2811	
COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining)	1139	
COBALT DIHYDROXIDE POWDER, containing not less than 10% respirable particles	3550	
COBALT NAPHTHENATES, POWDER	2001	
COBALT RESINATE, PRECIPITATED	1318	
Coloring: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	
COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	0382	
COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	0383	
COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	0384	
COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	0461	
COMPRESSED GAS, FLAMMABLE, N.O.S.	1954	
COMPRESSED GAS, N.O.S.	1956	
COMPRESSED GAS, OXIDIZING, N.O.S.	3156	
COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	3304	
COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	3305	
COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	1953	
COMPRESSED GAS, TOXIC, N.O.S.	1955	
COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	3306	
COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	3303	
CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	0248	
CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge	0249	
COPPER ACETOARSENITE	1585	
COPPER ARSENITE	1586	
COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2776	
COPPER BASED PESTICIDE, LIQUID, TOXIC	3010	
COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3009	
COPPER BASED PESTICIDE, SOLID, TOXIC	2775	

COPPER CHLORATE	2721	
COPPER CHLORIDE	2802	
COPPER CYANIDE	1587	
COPRA	1363	
CORD (FUSE), DETONATING, metal clad	0290	
CORD (FUSE), DETONATING, metal clad	0102	
CORD, DETONATING, flexible	0065	
CORD, DETONATING, flexible	0289	
CORD, DETONATING, MILD EFFECT, metal clad	0104	
CORD, IGNITER	0066	
CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	3264	
CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	3265	
CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	3266	
CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	3267	
CORROSIVE LIQUID, FLAMMABLE, N.O.S.	2920	
CORROSIVE LIQUID, N.O.S.	1760	
CORROSIVE LIQUID, OXIDIZING, N.O.S.	3093	
CORROSIVE LIQUID, SELF-HEATING, N.O.S.	3301	
CORROSIVE LIQUID, TOXIC, N.O.S.	2922	
CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.	3094	
CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.	3260	
CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.	3261	
CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.	3262	
CORROSIVE SOLID, BASIC, ORGANIC, N.O.S.	3263	
CORROSIVE SOLID, FLAMMABLE, N.O.S.	2921	
CORROSIVE SOLID, N.O.S.	1759	
CORROSIVE SOLID, OXIDIZING, N.O.S.	3084	
CORROSIVE SOLID, SELF-HEATING, N.O.S.	3095	
CORROSIVE SOLID, TOXIC, N.O.S.	2923	
CORROSIVE SOLID, WATER-REACTIVE, N.O.S.	3096	
COTTON WASTE, OILY	1364	
COTTON, WET	1365	
COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3024	
COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC	3026	
COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3025	
COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC	3027	
CRESOLS, LIQUID	2076	
CRESOLS, SOLID	3455	
CRESYLIC ACID	2022	
Crocidolite: see ASBESTOS, AMPHIBOLE	2212	
CROTONALDEHYDE	1143	
CROTONALDEHYDE, STABILIZED	1143	
CROTONIC ACID, LIQUID	3472	
CROTONIC ACID, SOLID	2823	
CROTONYLENE	1144	
Cumene hydroperoxide: see ORGANIC PEROXIDE TYPE F, LIQUID	3109	
CUPRIETHYLENEDIAMINE SOLUTION	1761	
Cutback bitumens at or above 100 °C and below its flash-point: see ELEVATED TEMPERATURE LIQUID, N.O.S.	3257	
Cutback bitumens with a flash-point above 60 °C, at or above its flash-point: see: ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S.	3256	
Cutback bitumens with a flash-point not greater than 60 °C: see TARS, LIQUID	1999	
Cutback bitumens with a flash-point not greater than 60 °C: see TARS, LIQUID	1999	
CUTTERS, CABLE, EXPLOSIVE	0070	
CYANIDE SOLUTION, N.O.S.	1935	
CYANIDES, INORGANIC, SOLID, N.O.S.	1588	
CYANOGEN	1026	

CYANOGEN BROMIDE	1889	
CYANOGEN CHLORIDE, STABILIZED	1589	
CYANURIC CHLORIDE	2670	
CYCLOBUTANE	2601	
CYCLOBUTYL CHLOROFORMATE	2744	
CYCLOHEPTANE	2241	
CYCLOHEPTATRIENE	2603	
CYCLOHEPTENE	2242	
CYCLOHEXANE	1145	
CYCLOHEXANONE	1915	
CYCLOHEXENE	2256	
CYCLOHEXENYLTRICHLOROSILANE	1762	
CYCLOHEXYL ACETATE	2243	
CYCLOHEXYL ISOCYANATE	2488	
CYCLOHEXYL MERCAPTAN	3054	
CYCLOHEXYLAMINE	2357	
CYCLOHEXYLTRICHLOROSILANE	1763	
CYCLOOCTADIENES	2520	
CYCLOOCTATETRAENE	2358	
CYCLOPENTANE	1146	
CYCLOPENTANOL	2244	
CYCLOPENTANONE	2245	
CYCLOPENTENE	2246	
CYCLOPROPANE	1027	
CYCLOTETRAMETHYLENETETRANITRAMINE (HMX; OCTOGEN), DESENSITIZED	0484	
CYCLOTETRAMETHYLENETETRANITRAMINE (HMX; OCTOGEN), WETTED with not less than 15% water, by mass	0226	
CYCLOTRIMETHYLENETRINITRAMINE (HEXOGEN, CYCLONITE, RDX) AND CYCLOTETRAMETHYLENETETRANITRAMINE (HMX; OCTOGEN) MIXTURE, WETTED with not less than 15% water, by mass	0391	
CYCLOTRIMETHYLENETRINITRAMINE (HEXOGEN, CYCLONITE, RDX), DESENSITIZED	0483	
CYCLOTRIMETHYLENETRINITRAMINE (HEXOGEN, CYCLONITE, RDX), WETTED with not less than 15% water, by mass	0072	
CYMENES	2046	
Dangerous goods in machinery or apparatus	3363	Exempt from SMGS Annex 2
DANGEROUS GOODS IN ARTICLES	3363	
DECABORANE	1868	
DECAHYDRONAPHTHALENE	1147	
Decilin, solvent: see FLAMMABLE LIQUID, TOXIC, N.O.S.	1992	
DEFLAGRATING METAL SALTS OF AROMATIC NITRODERIVATIVES, N.O.S.	0132	
DESENSITIZED EXPLOSIVE, LIQUID, N.O.S.	3379	
DESENSITIZED EXPLOSIVE, SOLID, N.O.S.	3380	
DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	0500	
DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	0360	
DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	0361	
DETONATORS FOR AMMUNITION	0366	
DETONATORS FOR AMMUNITION	0365	
DETONATORS FOR AMMUNITION	0073	
DETONATORS FOR AMMUNITION	0364	
DETONATORS, ELECTRIC for blasting	0456	
DETONATORS, ELECTRIC for blasting	0030	
DETONATORS, ELECTRIC for blasting	0255	
DETONATORS, ELECTRONIC programmable for blasting	0511	
DETONATORS, ELECTRONIC programmable for blasting	0512	
DETONATORS, ELECTRONIC programmable for blasting	0513	
DETONATORS, NON-ELECTRIC for blasting	0029	
DETONATORS, NON-ELECTRIC for blasting	0455	
DETONATORS, NON-ELECTRIC for blasting	0267	

DEUTERIUM, COMPRESSED	1957	
DEVICES, SMALL, HYDROCARBON GAS POWERED with release device	3150	
DEVICES, SMALL, HYDROCARBON GAS POWERED with release device	3150	
DIACETONE ALCOHOL	1148	
DIALLYL ETHER	2360	
DIALLYLAMINE	2359	
DIAZODINITROPHENOL, WETTED with not less than 40% water, or mixture of alcohol and water, by mass	0074	Prohibited
DIBENZYLDICHLOROSILANE	2434	
DIBORANE	1911	
DIBROMOCHLOROPROPANES	2872	
DIBROMODIFLUOROMETHANE	1941	
DIBROMOMETHANE	2664	
DIBUTYL ETHERS	1149	
DIBUTYLAMINOETHANOL	2873	
DICHLOROACETIC ACID	1764	
DICHLOROACETYL CHLORIDE	1765	
DICHLOROANILINES, LIQUID	1590	
DICHLOROANILINES, SOLID	3442	
DICHLORODIFLUOROMETHANE (REFRIGERANT GAS R 12)	1028	
DICHLORODIFLUOROMETHANE AND 1,1-DIFLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoromethane (REFRIGERANT GAS R 500)	2602	
DICHLORODIMETHYL ETHER, SYMMETRICAL	2249	Prohibited
DICHLOROFLUOROMETHANE (REFRIGERANT GAS R 21)	1029	
DICHLOROISOCYANURIC ACID SALTS	2465	
DICHLOROISOCYANURIC ACID, DRY	2465	
DICHLOROISOPROPYL ETHER	2490	
DICHLOROMETHANE	1593	
DICHLOROPENTANES	1152	
DICHLOROPHENYL ISOCYANATES	2250	
DICHLOROPHENYLTRICHLOROSILANE	1766	
DICHLOROPROPENES	2047	
DICHLOROSILANE	2189	
Dicumyl peroxide, commercially pure or more than 42% with an inert substance: see ORGANIC PEROXIDE TYPE F, SOLID	3110	
DICYCLOHEXYLAMINE	2565	
DICYCLOHEXYLAMMONIUM NITRITE	2687	
DICYCLOPENTADIENE	2048	
DIDYMIUM NITRATE	1465	
DIESEL FUEL, EN 590:1993 standard	1202	
DIETHOXYMETHANE	2373	
DIETHYL CARBONATE	2366	
DIETHYL ETHER (ETHYL ETHER)	1155	
DIETHYL KETONE	1156	
DIETHYL SULPHATE	1594	
DIETHYL SULPHIDE	2375	
DIETHYLAMINE	1154	
DIETHYLBENZENE	2049	
DIETHYLDICHLOROSILANE	1767	
DIETHYLENEGLYCOL DINITRATE, DESENSITIZED with not less than 25% non-volatile, water-insoluble phlegmatizer, by mass	0075	
DIETHYLENETRIAMINE	2079	
DIETHYLTHIOPHOSPHORYL CHLORIDE	2751	
DIFLUOROMETHANE (REFRIGERANT GAS R 32)	3252	
DIFLUOROPHOSPHORIC ACID, ANHYDROUS	1768	
DIISOBUTYL KETONE	1157	
DIISOBUTYLAMINE	2361	
DIISOBUTYLENE, ISOMERIC COMPOUNDS	2050	

DIISOCTYL ACID PHOSPHATE	1902	
DIISOPROPYL ETHER	1159	
DIISOPROPYLAMINE	1158	
DIKETENE, STABILIZED	2521	
DIMETHYL CARBONATE	1161	
DIMETHYL DISULPHIDE	2381	
DIMETHYL ETHER	1033	
DIMETHYL SULPHATE	1595	
DIMETHYL SULPHIDE	1164	
DIMETHYL THIOPHOSPHORYL CHLORIDE	2267	
DIMETHYLAMINE AQUEOUS SOLUTION	1160	
DIMETHYLAMINE, ANHYDROUS	1032	
DIMETHYLBENZYLAMINE	2619	
DIMETHYLCARBAMOYL CHLORIDE	2262	
Dimethylchloromethylchlorosilane: see CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	2985	
DIMETHYLCYCLOHEXANES	2263	
DIMETHYLDICHLOROSILANE	1162	
Dimethyldichlorosilane hydrolysate, see FLAMMABLE LIQUID, N.O.S.	1993	
DIMETHYLDIETHOXYSILANE	2380	
DIMETHYLDIOXANES	2707	
DIMETHYLHYDRAZINE, SYMMETRICAL	2382	
DIMETHYLHYDRAZINE, UNSYMMETRICAL	1163	
DIMETHYL-N-PROPYLAMINE	2266	
DI-n-AMYLAMINE	2841	
DI-n-BUTYLAMINE	2248	
DINITROANILINES	1596	
DINITROBENZENES, LIQUID	1597	
DINITROBENZENES, SOLID	3443	
DINITROGEN TETROXIDE (NITROGEN DIOXIDE)	1067	
DINITROGLYCOURIL (DINGU)	0489	
DINITRO-o-CRESOL	1598	
DINITROPHENOL SOLUTION	1599	
DINITROPHENOL, dry or wetted with less than 15% water, by mass	0076	
DINITROPHENOL, WETTED with not less than 15% water, by mass	1320	
DINITROPHENOLATES, alkali metals, dry or wetted with less than 15% water, by mass	0077	
DINITROPHENOLATES, WETTED with not less than 15% water, by mass	1321	
DINITRORESORCINOL, dry or wetted with less than 15% water, by mass	0078	
DINITRORESORCINOL, WETTED with not less than 15% water, by mass	1322	
DINITROSOBENZENE	0406	
DINITROTOLUENES, LIQUID	2038	
DINITROTOLUENES, MOLTEN	1600	
DINITROTOLUENES, SOLID	3454	
DI-n-PROPYL ETHER	2384	
DIOXANE	1165	
DIOXOLANE	1166	
DIPENTENE	2052	
DIPHENYLAMINE CHLOROARSINE	1698	
DIPHENYLCHLOROARSINE, LIQUID	1699	
DIPHENYLCHLOROARSINE, SOLID	3450	
DIPHENYLDICHLOROSILANE	1769	
DIPHENYLMETHYL BROMIDE	1770	
DIPICRYL SULPHIDE, dry or wetted with less than 10% water, by mass	0401	
DIPICRYL SULPHIDE, WETTED with not less than 10% water, by mass	2852	
DIPROPYL KETONE	2710	
DIPROPYLAMINE	2383	
Diran-A: see FLAMMABLE LIQUID, TOXIC, N.O.S.	1992	
DISILANE	3553	

DISINFECTANT, LIQUID, CORROSIVE, N.O.S.	1903	
DISINFECTANT, LIQUID, TOXIC, N.O.S.	3142	
DISINFECTANT, SOLID, TOXIC, N.O.S.	1601	
DISODIUM TRIOXOSILICATE	3253	
Ditertiary butyl peroxide: see ORGANIC PEROXIDE TYPE E, LIQUID	3107	
DIVINYL ETHER, STABILIZED	1167	
DODECYLTRICHLOROSILANE	1771	
DYE INTERMEDIATE, LIQUID, CORROSIVE, N.O.S.	2801	
DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S.	1602	
DYE INTERMEDIATE, SOLID, CORROSIVE, N.O.S.	3147	
DYE INTERMEDIATE, SOLID, TOXIC, N.O.S.	3143	
DYE, LIQUID, CORROSIVE, N.O.S.	2801	
DYE, LIQUID, TOXIC, N.O.S.	1602	
DYE, SOLID, CORROSIVE, N.O.S.	3147	
DYE, SOLID, TOXIC, N.O.S.	3143	
ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. with flash-point above 60 °C, at or above its flash-point	3256	
ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100 °C and below its flash-point (including molten metals, molten salts, etc.)	3257	
ELEVATED TEMPERATURE SOLID, N.O.S., at or above 240 °C	3258	
Enamel: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	
Enamel: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	
Enamel: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	
Enamel: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	
Enamel: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	
Engine, internal combustion, flammable gas powered or engine, internal combustion, flammable liquid powered or vehicle, flammable gas powered or vehicle, flammable liquid powered or engine, fuel cell, flammable gas powered or engine, fuel cell, flammable liquid powered or vehicle, fuel cell, flammable gas powered or vehicle, fuel cell, flammable liquid powered	3166	Exempt from SMGS Annex 2
Enite: see TOXIC LIQUID, ORGANIC, N.O.S.	2810	
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	3082	
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	3077	
EPIBROMOHYDRIN	2558	
EPICHLOROHYDRIN	2023	
ESTERS, N.O.S.	3272	
ETHANE	1035	
ETHANE, REFRIGERATED LIQUID	1961	
ETHANOL (ETHYL ALCOHOL)	1170	
ETHANOL AND GASOLINE MIXTURE, with more than 10% ethanol	3475	
ETHANOL AND MOTOR SPIRIT MIXTURE, with more than 10% ethanol	3475	
ETHANOL AND PETROL MIXTURE, with more than 10% ethanol	3475	
ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)	1170	
ETHANOLAMINE	2491	
ETHANOLAMINE SOLUTION	2491	
ETHERS, N.O.S.	3271	
Ethoxysilane compound "Product 119-296T": see FLAMMABLE LIQUID, N.O.S.	1993	
ETHYL 2-CHLOROPROPIONATE	2935	
ETHYL ACETATE	1173	
ETHYL ACRYLATE, STABILIZED	1917	
ETHYL AMYL KETONE	2271	
ETHYL BORATE	1176	
ETHYL BROMIDE	1891	
ETHYL BROMOACETATE	1603	
ETHYL BUTYL ETHER	1179	
ETHYL BUTYRATE	1180	
ETHYL CHLORIDE	1037	

ETHYL CHLOROACETATE	1181	
ETHYL CHLOROFORMATE	1182	
Ethyl chlorosilane: see CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	2988	
ETHYL CHLOROTHIOFORMATE	2826	
ETHYL CROTONATE	1862	
ETHYL FLUORIDE (REFRIGERANT GAS R 161)	2453	
ETHYL FORMATE	1190	
ETHYL ISOBUTYRATE	2385	
ETHYL ISOCYANATE	2481	
ETHYL LACTATE	1192	
ETHYL MERCAPTAN	2363	
ETHYL METHACRYLATE, STABILIZED	2277	
ETHYL METHYL ETHER	1039	
ETHYL METHYL KETONE (METHYL ETHYL KETONE)	1193	
ETHYL NITRITE SOLUTION	1194	
ETHYL ORTHOFORMATE	2524	
ETHYL OXALATE	2525	
ETHYL PROPIONATE	1195	
ETHYL PROPYL ETHER	2615	
ETHYLACETYLENE, STABILIZED	2452	
ETHYLAMINE	1036	
ETHYLAMINE, AQUEOUS SOLUTION with not less than 50% but not more than 70% ethylamine	2270	
ETHYLBENZENE	1175	
ETHYLDICHLOROARSINE	1892	
ETHYLDICHLOROSILANE	1183	
ETHYLENE	1962	
ETHYLENE CHLOROHYDRIN	1135	
ETHYLENE DIBROMIDE	1605	
ETHYLENE DICHLORIDE	1184	
ETHYLENE GLYCOL DIETHYL ETHER	1153	
ETHYLENE GLYCOL MONOETHYL ETHER	1171	
ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	1172	
ETHYLENE GLYCOL MONOMETHYL ETHER	1188	
ETHYLENE GLYCOL MONOMETHYL ETHER ACETATE	1189	
ETHYLENE OXIDE	1040	
ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	3300	
ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% but not more than 87% ethylene oxide	1041	
ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	1952	
ETHYLENE OXIDE AND CHLOROTETRAFLUOROETHANE MIXTURE with not more than 8.8% ethylene oxide	3297	
ETHYLENE OXIDE AND DICHLORODIFLUOROMETHANE MIXTURE with not more than 12.5% ethylene oxide	3070	
ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE with not more than 7.9% ethylene oxide	3298	
ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURE, not more than 30% ethylene oxide	2983	
ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE with not more than 5.6% ethylene oxide	3299	
ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1 MPa (10 bar) at 50 °C	1040	
ETHYLENE, ACETYLENE AND PROPYLENE MIXTURE, REFRIGERATED LIQUID containing at least 71.5% ethylene with not more than 22.5% acetylene and not more than 6% propylene	3138	
ETHYLENE, REFRIGERATED LIQUID	1038	
ETHYLENEDIAMINE	1604	
ETHYLENEIMINE, STABILIZED	1185	
Ethyllic liquid: see MOTOR FUEL ANTI-KNOCK MIXTURE	1649	
ETHYLPHENYLDICHLOROSILANE	2435	

ETHYLTRICHLOROSILANE	1196	
EXPLOSIVE, BLASTING, TYPE A	0081	
EXPLOSIVE, BLASTING, TYPE B	0331	
EXPLOSIVE, BLASTING, TYPE B	0082	
EXPLOSIVE, BLASTING, TYPE C	0083	
EXPLOSIVE, BLASTING, TYPE D	0084	
EXPLOSIVE, BLASTING, TYPE E	0241	
EXPLOSIVE, BLASTING, TYPE E	0332	
EXTRACTS, AROMATIC, LIQUID	1169	
Extracts, aromatic, liquid: see: EXTRACTS, LIQUID, for flavour or aroma	1197	
Extracts, flavouring, liquid: see: EXTRACTS, LIQUID, for flavour or aroma	1197	
EXTRACTS, LIQUID, for flavour or aroma	1197	
FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	1353	
FERRIC ARSENATE	1606	
FERRIC ARSENITE	1607	
FERRIC CHLORIDE SOLUTION	2582	
FERRIC CHLORIDE, ANHYDROUS	1773	
FERRIC NITRATE	1466	
FERROCERIUM	1323	
FERROSILICON with 30% or more but less than 90% silicon	1408	
FERROUS ARSENATE	1608	
FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS in a form liable to self-heating	2793	
FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS in a form liable to self-heating	2793	
FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS in a form liable to self-heating	2793	
FERTILIZER AMMONIATING SOLUTION with free ammonia	1043	
FIBRES IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.	1353	
Fibres, animal burnt, wet or damp	1372	Exempt from SMGS Annex 2
FIBRES, ANIMAL, N.O.S. with oil	1373	
FIBRES, SYNTHETIC, N.O.S. with oil	1373	
Fibres, vegetable, dry	3360	Exempt from SMGS Annex 2
FIBRES, VEGETABLE, N.O.S. with oil	1373	
FILMS, NITROCELLULOSE BASE, gelatin coated, except scrap	1324	
FIRE EXTINGUISHER CHARGES, corrosive liquid	1774	
FIRE EXTINGUISHERS with compressed or liquefied gas	1044	
FIRELIGHTERS, SOLID with flammable liquid	2623	
FIRE SUPPRESSANT DISPERSING DEVICES	0514	
FIRE SUPPRESSANT DISPERSING DEVICES	3559	
FIREWORKS	0333	See 2.2.1.1.7
FIREWORKS	0334	See 2.2.1.1.7
FIREWORKS	0335	See 2.2.1.1.7
FIREWORKS	0336	See 2.2.1.1.7
FIREWORKS	0337	
FIRST AID KIT	3316	
Fish meal (fish scrap), stabilized	2216	Exempt from SMGS Annex 2
FISH MEAL (FISH SCRAP), UNSTABILIZED	1374	
FLAMMABLE LIQUID, CORROSIVE, N.O.S.	2924	
FLAMMABLE LIQUID, N.O.S.	1993	
FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3286	
FLAMMABLE LIQUID, TOXIC, N.O.S.	1992	
FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.	3180	
FLAMMABLE SOLID, CORROSIVE, ORGANIC, N.O.S.	2925	
FLAMMABLE SOLID, INORGANIC, N.O.S.	3178	
FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.	3176	
FLAMMABLE SOLID, ORGANIC, N.O.S.	1325	

FLAMMABLE SOLID, OXIDIZING, N.O.S.	3097	Prohibited
FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.	3179	
FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.	2926	
FLARES, AERIAL	0403	
FLARES, AERIAL	0420	
FLARES, AERIAL	0421	
FLARES, AERIAL	0093	
FLARES, AERIAL	0404	
FLARES, SURFACE	0419	
FLARES, SURFACE	0418	
FLARES, SURFACE	0092	
FLASH POWDER	0094	
FLASH POWDER	0305	
FLUORINE, COMPRESSED	1045	
FLUOROACETIC ACID	2642	
FLUOROANILINES	2941	
FLUOROBENZENE	2387	
FLUOROBORIC ACID	1775	
FLUOROPHOSPHORIC ACID, ANHYDROUS	1776	
FLUOROSILICATES, N.O.S.	2856	
FLUOROSILICIC ACID	1778	
FLUOROSULPHONIC ACID	1777	
FLUOROTOLUENES	2388	
FORMALDEHYDE SOLUTION with not less than 25% formaldehyde	2209	
FORMALDEHYDE SOLUTION, FLAMMABLE	1198	
FORMIC ACID with more than 85% acid by mass	1779	
FORMIC ACID with not less than 10% but not more than 85% acid by mass	3412	
FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells	0099	
FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing water-reactive substances	3476	
FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing corrosive substances	3477	
FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing corrosive substances	3477	
FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride	3479	
FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas	3478	
FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas	3478	
FUEL CELL CARTRIDGES, containing corrosive substances	3477	
FUEL CELL CARTRIDGES, containing flammable liquids	3473	
FUEL CELL CARTRIDGES, containing flammable liquids	3473	
FUEL CELL CARTRIDGES, containing hydrogen in metal hydride	3479	
FUEL CELL CARTRIDGES, containing hydrogen in metal hydride	3479	
FUEL CELL CARTRIDGES, containing liquefied flammable gas	3478	
FUEL CELL CARTRIDGES, containing liquefied flammable gas	3478	
FUEL CELL CARTRIDGES, containing water-reactive substances	3476	
FUEL CELL CARTRIDGES, containing water-reactive substances	3476	
FUEL, AVIATION, TURBINE ENGINE	1863	
FUMARYL CHLORIDE	1780	
FUMIGATED CARGO TRANSPORT UNIT	3359	
FURALDEHYDES	1199	
FURAN	2389	
FURFURYL ALCOHOL	2874	
FURFURYLAMINE	2526	
FUSE, IGNITER, tubular, metal clad	0103	
FUSE, NON-DETONATING	0101	
FUSE, SAFETY	0105	
FUSEL OIL	1201	

FUZES, DETONATING	0257	
FUZES, DETONATING	0367	
FUZES, DETONATING	0107	
FUZES, DETONATING with protective features	0409	
FUZES, DETONATING with protective features	0410	
FUZES, DETONATING with protective features	0408	
FUZES, DETONATING, hand or rifle	0106	
FUZES, IGNITING	0368	
FUZES, IGNITING	0316	
FUZES, IGNITING	0317	
GALLIUM	2803	
GALLIUM CONTAINED IN MANUFACTURED ARTICLES	3554	
GAS CARTRIDGES without a release device, non-refillable	2037	
GAS OIL	1202	
GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid	3167	
GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid	3168	
GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S., not refrigerated liquid	3169	
GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.	3312	
GAS, REFRIGERATED LIQUID, N.O.S.	3158	
GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.	3311	
GASOLINE	1203	
GENETICALLY MODIFIED MICROORGANISMS	3245	
GENETICALLY MODIFIED ORGANISMS	3245	
GERMANE	2192	
GERMANE, ADSORBED	3523	
GERMANIUM TETRAHYDRIDE	2192	
GLYCEROL alpha-MONOCHLOROHYDRIN	2689	
GLYCIDALDEHYDE	2622	
GRENADES, hand or rifle, with bursting charge	0284	
GRENADES, hand or rifle, with bursting charge	0285	
GRENADES, hand or rifle, with bursting charge	0292	
GRENADES, hand or rifle, with bursting charge	0293	
GRENADES, PRACTICE, hand or rifle	0372	
GRENADES, PRACTICE, hand or rifle	0452	
GRENADES, PRACTICE, hand or rifle	0318	
GRENADES, PRACTICE, hand or rifle	0110	
GUANIDINE NITRATE	1467	
GUANYLNITROSAMINO GUANYLIDENE HYDRAZINE, WETTED with not less than 30% water, by mass	0113	Prohibited
GUANYLNITROSAMINO GUANYLTETRAZENE, WETTED with not less than 30% water, or mixture of alcohol and water, by mass	0114	Prohibited
GUNPOWDER (BLACK POWDER), COMPRESSED	0028	
GUNPOWDER (BLACK POWDER), granular or as a meal	0027	
GUNPOWDER (BLACK POWDER), IN PELLETS	0028	
HAFNIUM POWDER, DRY	2545	
HAFNIUM POWDER, WETTED with not less than 25% water	1326	
Hay	1327	Exempt from SMGS Annex 2
HEATING OIL, LIGHT, EN 590:1993 standard	1202	
HELIUM, COMPRESSED	1046	
HELIUM, REFRIGERATED LIQUID	1963	
HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	3296	
HEPTANES	1206	
HEXACHLOROACETONE	2661	
HEXACHLOROBENZENE	2729	
HEXACHLOROBUTADIENE	2279	
HEXACHLOROCYCLOPENTADIENE	2646	
HEXACHLOROPHENE	2875	

HEXADECYLTRICHLOROSILANE	1781	
HEXADIENES	2458	
HEXAETHYL TETRAPHOSPHATE	1611	
HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	1612	
HEXAFLUOROACETONE	2420	
HEXAFLUOROACETONE HYDRATE, LIQUID	2552	
HEXAFLUOROACETONE HYDRATE, SOLID	3436	
HEXAFLUROETHANE, COMPRESSED (REFRIGERANT GAS R 116)	2193	
HEXAFLUOROPHOSPHORIC ACID	1782	
HEXAFLUOROPROPYLENE (REFRIGERANT GAS R 1216)	1858	
HEXALDEHYDE	1207	
HEXAMETHYLENE DIISOCYANATE	2281	
HEXAMETHYLENEDIAMINE SOLUTION	1783	
HEXAMETHYLENEDIAMINE, SOLID	2280	
HEXAMETHYLENEIMINE	2493	
HEXAMETHYLENETETRAMINE	1328	
HEXANES	1208	
HEXANITRODIPHENYLAMINE (DIPICRYLAMINE, HEXYL)	0079	
HEXANITROSTILBENE	0392	
HEXANOLS	2282	
HEXOGEN AND CYCLOTETRAMETHYLENETETRANITRAMINE (HMX; OCTOGEN) MIXTURE, DESENSITIZED with not less than 10% phlegmatizer by mass	0391	
HEXOLITE (HEXOTOL), dry or wetted with less than 15% water, by mass 15%	0118	
HEXOTONAL	0393	
HEXYLTRICHLOROSILANE	1784	
HYDRAZINE AQUEOUS SOLUTION, FLAMMABLE with more than 37% hydrazine, by mass	3484	
HYDRAZINE HYDRATE	2030	
HYDRAZINE, ANHYDROUS	2029	
HYDRAZINE, AQUEOUS SOLUTION with more than 37% hydrazine, by mass	2030	
HYDRAZINE, AQUEOUS SOLUTION with not more than 37% hydrazine, by mass	3293	
HYDRIODIC ACID	1787	
HYDROBROMIC ACID	1788	
HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.	1964	
HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S.	1965	
HYDROCARBONS, LIQUID, N.O.S.	3295	
HYDROCHLORIC ACID	1789	
HYDROCYANIC ACID, AQUEOUS SOLUTION with not more than 20% hydrogen cyanide	1613	
Hydrocyanic acid: see HYDROCYANIC ACID, AQUEOUS SOLUTION (HYDROGEN CYANIDE, AQUEOUS SOLUTION) with not more than 20% hydrogen cyanide	1613	
HYDROFLUORIC ACID AND SULPHURIC ACID MIXTURE	1786	
HYDROFLUORIC ACID solution	1790	
HYDROGEN AND METHANE MIXTURE, COMPRESSED	2034	
HYDROGEN BROMIDE, ANHYDROUS	1048	
HYDROGEN CHLORIDE, ANHYDROUS	1050	
HYDROGEN CHLORIDE, REFRIGERATED LIQUID	2186	Prohibited
HYDROGEN CYANIDE, SOLUTION IN ALCOHOL with not more than 45% hydrogen cyanide	3294	
HYDROGEN CYANIDE, STABILIZED containing less than 3% water	1051	
HYDROGEN CYANIDE, STABILIZED, containing less than 3% water and absorbed in a porous inert	1614	
HYDROGEN FLUORIDE, ANHYDROUS	1052	
HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM	3468	
HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM CONTAINED IN EQUIPMENT	3468	
HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM PACKED WITH EQUIPMENT	3468	
HYDROGEN IODIDE, ANHYDROUS	2197	
HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE with acid(s), water and not more than 5% peroxyacetic acid, STABILIZED	3149	

HYDROGEN PEROXIDE, AQUEOUS SOLUTION	2015	
HYDROGEN PEROXIDE, STABILIZED	2015	
HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)	2014	
HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 8% but less than 20% hydrogen peroxide (stabilized as necessary)	2984	
HYDROGEN SELENIDE, ADSORBED	3526	
HYDROGEN SELENIDE, ANHYDROUS	2202	
HYDROGEN SULPHIDE	1053	
HYDROGEN, COMPRESSED	1049	
HYDROGEN, REFRIGERATED LIQUID	1966	
HYDROGENDIFLUORIDES, SOLID, N.O.S.	1740	
HYDROGENDIFLUORIDES, SOLUTION, N.O.S.	3471	
HYDROXYLAMINE SULPHATE	2865	
Hyperis (isopropyl benzene hydroperoxide): see ORGANIC PEROXIDE TYPE F, LIQUID	3109	
HYPOCHLORITE SOLUTION	1791	
HYPOCHLORITES, INORGANIC, N.O.S.	3212	
IGNITERS	0315	
IGNITERS	0314	
IGNITERS	0121	
IGNITERS	0454	
IGNITERS	0325	
INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only	2900	
INFECTIOUS SUBSTANCE, AFFECTING HUMANS	2814	
INSECTICIDE GAS, FLAMMABLE, N.O.S.	3354	
INSECTICIDE GAS, N.O.S.	1968	
INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	3355	
INSECTICIDE GAS, TOXIC, N.O.S.	1967	
IODINE	3495	
IODINE MONOCHLORIDE, LIQUID	3498	
IODINE MONOCHLORIDE, SOLID	1792	
IODINE PENTAFLUORIDE	2495	
IODOMETHYLPROPANES	2391	
IODOPROPANES	2392	
IRON OXIDE, SPENT	1376	
IRON PENTACARBONYL	1994	
IRON SPONGE, SPENT obtained from coal gas purification	1376	
ISOBUTANE	1969	
ISOBUTANOL (ISOBUTYL ALCOHOL)	1212	
ISOBUTYL ACETATE	1213	
ISOBUTYL ACRYLATE, STABILIZED	2527	
ISOBUTYL FORMATE	2393	
ISOBUTYL ISOBUTYRATE	2528	
ISOBUTYL ISOCYANATE	2486	
ISOBUTYL METHACRYLATE, STABILIZED	2283	
ISOBUTYL PROPIONATE	2394	
ISOBUTYLAMINE	1214	
ISOBUTYLENE	1055	
ISOBUTYRALDEHYDE (ISOBUTYRALDEHYDE)	2045	
ISOBUTYRIC ACID	2529	
ISOBUTYRONITRILE	2284	
ISOBUTYRYL CHLORIDE	2395	
ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.	3080	
ISOCYANATE SOLUTION, TOXIC, N.O.S.	2206	
ISOCYANATES, FLAMMABLE, TOXIC, N.O.S.	2478	
ISOCYANATES, FLAMMABLE, TOXIC, N.O.S.	2478	
ISOCYANATES, TOXIC, FLAMMABLE, N.O.S.	3080	
ISOCYANATES, TOXIC, N.O.S.	2206	
ISOCYANATOBENZOTRIFLUORIDES	2285	

ISOHEPTENE	2287	
ISOHEXENE	2288	
ISOOCTENES	1216	
ISOPENTENES	2371	
ISOPHORONE DIISOCYANATE	2290	
ISOPHORONEDIAMINE	2289	
ISOPRENE, STABILIZED	1218	
ISOPROPANOL (ISOPROPYL ALCOHOL)	1219	
ISOPROPENYL ACETATE	2403	
ISOPROPENYLBENZENE	2303	
ISOPROPYL 2-CHLOROPROPIONATE	2934	
ISOPROPYL ACETATE	1220	
ISOPROPYL ACID PHOSPHATE	1793	
ISOPROPYL BUTYRATE	2405	
ISOPROPYL CHLOROACETATE	2947	
ISOPROPYL CHLOROFORMATE	2407	
ISOPROPYL ISOBUTYRATE	2406	
ISOPROPYL ISOCYANATE	2483	
ISOPROPYL NITRATE	1222	
ISOPROPYL PROPIONATE	2409	
ISOPROPYLAMINE	1221	
ISOPROPYLBENZENE	1918	
ISOSORBIDE DINITRATE MIXTURE with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	2907	
ISOSORBIDE-5-MONONITRATE	3251	
JET PERFORATING GUNS, CHARGED, oil well, without detonator	0124	
JET PERFORATING GUNS, CHARGED, oil well, without detonator	0494	
KEROSENE	1223	
KETONES, LIQUID, N.O.S.	1224	
KRILL MEAL	3497	
KRYPTON, COMPRESSED	1056	
KRYPTON, REFRIGERATED LIQUID	1970	
Lacquer: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	
Lacquer: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	
Lacquer: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	
Lacquer: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	
Lacquer: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	
Lauroyl peroxide: see ORGANIC PEROXIDE TYPE D, SOLID	3106	
LEAD ACETATE	1616	
LEAD ARSENATES	1617	
LEAD ARSENITES	1618	
LEAD AZIDE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	0129	Prohibited
LEAD COMPOUND, SOLUBLE, N.O.S.	2291	
LEAD CYANIDE	1620	
LEAD DIOXIDE	1872	
LEAD NITRATE	1469	
LEAD PERCHLORATE SOLUTION	3408	
LEAD PERCHLORATE, SOLID	1470	
LEAD PHOSPHITE, DIBASIC	2989	
LEAD STYPHNATE (LEAD TRINITRORESORCINATE), WETTED with not less than 20% water, or mixture of alcohol and water, by mass	0130	Prohibited
LEAD SULPHATE with more than 3% free acid	1794	
LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment	3072	

LIFE-SAVING APPLIANCES, SELF-INFLATING	2990	
LIGHTER REFILLS containing flammable gas	1057	
LIGHTER REFILLS containing flammable gas	1057	
LIGHTERS, FUSE	0131	
LIQUEFIED GAS, FLAMMABLE, N.O.S.	3161	
LIQUEFIED GAS, FLAMMABLE, N.O.S.	3161	
LIQUEFIED GAS, N.O.S.	3163	
LIQUEFIED GAS, OXIDIZING, N.O.S.	3157	
LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	3308	
LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	3309	
LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	3160	
LIQUEFIED GAS, TOXIC, N.O.S.	3162	
LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	3310	
LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	3307	
LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air	1058	
Liquid filler: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	
Liquid filler: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	
Liquid filler: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	
Liquid filler: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	
Liquid lacquer base: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	
Liquid lacquer base: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	
Liquid lacquer base: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	
Liquid lacquer base: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	
LITHIUM	1415	
LITHIUM	1413	
LITHIUM ALUMINIUM HYDRIDE	2830	
LITHIUM ALUMINIUM HYDRIDE, ETHEREAL	1410	
LITHIUM BOROHYDRIDE	1411	
LITHIUM HYDRIDE	1414	
LITHIUM HYDRIDE, FUSED SOLID	2805	
LITHIUM HYDROXIDE	2680	
LITHIUM HYDROXIDE SOLUTION	2679	
LITHIUM HYPOCHLORITE MIXTURE	1471	
LITHIUM HYPOCHLORITE, DRY	1471	
LITHIUM ION BATTERIES (including lithium ion polymer batteries)	3480	
LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)	3481	
LITHIUM METAL BATTERIES (including lithium alloy batteries)	3090	
LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including lithium alloy batteries)	3481	
LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including lithium alloy batteries) SUBSTANCE IS SOLID, ENVIRONMENTALLY HAZARDOUS, N.O.S.	3091	
LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries)	3091	
LITHIUM NITRATE	2722	
LITHIUM NITRIDE	2806	
LITHIUM PEROXIDE	1472	
LITHIUM SILICON	1417	
LONDON PURPLE	1621	
Luminal A: see FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3286	
MAGNESIUM	1869	
MAGNESIUM ALLOYS POWDER	1418	
MAGNESIUM ALLOYS with more than 50% magnesium in pellets, turnings or ribbons	1869	

MAGNESIUM ALUMINIUM PHOSPHIDE	1419	
MAGNESIUM ARSENATE	1622	
MAGNESIUM BROMATE	1473	
MAGNESIUM CHLORATE	2723	
MAGNESIUM DIAMIDE	2004	
MAGNESIUM FLUOROSILICATE	2853	
MAGNESIUM GRANULES, COATED, particle size not less than 149 microns	2950	
MAGNESIUM HYDRIDE	2010	
MAGNESIUM NITRATE	1474	
MAGNESIUM PERCHLORATE	1475	
MAGNESIUM PEROXIDE	1476	
MAGNESIUM PHOSPHIDE	2011	
MAGNESIUM POWDER	1418	
MAGNESIUM SILICIDE	2624	
Magnetized material	2807	Exempt from SMGS Annex 2
MALEIC ANHYDRIDE	2215	
MALEIC ANHYDRIDE, MOLTEN	2215	
MALONONITRILE	2647	
MANEB	2210	
MANEB PREPARATION with not less than 60% maneb	2210	
MANEB PREPARATION, STABILIZED against self-heating	2968	
MANEB, STABILIZED against self-heating	2968	
MANGANESE NITRATE	2724	
MANGANESE RESINATE	1330	
MANNITOL HEXANITRATE, WETTED with not less than 40% water, or mixture of alcohol and water, by mass	0133	
MATCHES, FUSEE	2254	
MATCHES, SAFETY (book, card or strike on box)	1944	
MATCHES, 'STRIKE ANYWHERE'	1331	
MATCHES, WAX 'VESTA'	1945	
MEDICAL WASTE, CATEGORY A, AFFECTING HUMANS, solid	3549	
MEDICAL WASTE, CATEGORY A, AFFECTING ANIMALS only, solid	3549	
MEDICAL WASTE, N.O.S.	3291	
MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	3248	
MEDICINE, LIQUID, TOXIC, N.O.S.	1851	
MEDICINE, SOLID, TOXIC, N.O.S.	3249	
MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, N.O.S.	3336	
MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S.	1228	
MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.	3071	
MERCAPTANS, LIQUID, FLAMMABLE, N.O.S.	3336	
MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S.	1228	
MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S.	3071	
MERCURIC ARSENATE	1623	
MERCURIC CHLORIDE	1624	
Mercuric chloride: see	2025	
MERCURIC NITRATE	1625	
MERCURIC POTASSIUM CYANIDE	1626	
MERCUROUS NITRATE	1627	
MERCURY	2809	
MERCURY ACETATE	1629	
MERCURY AMMONIUM CHLORIDE	1630	
MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2778	
MERCURY BASED PESTICIDE, LIQUID, TOXIC	3012	
MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3011	
MERCURY BASED PESTICIDE, SOLID, TOXIC	2777	
MERCURY BENZOATE	1631	
MERCURY BROMIDES	1634	

MERCURY COMPOUND, LIQUID, N.O.S.	2024	
MERCURY COMPOUND, SOLID, N.O.S.	2025	
MERCURY CONTAINED IN MANUFACTURED ARTICLES	3506	
MERCURY CYANIDE	1636	
MERCURY FULMINATE, WETTED with not less than 20% water, or mixture of alcohol and water, by mass	0135	Prohibited
MERCURY GLUCONATE	1637	
MERCURY IODIDE	1638	
MERCURY NUCLEATE	1639	
MERCURY OLEATE	1640	
MERCURY OXIDE	1641	
MERCURY OXYCYANIDE, DESENSITIZED	1642	
MERCURY POTASSIUM IODIDE	1643	
MERCURY SALICYLATE	1644	
MERCURY SULPHATE	1645	
MERCURY THIOCYANATE	1646	
MESITYL OXIDE	1229	
METAL CARBONYLS, LIQUID, N.O.S.	3281	
METAL CARBONYLS, SOLID, N.O.S.	3466	
METAL CATALYST, DRY	2881	
METAL CATALYST, WETTED with a visible excess of liquid	1378	
METAL HYDRIDES, FLAMMABLE, N.O.S.	3182	
METAL HYDRIDES, WATER-REACTIVE, N.O.S.	1409	
METAL POWDER, FLAMMABLE, N.O.S.	3089	
METAL POWDER, SELF-HEATING, N.O.S.	3189	
METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.	3181	
METALDEHYDE	1332	
METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S.	3208	
METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S.	3209	
METHACRYLALDEHYDE, STABILIZED	2396	
METHACRYLIC ACID, STABILIZED	2531	
METHACRYLONITRILE, STABILIZED	3079	
METHALLYL ALCOHOL	2614	
METHANE, COMPRESSED	1971	
METHANE, REFRIGERATED LIQUID	1972	
METHANESULPHONYL CHLORIDE	3246	
METHANOL	1230	
METHOXYMETHYL ISOCYANATE	2605	
METHYL 2-CHLOROPROPIONATE	2933	
METHYL ACETATE	1231	
METHYL ACRYLATE, STABILIZED	1919	
METHYL BROMIDE AND ETHYLENE DIBROMIDE MIXTURE, LIQUID	1647	
METHYL BROMIDE with not more than 2% chloropicrin	1062	
METHYL BROMOACETATE	2643	
METHYL BUTYRATE	1237	
METHYL CHLORIDE (REFRIGERANT GAS R 40)	1063	
METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	1912	
METHYL CHLOROACETATE	2299	
METHYL CHLOROACETATE	2295	
METHYL CHLOROFORMATE	1238	
METHYL CHLOROMETHYL ETHER	1239	
METHYL FLUORIDE (REFRIGERANT GAS R 41)	2454	
METHYL FORMATE	1243	
METHYL IODIDE	2644	
METHYL ISOBUTYL CARBINOL	2053	
METHYL ISOBUTYL KETONE	1245	
METHYL ISOCYANATE	2480	
METHYL ISOPROPENYL KETONE, STABILIZED	1246	

METHYL ISOTHIOCYANATE	2477	
METHYL ISOVALERATE	2400	
METHYL MAGNESIUM BROMIDE IN ETHYL ETHER	1928	
METHYL MERCAPTAN	1064	
METHYL METHACRYLATE MONOMER, STABILIZED	1247	
METHYL NITRITE	2455	Prohibited
METHYL ORTHOSILICATE	2606	
METHYL PROPIONATE	1248	
METHYL PROPYL ETHER	2612	
METHYL PROPYL KETONE	1249	
METHYL tert-BUTYL ETHER	2398	
METHYL TRICHLOROACETATE	2533	
METHYL VINYL KETONE, STABILIZED	1251	
METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED, such as Mixture P1 or Mixture P2	1060	
METHYLAL	1234	
METHYLALLYL CHLORIDE	2554	
METHYLAMINE, ANHYDROUS	1061	
METHYLAMINE, AQUEOUS SOLUTION	1235	
METHYLAMYL ACETATE	1233	
METHYLCHLOROSILANE	1242	
METHYLCHLOROSILANE	2534	
Methylchlorovinylchlorosilane: see CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	2985	
METHYLCYCLOHEXANE	2296	
METHYLCYCLOHEXANOLS, flammable	2617	
METHYLCYCLOHEXANONE	2297	
METHYLCYCLOPENTANE	2298	
Methylethyl ketone peroxide solution of not more than 45% concentration and with not more than 10% active oxygen: see ORGANIC PEROXIDE TYPE D, LIQUID	3105	
METHYLHYDRAZINE	1244	
METHYLPENTADIENE	2461	
METHYLPHENYLDICHLOROSILANE	2437	
METHYLTETRAHYDROFURAN	2536	
METHYLTRICHLOROSILANE	1250	
Methylvinylchlorosilane: see CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	2985	
MINES with bursting charge	0294	
MINES with bursting charge	0138	
MINES with bursting charge	0136	
MINES with bursting charge	0137	
Mixed acids: see NITRIC ACID, RED FUMING	2032	
MOLYBDENUM PENTACHLORIDE	2508	
Monosilane argon gaseous mixtures, see COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	1953	
Monosilane hydrogen gaseous mixtures, see COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	1953	
MORPHOLINE	2054	
MOTOR FUEL ANTI-KNOCK MIXTURE	1649	
MOTOR FUEL ANTI-KNOCK MIXTURE, FLAMMABLE	3483	
N,n-BUTYLIMIDAZOLE	2690	
N,N-DIETHYLANILINE	2432	
N,N-DIETHYLETHYLENEDIAMINE	2685	
N,N-DIMETHYLANILINE	2253	
N,N-DIMETHYLCYCLOHEXYLAMINE	2264	
N,N-DIMETHYLFORMAMIDE	2265	
n-AMYL METHYL KETONE	1110	
NAPHTHALENE, CRUDE	1334	
NAPHTHALENE, MOLTEN	2304	
NAPHTHALENE, REFINED	1334	

NAPHTHYLTHIOUREA	1651	
NAPHTHYLUREA	1652	
Natural coral ore: see MERCURY COMPOUND, SOLID, N.O.S.	2025	
NATURAL GAS, COMPRESSED with high methane content	1971	
NATURAL GAS, REFRIGERATED LIQUID with high methane content	1972	
n-BUTYL CHLOROFORMATE	2743	
n-BUTYL FORMATE	1128	
n-BUTYL ISOCYANATE	2485	
n-BUTYL METHACRYLATE, STABILIZED	2227	
n-BUTYLAMINE	1125	
N-BUTYLANILINE	2738	
n-DECANE	2247	
NEON, COMPRESSED	1065	
NEON, REFRIGERATED LIQUID	1913	
N-ETHYLANILINE	2272	
N-ETHYLBENZYL TOLUIDINES, LIQUID	2753	
N-ETHYLBENZYL TOLUIDINES, SOLID	3460	
N-ETHYL-N-BENZYLANILINE	2274	
N-ETHYL TOLUIDINES	2754	
n-HEPTALDEHYDE	3056	
n-HEPTENE	2278	
NICKEL CARBONYL	1259	
NICKEL CYANIDE	1653	
NICKEL NITRATE	2725	
NICKEL NITRITE	2726	
NICOTINE	1654	
NICOTINE COMPOUND, LIQUID, N.O.S.	3144	
NICOTINE COMPOUND, SOLID, N.O.S.	1655	
NICOTINE HYDROCHLORIDE, LIQUID	1656	
NICOTINE HYDROCHLORIDE, SOLID	3444	
NICOTINE HYDROCHLORIDE, SOLUTION	1656	
NICOTINE PREPARATION, LIQUID, N.O.S.	3144	
NICOTINE PREPARATION, SOLID, N.O.S.	1655	
NICOTINE SALICYLATE	1657	
NICOTINE SULPHATE, SOLID	3445	
NICOTINE SULPHATE, SOLUTION	1658	
NICOTINE TARTRATE	1659	
NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3218	
NITRATES, INORGANIC, N.O.S.	1477	
NITRATING ACID MIXTURE	1796	
NITRATING ACID MIXTURE, SPENT	1826	
NITRIC ACID, other than red fuming	2031	
NITRIC ACID, RED FUMING	2032	
NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURE	1975	
NITRIC OXIDE, COMPRESSED	1660	
NITRILES, FLAMMABLE, TOXIC, N.O.S.	3273	
NITRILES, LIQUID, TOXIC, N.O.S.	3276	
NITRILES, SOLID, TOXIC, N.O.S.	3439	
NITRILES, TOXIC, FLAMMABLE, N.O.S.	3275	
NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3219	
NITRITES, INORGANIC, N.O.S.	2627	
NITRO UREA	0147	
NITROANILINES (o-, m-, p-)	1661	
NITROANISOL, LIQUID	2730	
NITROANISOL, SOLID	3458	
NITROBENZENE	1662	
NITROBENZENESULPHONIC ACID	2305	
NITROBENZOTRIFLUORIDES, LIQUID	2306	

NITROBENZOTRIFLUORIDES, SOLID	3431	
NITROBROMOBENZENES, LIQUID	2732	
NITROBROMOBENZENES, SOLID	3459	
NITROCELLULOSE MEMBRANE FILTERS, with not more than 12.6% nitrogen, by dry mass	3270	
NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	2059	
NITROCELLULOSE WITH ALCOHOL (not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass)	2556	
NITROCELLULOSE WITH WATER (not less than 25% water, by mass)	2555	
NITROCELLULOSE, dry or wetted with less than 25% water (or alcohol), by mass	0340	
NITROCELLULOSE, PLASTICIZED with not less than 18% plasticizing substance, by mass	0343	
NITROCELLULOSE, unmodified or plasticized with less than 18% plasticizing substance, by mass	0341	
NITROCELLULOSE, WETTED with not less than 25% alcohol, by mass	0342	
NITROCELLULOSE, with not more than 12.6% nitrogen, by dry mass, MIXTURE WITH or WITHOUT PLASTICIZER, WITH or WITHOUT PIGMENT	2557	
NITROCRESOLS, LIQUID	3434	
NITROCRESOLS, SOLID	2446	
NITROETHANE	2842	
NITROGEN TRIFLUORIDE	2451	
NITROGEN TRIOXIDE	2421	Prohibited
NITROGEN, COMPRESSED	1066	
NITROGEN, REFRIGERATED LIQUID	1977	
NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin, by mass	3343	
NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin, by mass	3357	
NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin, by mass	3319	
NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 10% nitroglycerin	0144	
NITROGLYCERIN SOLUTION IN ALCOHOL with not more than 1% nitroglycerin	1204	
NITROGLYCERIN, DESENSITIZED with not less than 40% non-volatile water-insoluble phlegmatizer, by mass	0143	
NITROGLYCERIN, SOLUTION IN ALCOHOL with more than 1% but not more than 5% nitroglycerin	3064	
NITROGUANIDINE, dry or wetted with less than 20% water, by mass	0282	
NITROGUANIDINE, WETTED with not less than 20% water, by mass	1336	
NITROHYDROCHLORIC ACID	1798	Prohibited
NITROMETHANE	1261	
NITRONAPHTHALENE	2538	
NITROPHENOLS (o-, m-, p-)	1663	
NITROPROPANES	2608	
NITROSTARCH, dry or wetted with less than 20% water, by mass	0146	
NITROSTARCH, WETTED with not less than 20% water, by mass	1337	
NITROSYL CHLORIDE	1069	
NITROSYLSULPHURIC ACID, LIQUID	2308	
NITROSYLSULPHURIC ACID, SOLID	3456	
NITROTOLUENES, LIQUID	1664	
NITROTOLUENES, SOLID	3446	
NITROTOLUIDINES (MONO)	2660	
NITROTRIAZOLONE (NTO)	0490	
NITROUS OXIDE	1070	
NITROUS OXIDE, REFRIGERATED LIQUID	2201	
NITROXYLENES, LIQUID	1665	
NITROXYLENES, SOLID	3447	
N-METHYLANILINE	2294	
N-METHYLBUTYLAMINE	2945	
NONANES	1920	

NONYLTRICHLOROSILANE	1799	
n-PROPANOL (PROPYL ALCOHOL, NORMAL)	1274	
n-PROPYL ACETATE	1276	
n-PROPYL CHLOROFORMATE	2740	
n-PROPYL ISOCYANATE	2482	
n-PROPYL NITRATE	1865	
n-PROPYLBENZENE	2364	
N- AMINO ETHYL PIPERAZINE	2815	
OCTADECYLTRICHLOROSILANE	1800	
OCTADIENES	2309	
OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)	2422	
OCTAFLUOROCYCLOBUTANE (REFRIGERANT GAS RC 318)	1976	
OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)	2424	
OCTANES	1262	
OCTOLITE (OCTOL), dry or wetted with less than 15% water, by mass	0266	
OCTONAL	0496	
OCTYL ALDEHYDES	1191	
OCTYLTRICHLOROSILANE	1801	
o-DICHLOROBENZENE	1591	
OIL GAS, COMPRESSED	1071	
ORGANIC PEROXIDE TYPE B, LIQUID	3101	
ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED	3111	Prohibited
ORGANIC PEROXIDE TYPE B, SOLID	3102	
ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED	3112	Prohibited
ORGANIC PEROXIDE TYPE C, LIQUID	3103	
ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED	3113	Prohibited
ORGANIC PEROXIDE TYPE C, SOLID	3104	
ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED	3114	Prohibited
ORGANIC PEROXIDE TYPE D, LIQUID	3105	
ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED	3115	Prohibited
ORGANIC PEROXIDE TYPE D, SOLID	3106	
ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED	3116	Prohibited
ORGANIC PEROXIDE TYPE E, LIQUID	3107	
ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED	3117	Prohibited
ORGANIC PEROXIDE TYPE E, SOLID	3108	
ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED	3118	Prohibited
ORGANIC PEROXIDE TYPE F, LIQUID	3109	
ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED	3119	Prohibited
ORGANIC PEROXIDE TYPE F, SOLID	3110	
ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED	3120	Prohibited
ORGANIC PIGMENTS, SELF-HEATING	3313	
ORGANOARSENIC COMPOUND, LIQUID, N.O.S.	3280	
ORGANOARSENIC COMPOUND, SOLID, N.O.S.	3465	
ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2762	
ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC	2996	
ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	2995	
ORGANOCHLORINE PESTICIDE, SOLID, TOXIC	2761	
ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S.	3282	
ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.	3467	
ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC	3392	
ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE	3394	
ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE	3398	
ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE	3399	
ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC	3391	
ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC, WATER-REACTIVE	3393	
ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING	3400	
ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE	3395	

ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, FLAMMABLE	3396	
ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, SELF-HEATING	3397	
ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S.	3278	
ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S.	3464	
ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.	3279	
ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2784	
ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC	3018	
ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3017	
ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC	2783	
ORGANOTIN COMPOUND, LIQUID, N.O.S.	2788	
ORGANOTIN COMPOUND, SOLID, N.O.S.	3146	
ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2787	
ORGANOTIN PESTICIDE, LIQUID, TOXIC	3020	
ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3019	
ORGANOTIN PESTICIDE, SOLID, TOXIC	2786	
OSMIUM TETROXIDE	2471	
OXIDIZING LIQUID, CORROSIVE, N.O.S.	3098	
OXIDIZING LIQUID, N.O.S.	3139	
OXIDIZING LIQUID, TOXIC, N.O.S.	3099	
OXIDIZING SOLID, CORROSIVE, N.O.S.	3085	
OXIDIZING SOLID, FLAMMABLE, N.O.S.	3137	Prohibited
OXIDIZING SOLID, N.O.S.	1479	
OXIDIZING SOLID, SELF-HEATING, N.O.S.	3100	Prohibited
OXIDIZING SOLID, TOXIC, N.O.S.	3087	
OXIDIZING SOLID, WATER-REACTIVE, N.O.S.	3121	Prohibited
OXYGEN DIFLUORIDE, COMPRESSED	2190	
OXYGEN GENERATOR, CHEMICAL	3356	
OXYGEN, COMPRESSED	1072	
OXYGEN, REFRIGERATED LIQUID	1073	
PACKAGINGS, DISCARDED, EMPTY, UNCLEARED	3509	
PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	
PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	
PAINT RELATED MATERIAL (including paint thinning and reducing compound)	1263	
PAINT RELATED MATERIAL (including paint thinning and reducing compound)	3066	
PAINT RELATED MATERIAL, CORROSIVE, FLAMMABLE (including paint thinning and reducing)	3470	
PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning and reducing)	3469	
PAINT, CORROSIVE, FLAMMABLE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	
PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	
PAPER, UNSATURATED OIL TREATED, incompletely dried (including carbon paper)	1379	
Paraanthracene: see ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	3082	
PARAFORMALDEHYDE	2213	
PARALDEHYDE	1264	
PENTABORANE	1380	
PENTACHLOROETHANE	1669	
PENTACHLOROPHENOL	3155	
PENTAERYTHRITOL TETRANITRATE (PENTAERYTHRITOL TETRANITRATE, PETN), DESENSITIZED with not less than 15% phlegmatizer, by mass	0150	
PENTAERYTHRITOL TETRANITRATE (PENTAERYTHRITOL TETRANITRATE, PETN), DESENSITIZED with not less than 25% phlegmatizer, by mass	0150	
PENTAERYTHRITOL TETRANITRATE (PENTAERYTHRITOL TETRANITRATE, PETN), with not less than 7% wax, by mass	0411	
PENTAERYTHRITOL TETRANITRATE MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	3344	

PENTAERYTHRITOL TETRANITRATE MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	3344	
PENTAFLUOROETHANE (REFRIGERANT GAS R 125)	3220	
PENTAMETHYLHEPTANE	2286	
PENTANE-2,4-DIONE	2310	
PENTANES, liquid	1265	
PENTANOLS	1105	
PENTOLITE, dry or wetted with less than 15% water, by mass	0151	
Percarbamide: see UREA HYDROGEN PEROXIDE	1511	
PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3211	
PERCHLORATES, INORGANIC, N.O.S.	1481	
PERCHLORIC ACID with more than 50% but not more than 72% acid, by mass	1873	
PERCHLORIC ACID with not more than 50% acid, by mass	1802	
PERCHLOROMETHYL MERCAPTAN	1670	
PERCHLORYL FLUORIDE	3083	
PERFLUORO(ETHYL VINYL ETHER)	3154	
PERFLUORO(METHYL VINYL ETHER)	3153	
PERFUMERY PRODUCTS with flammable solvents	1266	
PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3214	
PERMANGANATES, INORGANIC, N.O.S.	1482	
PEROXIDES, INORGANIC, N.O.S.	1483	
PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	3216	
PERSULPHATES, INORGANIC, N.O.S.	3215	
PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S., flash-point less than 23 °C	3021	
PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S., flash-point not less than 23 °C	2903	
PESTICIDE, LIQUID, TOXIC, N.O.S.	2902	
PESTICIDE, SOLID, TOXIC, N.O.S.	2588	
PETN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN, by mass	3344	
PETROL	1203	
PETROL	1203	
PETROLEUM CRUDE OIL	1267	
PETROLEUM DISTILLATES, N.O.S.	1268	
PETROLEUM GASES, LIQUEFIED	1075	
Petroleum pitch: see TOXIC SOLID, ORGANIC, N.O.S.	2811	
PETROLEUM PRODUCTS, N.O.S.	1268	
PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC	3494	
PHENACYL BROMIDE	2645	
PHENETIDINES	2311	
PHENOL SOLUTION	2821	
PHENOL, MOLTEN	2312	
PHENOL, SOLID	1671	
PHENOLATES, LIQUID	2904	
PHENOLATES, SOLID	2905	
PHENOLSULPHONIC ACID, LIQUID	1803	
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3346	
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC	3348	
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than	3347	
PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC	3345	
PHENYL CHLOROFORMATE	2746	
PHENYL ISOCYANATE	2487	
PHENYL MERCAPTAN	2337	
PHENYLACETONITRILE, LIQUID	2470	
PHENYLACETYL CHLORIDE	2577	
PHENYLCARBYLAMINE CHLORIDE	1672	
Phenylchlorosilane: see CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S.	2988	

PHENYLENEDIAMINES (o-, m-, p-)	1673	
PHENYLHYDRAZINE	2572	
PHENYLMERCURIC ACETATE	1674	
PHENYLMERCURIC COMPOUND, N.O.S.	2026	
PHENYLMERCURIC HYDROXIDE	1894	
PHENYLMERCURIC NITRATE	1895	
PHENYLPHOSPHORUS DICHLORIDE	2798	
PHENYLPHOSPHORUS THIODICHLORIDE	2799	
PHENYLTRICHLOROSILANE	1804	
PHOSGENE	1076	
PHOSPHINE	2199	
PHOSPHINE, ADSORBED	3525	
PHOSPHORIC ACID, SOLID	3453	
PHOSPHORIC ACID, SOLUTION	1805	
PHOSPHOROUS ACID	2834	
PHOSPHORUS HEPTASULPHIDE, free from yellow and white phosphorus	1339	
PHOSPHORUS OXYBROMIDE	1939	
PHOSPHORUS OXYBROMIDE, MOLTEN	2576	
PHOSPHORUS OXYCHLORIDE	1810	
PHOSPHORUS PENTABROMIDE	2691	
PHOSPHORUS PENTACHLORIDE	1806	
PHOSPHORUS PENTAFLUORIDE	2198	
PHOSPHORUS PENTAFLUORIDE, ADSORBED	3524	
PHOSPHORUS PENTASULPHIDE, free from yellow and white phosphorus	1340	
PHOSPHORUS PENTOXIDE	1807	
PHOSPHORUS SESQUISULPHIDE, free from yellow and white phosphorus	1341	
PHOSPHORUS TRIBROMIDE	1808	
PHOSPHORUS TRICHLORIDE	1809	
PHOSPHORUS TRIOXIDE	2578	
PHOSPHORUS TRISULPHIDE, free from yellow and white phosphorus	1343	
PHOSPHORUS, AMORPHOUS	1338	
PHOSPHORUS, WHITE, DRY	1381	
PHOSPHORUS, WHITE, MOLTEN	2447	
PHOSPHORUS, WHITE, UNDER WATER or IN SOLUTION	1381	
PHOSPHORUS, YELLOW, DRY	1381	
Phosphorus, yellow, molten, see PHOSPHORUS, WHITE, MOLTEN	2447	
PHOSPHORUS, YELLOW, UNDER WATER or IN SOLUTION	1381	
PHTHALIC ANHYDRIDE with more than 0.05% of maleic anhydride	2214	
PICOLINES	2313	
PICRIC ACID, WETTED with not less than 30% water, by mass	1344	
PINE OIL	1272	
PIPERAZINE	2579	
PIPERIDINE	2401	
PLASTICS MOULDING COMPOUND in dough, sheet or extruded rope form evolving flammable vapour	3314	
PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S.	2006	
p-NITROSODIMETHYLANILINE	1369	
Polish: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	
Polish: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	
Polish: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	
Polish: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	
POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S.	2733	
POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.	2734	
POLYAMINES, LIQUID, CORROSIVE, N.O.S.	2735	
POLYAMINES, SOLID, CORROSIVE, N.O.S.	3259	

POLYAMINES, SOLID, CORROSIVE, N.O.S.	3259	
POLYCHLORINATED BIPHENYLS, LIQUID	2315	
POLYCHLORINATED BIPHENYLS, SOLID	3432	
POLYESTER RESIN KIT	3269	
POLYHALOGENATED BIPHENYLS, LIQUID	3151	
POLYHALOGENATED BIPHENYLS, LIQUID	3151	
POLYHALOGENATED BIPHENYLS, SOLID	3152	
POLYHALOGENATED BIPHENYLS, SOLID	3152	
POLYMERIC BEADS, EXPANDABLE, evolving flammable vapour	2211	
POTASSIUM	2257	
POTASSIUM	1401	
POTASSIUM ARSENATE	1677	
POTASSIUM ARSENITE	1678	
POTASSIUM BOROHYDRIDE	1870	
POTASSIUM BROMATE	1484	
POTASSIUM CHLORATE	1485	
POTASSIUM CHLORATE, AQUEOUS SOLUTION	2427	
POTASSIUM CUPROCYANIDE	1679	
POTASSIUM CYANIDE SOLUTION	3413	
POTASSIUM CYANIDE, SOLID	1680	
POTASSIUM DITHIONITE (POTASSIUM HYDROSULPHITE)	1929	
POTASSIUM FLUORIDE SOLUTION	3422	
POTASSIUM FLUORIDE, SOLID	1812	
POTASSIUM FLUOROACETATE	2628	
POTASSIUM FLUOROSILICATE	2655	
POTASSIUM HYDROGEN SULPHATE	2509	
POTASSIUM HYDROGENDIFLUORIDE SOLUTION	3421	
POTASSIUM HYDROGENDIFLUORIDE, SOLID	1811	
POTASSIUM HYDROXIDE SOLUTION	1814	
POTASSIUM HYDROXIDE, SOLID	1813	
POTASSIUM METAL ALLOYS, LIQUID	1420	
POTASSIUM METAL ALLOYS, SOLID	3403	
POTASSIUM METAVANADATE	2864	
POTASSIUM MONOXIDE	2033	
POTASSIUM NITRATE	1486	
POTASSIUM NITRATE AND SODIUM NITRITE MIXTURE	1487	
POTASSIUM NITRITE	1488	
POTASSIUM PERCHLORATE	1489	
POTASSIUM PERMANGANATE	1490	
POTASSIUM PEROXIDE	1491	
POTASSIUM PERSULPHATE	1492	
POTASSIUM PHOSPHIDE	2012	
POTASSIUM SODIUM ALLOYS, LIQUID	1422	
POTASSIUM SODIUM ALLOYS, SOLID	3404	
POTASSIUM SULPHIDE with less than 30% water of crystallization	1382	
POTASSIUM SULPHIDE, ANHYDROUS	1382	
POTASSIUM SULPHIDE, HYDRATED with not less than 30% water of crystallization	1847	
POTASSIUM SUPEROXIDE	2466	
POWDER CAKE (POWDER PASTE), WETTED with not less than 17% alcohol, by mass	0433	
POWDER CAKE (POWDER PASTE), WETTED with not less than 25% water, by mass	0159	
POWDER, SMOKELESS	0161	
POWDER, SMOKELESS	0160	
POWDER, SMOKELESS	0509	
PRIMERS, CAP TYPE	0378	
PRIMERS, CAP TYPE	0377	
PRIMERS, CAP TYPE	0044	
PRIMERS, TUBULAR	0319	
PRIMERS, TUBULAR	0320	

PRIMERS, TUBULAR	0376	
PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable	1210	
PRINTING INK, flammable	1210	
Product T-185: see FLAMMABLE LIQUID, N.O.S.	1993	
PROJECTILES with burster or expelling charge	0427	
PROJECTILES with burster or expelling charge	0426	
PROJECTILES with burster or expelling charge	0347	
PROJECTILES with burster or expelling charge	0434	
PROJECTILES with burster or expelling charge	0346	
PROJECTILES with burster or expelling charge	0435	
PROJECTILES with bursting charge	0344	
PROJECTILES with bursting charge	0168	
PROJECTILES with bursting charge	0169	
PROJECTILES with bursting charge	0324	
PROJECTILES with bursting charge	0167	
PROJECTILES, inert with tracer	0424	
PROJECTILES, inert with tracer	0345	
PROJECTILES, inert with tracer	0425	
Pronit: see TOXIC LIQUID, ORGANIC, N.O.S.	2810	
PROPADIENE, STABILIZED	2200	
PROPANE	1978	
PROPANETHIOLS	2402	
PROPELLANT, LIQUID	0495	
PROPELLANT, LIQUID	0497	
PROPELLANT, SOLID	0501	
PROPELLANT, SOLID	0499	
PROPELLANT, SOLID	0498	
PROPIONALDEHYDE	1275	
PROPIONIC ACID with not less than 10% and less than 90% acid by mass	1848	
PROPIONIC ACID with not less than 90% acid by mass	3463	
PROPIONIC ANHYDRIDE	2496	
PROPIONITRILE	2404	
PROPIONYL CHLORIDE	1815	
Propyl chloride: see 1-CHLOROPROPANE	1278	
PROPYL FORMATES	1281	
PROPYLAMINE	1277	
PROPYLENE	1077	
PROPYLENE CHLOROHYDRIN	2611	
PROPYLENE OXIDE	1280	
PROPYLENE TETRAMER	2850	
PROPYLENEIMINE, STABILIZED	1921	
PROPYLTRICHLOROSILANE	1816	
PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	3350	
PYRETHROID PESTICIDE, LIQUID, TOXIC	3352	
PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3351	
PYRETHROID PESTICIDE, SOLID, TOXIC	3349	
PYRIDINE	1282	
PYROPHORIC ALLOY, N.O.S.	1383	
PYROPHORIC ALLOY, N.O.S.	1383	
PYROPHORIC LIQUID, INORGANIC, N.O.S.	3194	
PYROPHORIC LIQUID, ORGANIC, N.O.S.	2845	
PYROPHORIC SOLID, INORGANIC, N.O.S.	3200	
PYROPHORIC SOLID, ORGANIC, N.O.S.	2846	
PYROSULPHURYL CHLORIDE	1817	
PYRROLIDINE	1922	
QUINOLINE	2656	
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – ARTICLES	2911	

RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM	2909	
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING	2908	
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS	2911	
RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL	2910	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non fissile or fissile-excepted	2912	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE	3324	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non-fissile or fissile-excepted	3321	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted	3322	
RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY, (LSA-III), FISSILE	3325	
RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE	3326	
RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I, SCO-II or SCO-III), non fissile or fissile-excepted	2913	
RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE	3331	
RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non-fissile or fissile-excepted	2919	
RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form	3327	
RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non fissile or fissile-excepted	2915	
RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE	3333	
RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile-excepted	3332	
RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE	3329	
RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non fissile or fissile-excepted	2917	
RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE	3328	
RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non fissile or fissile-excepted	2916	
RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE	3330	
RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted	3323	
RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE	2977	
RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non fissile or fissile-excepted	2978	
Rags, oily	1856	Exempt from SMGS Annex 2
REFRIGERANT GAS R 1113	1082	
REFRIGERANT GAS R 404A (Pentafluoroethane, 1,1,1-trifluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1-trifluoroethane)	3337	
REFRIGERANT GAS R 407A (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 20% difluoromethane and 40% pentafluoroethane)	3338	
REFRIGERANT GAS R 407B (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 10% difluoromethane and 70% pentafluoroethane)	3339	
REFRIGERANT GAS R 407C (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 23%)	3340	
REFRIGERANT GAS, N.O.S., such as Mixture F1, Mixture F2 or Mixture F3	1078	
REFRIGERATING MACHINES containing flammable, non-toxic, liquefied gas	3358	
REFRIGERATING MACHINES containing non-flammable, non-toxic gases or ammonia solutions (UN 2672)	2857	
REGULATED MEDICAL WASTE, N.O.S.	3291	
RELEASE DEVICES, EXPLOSIVE	0173	
RESIN SOLUTION, flammable	1866	
RESORCINOL	2876	
RIVETS, EXPLOSIVE	0174	
Road oils at or above 100 °C and below its flash-point: see ELEVATED TEMPERATURE LIQUID, N.O.S.	3257	
Road oils at or above 100 °C and below its flash-point: see ELEVATED TEMPERATURE LIQUID, N.O.S.	3256	
ROCKET MOTORS	0186	

ROCKET MOTORS	0280	
ROCKET MOTORS	0281	
ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	0322	
ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge	0250	
ROCKET MOTORS, LIQUID FUELLED	0396	
ROCKET MOTORS, LIQUID FUELLED	0395	
ROCKETS with bursting charge	0180	
ROCKETS with bursting charge	0181	
ROCKETS with bursting charge	0182	
ROCKETS with bursting charge	0295	
ROCKETS with expelling charge	0437	
ROCKETS with expelling charge	0436	
ROCKETS with expelling charge	0438	
ROCKETS with inert head	0502	
ROCKETS with inert head	0183	
ROCKETS, LINE-THROWING	0238	
ROCKETS, LINE-THROWING	0240	
ROCKETS, LINE-THROWING	0453	
ROCKETS, LIQUID FUELLED with bursting charge	0397	
ROCKETS, LIQUID FUELLED with bursting charge	0398	
ROSIN OIL	1286	
RUBBER SCRAP, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45%	1345	
RUBBER SHODDY, powdered or granulated, not exceeding 840 microns and rubber content exceeding 45%	1345	
RUBBER SOLUTION	1287	
RUBIDIUM	1423	
RUBIDIUM HYDROXIDE	2678	
RUBIDIUM HYDROXIDE SOLUTION	2677	
SAFETY DEVICES, electrically initiated	3268	
SAFETY DEVICES, PYROTECHNIC	0503	
Samin: see FLAMMABLE LIQUID, TOXIC, N.O.S.	1992	
SAMPLES, EXPLOSIVE, other than initiating explosive	0190	
Seat-belt pretensioners: see SAFETY DEVICES, electrically initiated	3268	
Seat-belt pretensioners: see SAFETY DEVICES, PYROTECHNIC	0503	
SEED CAKE with more than 1.5% oil and not more than 11% moisture	1386	
SEED CAKE with not more than 1.5% oil and not more than 11% moisture	2217	
SELENATES	2630	
SELENIC ACID	1905	
SELENITES	2630	
SELENIUM COMPOUND, LIQUID, N.O.S.	3440	
SELENIUM COMPOUND, SOLID, N.O.S.	3283	
SELENIUM DISULPHIDE	2657	
SELENIUM HEXAFLUORIDE	2194	
SELENIUM OXYCHLORIDE	2879	
SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.	3188	
SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.	3185	
SELF-HEATING LIQUID, INORGANIC, N.O.S.	3186	
SELF-HEATING LIQUID, ORGANIC, N.O.S.	3183	
SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.	3187	
SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.	3184	
SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.	3192	
SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.	3126	
SELF-HEATING SOLID, INORGANIC, N.O.S.	3190	
SELF-HEATING SOLID, ORGANIC, N.O.S.	3088	
SELF-HEATING SOLID, ORGANIC, N.O.S.	3128	
SELF-HEATING SOLID, OXIDIZING, N.O.S.	3127	Prohibited
SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.	3191	
SELF-REACTIVE LIQUID TYPE B	3221	

SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED	3231	Prohibited
SELF-REACTIVE LIQUID TYPE C	3223	
SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED	3233	Prohibited
SELF-REACTIVE LIQUID TYPE D	3225	
SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED	3235	Prohibited
SELF-REACTIVE LIQUID TYPE E	3227	
SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED	3237	Prohibited
SELF-REACTIVE LIQUID TYPE F	3229	
SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED	3239	Prohibited
SELF-REACTIVE SOLID TYPE B	3222	
SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED	3232	Prohibited
SELF-REACTIVE SOLID TYPE C	3224	
SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED	3234	Prohibited
SELF-REACTIVE SOLID TYPE D	3226	
SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED	3236	Prohibited
SELF-REACTIVE SOLID TYPE E	3228	
SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED	3238	Prohibited
SELF-REACTIVE SOLID TYPE F	3230	
SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED	3240	Prohibited
SHALE OIL	1288	
Shellac: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	
Shellac: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	
Shellac: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	
Shellac: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	
SIGNAL DEVICES, HAND	0373	
SIGNAL DEVICES, HAND	0191	
SIGNALS, DISTRESS, ship	0195	
SIGNALS, DISTRESS, ship	0194	
SIGNALS, DISTRESS, ship	0505	
SIGNALS, DISTRESS, ship	0506	
SIGNALS, RAILWAY TRACK, EXPLOSIVE	0193	
SIGNALS, RAILWAY TRACK, EXPLOSIVE	0493	
SIGNALS, RAILWAY TRACK, EXPLOSIVE	0492	
SIGNALS, RAILWAY TRACK, EXPLOSIVE	0192	
SIGNALS, SMOKE	0196	
SIGNALS, SMOKE	0197	
SIGNALS, SMOKE	0487	
SIGNALS, SMOKE	0313	
SIGNALS, SMOKE	0507	
SILANE	2203	
SILICON POWDER, AMORPHOUS	1346	
SILICON TETRACHLORIDE	1818	
SILICON TETRAFLUORIDE	1859	
SILICON TETRAFLUORIDE, ADSORBED	3521	
SILVER ARSENITE	1683	
SILVER CYANIDE	1684	
SILVER NITRATE	1493	
SILVER PICRATE, WETTED with not less than 30% water, by mass	1347	
Slavsilane: see CORROSIVE LIQUID, TOXIC, N.O.S.	2922	
SLUDGE ACID	1906	
SODA LIME with more than 4% sodium hydroxide	1907	
SODIUM	1428	
SODIUM ALUMINATE SOLUTION	1819	
Sodium aluminate, solid	2812	Exempt from SMGS Annex 2

SODIUM ALUMINIUM HYDRIDE	2835	
SODIUM AMMONIUM VANADATE	2863	
SODIUM ARSANILATE	2473	
SODIUM ARSENATE	1685	
SODIUM ARSENITE, AQUEOUS SOLUTION	1686	
SODIUM ARSENITE, SOLID	2027	
SODIUM AZIDE	1687	
SODIUM BOROHYDRIDE	1426	
SODIUM BOROHYDRIDE AND SODIUM HYDROXIDE SOLUTION, with not more than 12% sodium borohydride and not more than 40% sodium hydroxide by mass	3320	
SODIUM BROMATE	1494	
SODIUM CACODYLATE	1688	
SODIUM CARBONATE PEROXYHYDRATE	3378	
SODIUM CHLORATE	1495	
SODIUM CHLORATE, AQUEOUS SOLUTION	2428	
SODIUM CHLORITE	1496	
SODIUM CHLOROACETATE	2659	
SODIUM CUPROCYANIDE SOLUTION	2317	
SODIUM CUPROCYANIDE, SOLID	2316	
SODIUM CYANIDE SOLUTION	3414	
SODIUM CYANIDE, SOLID	1689	
SODIUM DINITRO-o-CRESOLATE, dry or wetted with less than 15% water, by mass	0234	
SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 10% water, by mass	3369	
SODIUM DINITRO-o-CRESOLATE, WETTED with not less than 15% water, by mass	1348	
SODIUM DITHIONITE (SODIUM HYDROSULPHITE)	1384	
SODIUM FLUORIDE SOLUTION	3415	
SODIUM FLUORIDE, SOLID	1690	
SODIUM FLUOROACETATE	2629	
SODIUM FLUOROSILICATE	2674	
SODIUM HYDRIDE	1427	
SODIUM HYDROGENDIFLUORIDE	2439	
SODIUM HYDROSULPHIDE with less than 25% water of crystallization	2318	
SODIUM HYDROSULPHIDE, HYDRATED with not less than 25% water of crystallization	2949	
SODIUM HYDROXIDE SOLUTION	1824	
SODIUM ION BATTERIES CONTAINED IN EQUIPMENT, with organic electrolyte	3552	
SODIUM ION BATTERIES PACKED WITH EQUIPMENT, with organic electrolyte	3552	
SODIUM ION BATTERIES with organic electrolyte	3551	
SODIUM ION BATTERIES with organic electrolyte	3551	
SODIUM HYDROXIDE, SOLID	1823	
SODIUM METHYLATE	1431	
SODIUM METHYLATE SOLUTION in alcohol	1289	
SODIUM MONOXIDE	1825	
SODIUM NITRATE	1498	
SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	1499	
SODIUM NITRITE	1500	
SODIUM PENTACHLOROPHENATE	2567	
SODIUM PERBORATE MONOHYDRATE	3377	
SODIUM PERCHLORATE	1502	
SODIUM PERMANGANATE	1503	
SODIUM PEROXIDE	1504	
SODIUM PEROXOBORATE, ANHYDROUS	3247	
SODIUM PERSULPHATE	1505	
SODIUM PHOSPHIDE	1432	
SODIUM PICRAMATE, dry or wetted with less than 20% water, by mass	0235	
SODIUM PICRAMATE, WETTED with not less than 20% water, by mass	1349	
SODIUM SULPHIDE, ANHYDROUS	1385	
SODIUM SULPHIDE, HYDRATED with not less than 30% water	1385	
SODIUM SULPHIDE, HYDRATED with not less than 30% water	1849	

SODIUM SUPEROXIDE	2547	
SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.	3244	
SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S. having a flash-point up to 60 °C	3175	
SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S. having a flash-point up to 60 °C	3175	
SOLIDS CONTAINING TOXIC LIQUID, N.O.S.	3243	
SOUNDING DEVICES, EXPLOSIVE	0375	
SOUNDING DEVICES, EXPLOSIVE	0296	
SOUNDING DEVICES, EXPLOSIVE	0374	
SOUNDING DEVICES, EXPLOSIVE	0204	
Stain: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	
STANNIC CHLORIDE PENTAHYDRATE	2440	
STANNIC CHLORIDE, ANHYDROUS	1827	
STANNIC PHOSPHIDES	1433	
STIBINE	2676	
Straw	1327	Exempt from SMGS Annex 2
Straw	1327	Exempt from SMGS Annex 2
STRONTIUM ARSENITE	1691	
STRONTIUM CHLORATE	1506	
STRONTIUM NITRATE	1507	
STRONTIUM PERCHLORATE	1508	
STRONTIUM PEROXIDE	1509	
STRONTIUM PHOSPHIDE	2013	
STRYCHNINE	1692	
STRYCHNINE SALTS	1692	
STYRENE MONOMER, STABILIZED	2055	
SUBSTANCES, EXPLOSIVE, N.O.S.	0357	
SUBSTANCES, EXPLOSIVE, N.O.S.	0479	
SUBSTANCES, EXPLOSIVE, N.O.S.	0473	Prohibited
SUBSTANCES, EXPLOSIVE, N.O.S.	0478	
SUBSTANCES, EXPLOSIVE, N.O.S.	0480	
SUBSTANCES, EXPLOSIVE, N.O.S.	0485	
SUBSTANCES, EXPLOSIVE, N.O.S.	0359	
SUBSTANCES, EXPLOSIVE, N.O.S.	0481	
SUBSTANCES, EXPLOSIVE, N.O.S.	0477	
SUBSTANCES, EXPLOSIVE, N.O.S.	0358	
SUBSTANCES, EXPLOSIVE, N.O.S.	0476	
SUBSTANCES, EXPLOSIVE, N.O.S.	0475	
SUBSTANCES, EXPLOSIVE, N.O.S.	0474	
SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE, N.O.S.	0482	
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2780	
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC	3014	
SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3013	
SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC	2779	
SULPHAMIC ACID	2967	
SULPHUR	1350	
SULPHUR CHLORIDES	1828	
SULPHUR DIOXIDE	1079	
SULPHUR HEXAFLUORIDE	1080	
SULPHUR TETRAFLUORIDE	2418	
SULPHUR TRIOXIDE, STABILIZED	1829	
SULPHUR, MOLTEN	2448	
SULPHURIC ACID with more than 51% acid	1830	
SULPHURIC ACID with not more than 51% acid	2796	
SULPHURIC ACID, FUMING	1831	
SULPHURIC ACID, SPENT	1832	

SULPHUROUS ACID	1833	
SULPHURYL CHLORIDE	1834	
SULPHURYL FLUORIDE	2191	
Synthin: see FLAMMABLE LIQUID, TOXIC, N.O.S.	1992	
TARS, LIQUID, including road oils, and cutback bitumens	1999	
Tars, liquid, including road oils, and cutback bitumens, at or above 100 °C and below its flash-point: see ELEVATED TEMPERATURE LIQUID, N.O.S.	3257	
Tars, liquid, including road oils, and cutback bitumens, with a flash-point above 60 °C, at or above its flash- point: see ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S.	3256	
TEAR GAS CANDLES	1700	
TEAR GAS SUBSTANCE, LIQUID, N.O.S.	1693	
TEAR GAS SUBSTANCE, SOLID, N.O.S.	3448	
TELLURIUM COMPOUND, N.O.S.	3284	
TELLURIUM HEXAFLUORIDE	2195	
TERPENE HYDROCARBONS, N.O.S.	2319	
TERPINOLENE	2541	
Tert butyl benzoyl peroxide solution, with not more than 77%, see ORGANIC PEROXIDE TYPE B, LIQUID	3101	
tert-BUTYL HYPOCHLORITE	3255	Prohibited
tert-BUTYL ISOCYANATE	2484	
tert-BUTYLCYCLOHEXYL CHLOROFORMATE	2747	
Tertiary butyl hydroperoxide: see ORGANIC PEROXIDE TYPE C, LIQUID	3103	
TETRABROMOETHANE	2504	
TETRACHLOROETHANE	1702	
TETRACHLOROETHYLENE	1897	
TETRAETHYL DITHIOPYROPHOSPHATE	1704	
TETRAETHYL SILICATE	1292	
TETRAETHYLENEPENTAMINE	2320	
TETRAFLUOROETHYLENE, STABILIZED	1081	
TETRAFLUOROMETHANE, COMPRESSED (REFRIGERANT GAS R 14)	1982	
TETRAHYDROFURAN	2056	
TETRAHYDROFURFURYLAMINE	2943	
TETRAHYDROPHthalic ANHYDRIDES with more than 0.05% of maleic anhydride	2698	
TETRAHYDROTHIOPHENE	2412	
TETRAMETHYLAMMONIUM HYDROXIDE, SOLID	3423	
TETRAMETHYLAMMONIUM HYDROXIDE AQUEOUS SOLUTION	1835	
TETRAMETHYLAMMONIUM HYDROXIDE SOLUTION with not less than 25% tetramethylammonium	3560	
TETRAMETHYLSILANE	2749	
TETRANITROANILINE	0207	
TETRANITROMETHANE	1510	
TETRAPROPYL ORTHOTITANATE	2413	
TETRAZOL-1-ACETIC ACID	0407	
Textile waste, wet	1857	Exempt from SMGS Annex 2
THALLIUM CHLORATE	2573	
THALLIUM COMPOUND, N.O.S.	1707	
THALLIUM NITRATE	2727	
THIOACETIC ACID	2436	
THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2772	
THIOCARBAMATE PESTICIDE, LIQUID, TOXIC	3006	
THIOCARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	3005	
THIOCARBAMATE PESTICIDE, SOLID, TOXIC	2771	
THIOGLYCOL	2966	
THIOGLYCOLIC ACID	1940	
THIOLACTIC ACID	2936	
THIONYL CHLORIDE	1836	
THIOPHENE	2414	

THIOPHOSGENE	2474	
THIOPHOSPHORYL CHLORIDE	1837	
THIOUREA DIOXIDE	3341	
TINCTURES, MEDICINAL	1293	
TITANIUM DISULPHIDE	3174	
TITANIUM HYDRIDE	1871	
TITANIUM POWDER, DRY	2546	
TITANIUM POWDER, WETTED with not less than 25% water	1352	
TITANIUM SPONGE GRANULES	2878	
TITANIUM SPONGE POWDERS	2878	
TITANIUM TETRACHLORIDE	1838	
TITANIUM TRICHLORIDE MIXTURE	2869	
TITANIUM TRICHLORIDE MIXTURE, PYROPHORIC	2441	
TITANIUM TRICHLORIDE MIXTURE, PYROPHORIC	2441	
TOLUENE	1294	
TOLUENE DIISOCYANATE	2078	
TOLUIDINES, LIQUID	1708	
TOLUIDINES, SOLID	3451	
TORPEDOES with bursting charge	0329	
TORPEDOES with bursting charge	0451	
TORPEDOES with bursting charge	0330	
TORPEDOES, LIQUID FUELLED with inert head	0450	
TORPEDOES, LIQUID FUELLED with or without bursting charge	0449	
TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC ₅₀	3390	
TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC ₅₀	3389	
TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC ₅₀	3488	
TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC ₅₀	3489	
TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC ₅₀	3383	
TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC ₅₀	3384	
TOXIC BY INHALATION LIQUID, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC ₅₀	3381	
TOXIC BY INHALATION LIQUID, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC ₅₀	3382	
TOXIC BY INHALATION LIQUID, OXYDIZING, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC ₅₀	3387	
TOXIC BY INHALATION LIQUID, OXYDIZING, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC ₅₀	3388	
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC ₅₀	3490	
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 1 000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC ₅₀	3491	
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m3 and saturated vapour concentration greater than or equal to 10 LC ₅₀	3386	
TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m3 and saturated vapour concentration greater than or equal to 500 LC ₅₀	3385	
TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.	3289	
TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.	2927	
TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.	2929	
TOXIC LIQUID, INORGANIC, N.O.S.	3287	
TOXIC LIQUID, ORGANIC, N.O.S.	2810	
TOXIC LIQUID, OXIDIZING, N.O.S.	3122	

TOXIC LIQUID, WATER-REACTIVE, N.O.S.	3123	
TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.	3290	
TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.	2928	
TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.	2930	
TOXIC SOLID, INORGANIC, N.O.S.	3288	
TOXIC SOLID, ORGANIC, N.O.S.	2811	
TOXIC SOLID, OXIDIZING, N.O.S.	3086	
TOXIC SOLID, SELF-HEATING, N.O.S.	3124	
TOXIC SOLID, WATER-REACTIVE, N.O.S.	3125	
TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S.	3172	
TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.	3462	
TRACERS FOR AMMUNITION	0212	
TRACERS FOR AMMUNITION	0306	
trans-2-Butylene, see: BUTYLENE	1012	
Tremolite: see ASBESTOS, AMPHIBOLE	2212	
TRIALLYL BORATE	2609	
TRIALLYLAMINE	2610	
TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC, flash-point less than 23 °C	2764	
TRIAZINE PESTICIDE, LIQUID, TOXIC	2998	
TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE, flash-point not less than 23 °C	2997	
TRIAZINE PESTICIDE, SOLID, TOXIC	2763	
TRIBUTYLAMINE	2542	
TRIBUTYLPHOSPHANE	3254	
TRICHLOROACETIC ACID	1839	
TRICHLOROACETIC ACID SOLUTION	2564	
TRICHLOROACETYL CHLORIDE	2442	
TRICHLOROBENZENES, LIQUID	2321	
TRICHLOROBUTENE	2322	
TRICHLOROETHYLENE	1710	
TRICHLOROISOCYANURIC ACID, DRY	2468	
TRICHLOROSILANE	1295	
TRICRESYL PHOSPHATE with more than 3% ortho isomer	2574	
TRIETHYL PHOSPHITE	2323	
TRIETHYLAMINE	1296	
Triethylchlorosilane: see CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	2985	
TRIETHYLENETETRAMINE	2259	
TRIFLUOROACETIC ACID	2699	
TRIFLUOROACETYL CHLORIDE	3057	
TRIFLUOROCHLOROETHYLENE, STABILIZED	1082	
TRIFLUOROMETHANE (REFRIGERANT GAS R 23)	1984	
TRIFLUOROMETHANE, REFRIGERATED LIQUID	3136	
TRIFLUOROMETHYL TETRAZOLE-SODIUM SALT IN ACETONE, with not less than 68% acetone, by mass	3555	
TRIISOBUTYLENE	2324	
TRIISOPROPYL BORATE	2616	
TRIMETHYL BORATE	2416	
TRIMETHYL PHOSPHITE	2329	
TRIMETHYLACETYL CHLORIDE	2438	
TRIMETHYLAMINE, ANHYDROUS	1083	
TRIMETHYLAMINE, AQUEOUS SOLUTION, not more than 50% trimethylamine, by mass	1297	
TRIMETHYLCHLOROSILANE	1298	
TRIMETHYLCYCLO-HEXYLAMINE	2326	
TRIMETHYLHEXAMETHYLENE DIISOCYANATE	2328	
TRIMETHYLHEXAMETHYLENEDIAMINES	2327	
TRINITROANILINE (PICRAMIDE)	0153	
TRINITROANISOLE	0213	
TRINITROBENZENE, dry or wetted with less than 30% water, by mass	0214	
TRINITROBENZENE, WETTED with not less than 10% water, by mass	3367	

TRINITROBENZENE, WETTED with not less than 30% water, by mass	1354	
TRINITROBENZENESULPHONIC ACID	0386	
TRINITROBENZOIC ACID, dry or wetted with less than 30% water, by mass	0215	
TRINITROBENZOIC ACID, WETTED with not less than 10% water, by mass	3368	
TRINITROBENZOIC ACID, WETTED with not less than 30% water, by mass	1355	
TRINITROCHLOROBEZENE (PICRYL CHLORIDE)	0155	
TRINITROCHLOROBEZENE (PICRYL CHLORIDE) WETTED with not less than 10% water, by mass	3365	
TRINITROFLUORENONE	0387	
TRINITRO-m-CRESOL	0216	
TRINITRONAPHTHALENE	0217	
TRINITROPHENETOLE	0218	
TRINITROPHENOL (PICRIC ACID), dry or wetted with less than 30% water, by mass	0154	
TRINITROPHENOL (PICRIC ACID), WETTED with not less than 10% water, by mass	3364	
TRINITROPHENOL (PICRIC ACID), WETTED with not less than 30% water, by mass	1344	
TRINITROPHENYLMETHYLNITRAMINE (TETRYL)	0208	
TRINITRORESORCINOL (STYPHNIC ACID), dry or wetted with less than 20% water, or mixture of alcohol and water, by mass	0219	
TRINITRORESORCINOL (STYPHNIC ACID), WETTED with not less than 20% water, or mixture of alcohol and water, by mass	0394	
TRINITROTOLUENE (TNT) AND HEXANITROSTILBENE MIXTURE	0388	
TRINITROTOLUENE (TNT) AND TRINITROBENZENE MIXTURE	0388	
TRINITROTOLUENE (TNT) MIXTURE CONTAINING TRINITROBENZENE AND HEXANITROSTILBENE	0389	
TRINITROTOLUENE (TNT), dry or wetted with less than 30% water, by mass	0209	
TRINITROTOLUENE (TNT), WETTED with not less than 10% water, by mass	3366	
TRINITROTOLUENE (TNT), WETTED with not less than 30% water, by mass	1356	
Triphenylchlorosilane: see CORROSIVE SOLID, TOXIC, N.O.S.	2923	
TRIPROPYLAMINE	2260	
TRIPROPYLENE	2057	
TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE SOLUTION	2501	
TRITONAL	0390	
TUNGSTEN HEXAFLUORIDE	2196	
TURPENTINE	1299	
TURPENTINE SUBSTITUTE	1300	
UNDECANE	2330	
Unsymmetrical dimethylhydrazine (heptyl): see FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.	3286	
URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, less than 0.1 kg per package, non-fissile or fissile-excepted	3507	
UREA HYDROGEN PEROXIDE	1511	
UREA NITRATE, dry or wetted with less than 20% water, by mass	0220	
UREA NITRATE, WETTED with not less than 10% water, by mass	3370	
UREA NITRATE, WETTED with not less than 20% water, by mass	1357	
VALERALDEHYDE	2058	
VALERYL CHLORIDE	2502	
VANADIUM COMPOUND, N.O.S.	3285	
VANADIUM OXYTRICHLORIDE	2443	
VANADIUM PENTOXIDE, non-fused form	2862	
VANADIUM TETRACHLORIDE	2444	
VANADIUM TRICHLORIDE	2475	
VANADYL SULPHATE	2931	
Varnish: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	1263	
Varnish: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3066	
Varnish: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	
Varnish: see PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	
VEHICLE, FLAMMABLE GAS POWERED	3166	

VEHICLE, FLAMMABLE LIQUID POWERED	3166	
VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED	3166	
VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED	3166	
VEHICLE, LITHIUM ION BATTERY POWERED	3556	
VEHICLE, LITHIUM METAL BATTERY POWERED	3557	
VEHICLE, SODIUM ION BATTERY POWERED	3558	
Vehicle undercoating: see	1139	
VINYL ACETATE, STABILIZED	1301	
VINYL BROMIDE, STABILIZED	1085	
VINYL BUTYRATE, STABILIZED	2838	
VINYL CHLORIDE, STABILIZED	1086	
VINYL CHLOROACETATE	2589	
VINYL ETHYL ETHER, STABILIZED	1302	
VINYL FLUORIDE, STABILIZED	1860	
VINYL ISOBUTYL ETHER, STABILIZED	1304	
VINYL METHYL ETHER, STABILIZED	1087	
VINYLDENE CHLORIDE, STABILIZED	1303	
VINYLPYRIDINES, STABILIZED	3073	
VINYLTOLUENES, STABILIZED	2618	
VINYLTRICHLOROSILANE	1305	
WARHEADS, ROCKET with burster or expelling charge	0371	
WARHEADS, ROCKET with burster or expelling charge	0370	
WARHEADS, ROCKET with bursting charge	0369	
WARHEADS, ROCKET with bursting charge	0286	
WARHEADS, ROCKET with bursting charge	0287	
WARHEADS, TORPEDO with bursting charge	0221	
Wastes containing flammable liquid, n.o.s. having a flash-point up to 60 °C: see SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S.	3175	
WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	3129	
WATER-REACTIVE LIQUID, N.O.S.	3148	
WATER-REACTIVE LIQUID, TOXIC, N.O.S.	3130	
WATER-REACTIVE SOLID, CORROSIVE, N.O.S.	3131	
WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.	3132	
WATER-REACTIVE SOLID, N.O.S.	2813	
WATER-REACTIVE SOLID, OXIDIZING, N.O.S.	3133	Prohibited
WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.	3135	
WATER-REACTIVE SOLID, TOXIC, N.O.S.	3134	
WOOD PRESERVATIVES, LIQUID	1306	
Wool waste, wet	1387	Exempt from SMGS Annex 2
XANTHATES	3342	
XENON	2036	
XENON, REFRIGERATED LIQUID	2591	
XYLENES	1307	
XYLENOLS, LIQUID	3430	
XYLENOLS, SOLID	2261	
XYLIDINES, LIQUID	1711	
XYLIDINES, SOLID	3452	
XYLYL BROMIDE, SOLID	3417	
XYLYL BROMIDE, SOLID	1701	
ZINC AMMONIUM NITRITE	1512	
ZINC ARSENATE	1712	
ZINC ARSENATE AND ZINC ARSENITE MIXTURE	1712	
ZINC ARSENITE	1712	
ZINC ASHES	1435	
ZINC BROMATE	2469	
ZINC CHLORATE	1513	
ZINC CHLORIDE SOLUTION	1840	
ZINC CHLORIDE, ANHYDROUS	2331	

ZINC CYANIDE	1713	
ZINC DITHIONITE (ZINC HYDROSULPHITE)	1931	
ZINC DUST	1436	
ZINC FLUOROSILICATE	2855	
ZINC NITRATE	1514	
ZINC PERMANGANATE	1515	
ZINC PEROXIDE	1516	
ZINC PHOSPHIDE	1714	
ZINC POWDER	1436	
ZINC RESINATE	2714	
ZIRCONIUM HYDRIDE	1437	
ZIRCONIUM NITRATE	2728	
ZIRCONIUM PICRAMATE, dry or wetted with less than 20% water, by mass	0236	
ZIRCONIUM PICRAMATE, WETTED with not less than 20% water, by mass	1517	
ZIRCONIUM POWDER, DRY	2008	
ZIRCONIUM POWDER, WETTED with not less than 25% water	1358	
ZIRCONIUM SCRAP	1932	
ZIRCONIUM SUSPENDED IN A FLAMMABLE LIQUID	1308	
ZIRCONIUM TETRACHLORIDE	2503	
ZIRCONIUM, DRY, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)	2858	
ZIRCONIUM, DRY, finished sheets, strip or coiled wire	2009	

CHAPTER 3.3

Special provisions applicable to certain articles or substances

- 3.3.1** When Column (6) of Table A of Chapter 3.2 indicates that a special provision is relevant to a substance or article, the meaning and requirements of that special provision are as set forth below. Where a special provision includes a requirement for package marking, the provisions of 5.2.1.2 (a) and (b) shall be met. If the required mark is in the form of specific wording indicated in quotation marks, such as "LITHIUM BATTERIES FOR DISPOSAL", the size of the mark shall be at least 12 mm, unless otherwise indicated in the special provision or elsewhere in Annex 2 to SMGS.
- 16** Samples of new or existing explosive substances or articles may be carried as directed by the competent authorities (see 2.2.1.1.3) for purposes including: testing, classification, research and development, quality control, or as a commercial sample. Explosive samples which are not wetted or desensitized shall be limited to 10 kg in small packages as specified by the competent authorities. Explosive samples which are wetted or desensitized shall be limited to 25 kg.
- 23** Even though this substance has a flammability hazard, it only exhibits such hazard under extreme fire conditions in confined areas.
- 28** This substance may be carried under the provisions of Class 3 or Class 4.1 only if it is so packed that the percentage of diluent will not fall below that stated, at any time during carriage (see 2.2.3.1.1 and 2.2.41.1.18). In cases where the diluent is not stated, the substance shall be packed so that the amount of explosive substance does not exceed the stated value.
- 32** This substance is not subject to the requirements of Annex 2 to SMGS when in any other form.
- 37** This substance is not subject to the requirements of Annex 2 to SMGS when coated.
- 38** This substance is not subject to the requirements of Annex 2 to SMGS when it contains not more than 0.1% calcium carbide.
- 39** This substance is not subject to the requirements of Annex 2 to SMGS when it contains less than 30% or not less than 90% silicon.
- 43** When offered for carriage as pesticides, these substances shall be carried under the relevant pesticide entry and in accordance with the relevant pesticide provisions (see 2.2.61.1.10 to 2.2.61.1.11.2).
- 45** Antimony sulphides and oxides which contain not more than 0.5% of arsenic calculated on the total mass are not subject to the requirements of Annex 2 to SMGS.
- 47** Ferricyanides and ferrocyanides are not subject to the requirements of Annex 2 to SMGS.
- 48** The carriage of this substance, when it contains more than 20% hydrocyanic acid, is prohibited.
- 59** These substances are not subject to the requirements of Annex 2 to SMGS when they contain not more than 50% magnesium.
- 60** If the concentration is more than 72%, the carriage of this substance is prohibited.
- 61** The technical name which shall supplement the proper shipping name shall be the ISO common name (see also ISO 1750:1981 "Pesticides and other agrochemicals - common names", as amended), other name listed in the WHO "Recommended Classification of Pesticides by Hazard and Guidelines to Classification" or the name of the active substance (see also 3.1.2.8.1 and 3.1.2.8.1.1).
- 62** This substance is not subject to the requirements of Annex 2 to SMGS when it contains not more than 4% sodium hydroxide.

- 65** Hydrogen peroxide aqueous solutions with less than 8% hydrogen peroxide are not subject to the requirements of Annex 2 to SMGS.
- 66** Cinnabar is not subject to the requirements of Annex 2 to SMGS.
- 103** The carriage of ammonium nitrites and mixtures of an inorganic nitrite with ammonium salt is prohibited.
- 105** Nitrocellulose meeting the descriptions of UN No. 2556 or UN No. 2557 may be classified in Class 4.1.
- 113** The carriage of chemically unstable mixtures is prohibited.
- 119** Refrigerating machines include machines or other appliances which have been designed for the specific purpose of keeping food or other items at a low temperature in an internal compartment, and air conditioning units. Refrigerating machines and refrigerating machine components are not subject to the provisions of Annex 2 to SMGS if they contain less than 12 kg of gas in Class 2, group A or O according to 2.2.2.1.3, or if they contain less than 12 litres ammonia solution (UN No. 2672).
- Note:** For the purposes of carriage, heat pumps may be considered as refrigerating machines.
- 122** The subsidiary risks and the UN number (generic entry) for each of the currently assigned organic peroxide formulations are given in 2.2.52.4, 4.1.4.2 packing instruction IBC 520 and 4.2.5.2.6 portable tank instruction T 23.
- 123** (reserved)
- 127** Other inert material or inert material mixture may be used, provided this inert material has identical phlegmatizing properties.
- 131** The phlegmatized substance shall be significantly less sensitive than dry PETN.
- 135** The dihydrated sodium salt of dichloroisocyanuric acid does not meet the criteria for inclusion in Class 5.1 and is not subject to Annex 2 to SMGS unless meeting the criteria for inclusion in another Class.
- 138** p-Bromobenzyl cyanide is not subject to the requirements of Annex 2 to SMGS.
- 141** Products which have undergone sufficient heat treatment so that they present no hazard during carriage are not subject to the requirements of Annex 2 to SMGS.
- 142** Solvent extracted soya bean meal containing not more than 1.5% oil and 11% moisture, which is substantially free of flammable solvent, is not subject to the requirements of Annex 2 to SMGS.
- 144** An aqueous solution containing not more than 24% alcohol by volume is not subject to the requirements of Annex 2 to SMGS.
- 145** Alcoholic beverages of packing group III, when carried in receptacles of 250 litres or less, are not subject to the requirements of Annex 2 to SMGS.
- 152** The classification of this substance will vary with particle size and packaging, but borderlines have not been experimentally determined. Appropriate classifications shall be made in accordance with 2.2.1.
- 153** This entry applies only if it is demonstrated, on the basis of tests, that the substances when in contact with water are not combustible nor show a tendency to auto-ignition and that the mixture of gases evolved is not flammable.
- 162** (reserved)
- 163** A substance mentioned by name in Table A of Chapter 3.2 shall not be carried under this entry. Substances carried under this entry may contain 20% or less nitrocellulose provided the nitrocellulose contains not more than 12.6% nitrogen (by dry mass).
- 168** Asbestos which is immersed or fixed in a natural or artificial binder (such as cement, plastics, asphalt, resins or mineral ore) in such a way that no escape of

hazardous quantities of respirable asbestos fibres can occur during carriage is not subject to the requirements of Annex 2 to SMGS. Manufactured articles containing asbestos and not meeting this provision are nevertheless not subject to the requirements of Annex 2 to SMGS when packed so that no escape of hazardous quantities of respirable asbestos fibres can occur during carriage.

- 169** Phthalic anhydride in the solid state and tetrahydrophthalic anhydrides, with not more than 0.05% maleic anhydride, are not subject to the requirements of Annex 2 to SMGS. Phthalic anhydride molten at a temperature above its flash-point, with not more than 0.05% maleic anhydride, shall be classified under UN No. 3256.

- 172** Where a radioactive material has (a) subsidiary risk(s):
- a) The substance shall be allocated to packing group I, II or III, if appropriate, by application of the packing group criteria provided in Part 2 corresponding to the nature of the predominant subsidiary risk;
 - b) Packages shall be labelled with subsidiary hazard labels corresponding to each subsidiary hazard exhibited by the material; corresponding placards shall be affixed to cargo transport units in accordance with the relevant provisions of 5.3.1;
 - c) For the purposes of documentation and package marking, the proper shipping name shall be supplemented with the name of the constituents which most predominantly contribute to this (these) subsidiary risk(s) and which shall be enclosed in parenthesis;
 - d) The dangerous goods transport document shall indicate the label model number(s) corresponding to each subsidiary risk in parenthesis after the Class number "7" and, where assigned the packing group as required by 5.4.1.1.1 (d).

For packing, see also 4.1.9.1.5.

- 177** Barium sulphate is not subject to the requirements of Annex 2 to SMGS.
- 178** This designation shall be used only when no other appropriate designation exists in Table A of Chapter 3.2, and only with the approval of the competent authority of the country of origin (see 2.2.1.1.3).

- 181** Packages containing this type of substance shall bear a label conforming to model No. 1 (see 5.2.2.2.2) unless the competent authority of the country of origin has permitted this label to be dispensed with for the specific packaging employed because test data have proved that the substance in this packaging does not exhibit explosive behaviour (see 5.2.2.1.9).

- 182** The group of alkali metals includes lithium, sodium, potassium, rubidium and cesium.

- 183** The group of alkaline earth metals includes magnesium, calcium, strontium and barium.

- 186** (reserved)

- 188** Cells and batteries offered for carriage are not subject to other provisions of RID if they meet the following:

- a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium-ion or sodium ion cell, the Watt-hour rating is not more than 20 Wh;

Note: When lithium batteries in conformity with 2.2.9.1.7.1 (f) are carried in accordance with this special provision, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh. (see special provision 387).

- b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium-ion or sodium ion battery, the Watt-hour rating is not more than 100 Wh. Lithium ion and sodium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case, except lithium ion batteries manufactured before 1 January 2009;

Note: When lithium batteries in conformity with 2.2.9.1.7.1 (f) are carried in accordance with this special provision, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh. (see special provision 387).

c) Each lithium cell or battery meets the provisions of 2.2.9.1.7.1 (a), (e), (f) if applicable and (g) or for those sodium ion cells or batteries, the provisions of 2.2.9.1.7.2 (a), (e) and (f) shall apply;

d) Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit. The inner packagings shall be packed in strong outer packagings which conform to the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.5;

e) Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. This requirement does not apply to devices which are intentionally active in carriage (radio frequency identification (RFID) transmitters, watches, sensors, etc.) and which are not capable of generating a dangerous evolution of heat. When batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;

f) Each package shall be marked with the appropriate battery mark, as illustrated in 5.2.1.9. This requirement does not apply to:

1) packages containing only button cell batteries installed in equipment (including circuit boards);

2) packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.

When packages are placed in an overpack, the battery mark shall either be clearly visible or be reproduced on the outside of the overpack and the overpack shall be marked with the word "OVERPACK". The lettering of the "OVERPACK" mark shall be at least 12 mm high.

Note: Packages containing lithium batteries packed in conformity with the provisions of Part 4, Chapter 11, packing instructions 965 or 968, Section IB of the ICAO Technical Instructions that bear the mark as shown in 5.2.1.9 (battery mark) and the label shown in 5.2.2.2, model No. 9A shall be deemed to meet the provisions of this special provision.

g) Except when cells or batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents;

h) Except when cells or batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass. 3.3-4.

As used above and elsewhere in Annex 2 SMGS, "lithium content" means the mass of lithium in the anode of a lithium metal or lithium alloy cell. As used in this special provision "equipment" means apparatus for which the cells or batteries will provide electrical power for its operation.

Separate UN numbers exist for lithium metal batteries and lithium ion batteries to facilitate the carriage of these batteries for specific modes of carriage and to enable the application of different emergency response actions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the Manual of Tests and Criteria is considered a "cell" and shall be carried according to the requirements for "cells" for the purpose of this special provision.

- 190** Aerosol dispensers shall be provided with protection against inadvertent discharge. Aerosols with a capacity not exceeding 50 ml containing only non-toxic constituents are not subject to the requirements of Annex 2 to SMGS.
- 191** Receptacles, small, with a capacity not exceeding 50 ml, containing only non-toxic constituents are not subject to the requirements of Annex 2 to SMGS.
- 193** This entry may only be used for ammonium nitrate based compound fertilizers. They shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39. Fertilizers meeting the criteria for this UN number are not subject to the requirements of Annex 2 to SMGS.
- 194** The UN number (generic entry) for each of the currently assigned self-reactive substances is given in 2.2.41.4.
- 196** Formulations which in laboratory testing neither detonate in the cavitated state nor deflagrate, which show no effect when heated under confinement and which exhibit no explosive power may be carried under this entry. The formulation must also be thermally stable (i.e. the SADT is 60 °C or higher for a 50 kg package). Formulations not meeting these criteria shall be carried under the provisions of Class 5.2, (see 2.2.52.4).
- 198** Nitrocellulose solutions containing not more than 20% nitrocellulose may be carried as paint, perfumery products or printing ink, as applicable (see UN Nos. 1210, 1263, 1266, 3066, 3469 and 3470).
- 199** Lead compounds which, when mixed in a ratio of 1:1000 with 0.07M hydrochloric acid and stirred for one hour at a temperature of 23 °C ± 2 °C, exhibit a solubility of 5% or less (see ISO 3711:1990 "*Lead chromate pigments and lead chromate – molybdate pigments – Specifications and methods of test*") are considered insoluble and are not subject to the requirements of Annex 2 to SMGS unless they meet the criteria for inclusion in another class.
- 201** Lighters and lighter refills shall comply with the provisions of the country in which they were filled. They shall be provided with protection against inadvertent discharge. The liquid portion of the gas shall not exceed 85% of the capacity of the receptacle at 15 °C. The receptacles, including the closures, shall be capable of withstanding an internal pressure of twice the pressure of the liquefied petroleum gas at 55 °C. The valve mechanisms and ignition devices shall be securely sealed, taped or otherwise fastened or designed to prevent operation or leakage of the contents during carriage. Lighters shall not contain more than 10 g of liquefied petroleum gas. Lighter refills shall not contain more than 65 g of liquefied petroleum gas.

Note: For waste lighters collected separately see Chapter 3.3, special provision 654.

- 203** This entry shall not be used for polychlorinated biphenyls, liquid, UN No. 2315 and polychlorinated biphenyls, solid, UN No. 3432.
- 204** (reserved)
- 205** This entry shall not be used for UN No. 3155 PENTACHLOROPHENOL
- 207** Plastics moulding compounds may be made from polystyrene, poly(methyl methacrylate) or other polymeric material.
- 208** The commercial grade of calcium nitrate fertilizer, when consisting mainly of a double salt (calcium nitrate and ammonium nitrate) containing not more than 10% ammonium nitrate and at least 12% water of crystallization, is not subject to the requirements of Annex 2 to SMGS.
- 210** Toxins from plant, animal or bacterial sources which contain infectious substances, or toxins that are contained in infectious substances, shall be classified in Class 6.2.
- 215** This entry only applies to the technically pure substance or to formulations derived from it having an SADT higher than 75 °C and therefore does not apply to formulations which are self-reactive substances (for self-reactive substances,

see 2.2.41.4). Homogeneous mixtures containing not more than 35% by mass of azodicarbonamide and at least 65% of inert substance are not subject to the requirements of Annex 2 to SMGS unless criteria of other classes are met.

- 216** Mixtures of solids which are not subject to the requirements of Annex 2 to SMGS and flammable liquids may be carried under this entry without first applying the classification criteria of Class 4.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging cargo transport unit is closed. Sealed packets and articles containing less than 10 ml of a packing group II or III flammable liquid absorbed into a solid material are not subject to Annex 2 to SMGS provided there is no free liquid in the packet or article.
- 217** Mixtures of solids which are not subject to the requirements of Annex 2 to SMGS and toxic liquids may be carried under this entry without first applying the classification criteria of Class 6.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. This entry shall not be used for solids containing a packing group I liquid.
- 218** Mixtures of solids which are not subject to the requirements of Annex 2 to SMGS and corrosive liquids may be carried under this entry without first applying the classification criteria of Class 8, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging, wagon or container is closed.
- 219** Genetically modified microorganisms (GMMOs) and genetically modified organisms (GMOs) packed and marked in accordance with packing instruction P 904 of 4.1.4.1 are not subject to any other requirements of Annex 2 to SMGS.

If GMMOs or GMOs meet the criteria for inclusion in Class 6.1 or 6.2 (see 2.2.61.1 and 2.2.62.1) the requirements in Annex 2 to SMGS for the carriage of toxic substances or infectious substances apply.

- 220** Only the technical name of the flammable liquid component of this solution or mixture shall be shown in parentheses immediately following the proper shipping name.
- 221** Substances included under this entry shall not be of packing group I.
- 223** If the physicochemical properties of a substance complying with this description are such that, according to the test results, the substance does not meet the classification criteria, then the substance is not subject to Annex 2 to SMGS.

For example: ferrosilicon with a particle size of more than 3.2 mm is not subject to Annex 2 to SMGS.

- 224** Unless it can be demonstrated by testing that the sensitivity of the substance in its frozen state is no greater than in its liquid state, the substance shall remain liquid during normal transport conditions.
- 225** Fire extinguishers under this entry may include installed actuating cartridges (cartridges, power device of classification code 1.4C or 1.4S), without changing the classification of Class 2, group A or O according to 2.2.2.1.3 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per extinguishing unit.

Fire extinguishers shall be manufactured, tested, approved and labelled according to the provisions applied in the country of manufacture.

Note: "Provisions applied in the country of manufacture" means the provisions applicable in the country of manufacture or those applicable in the country of use.

Fire extinguishers under this entry include:

- a) portable fire extinguishers for manual handling and operation;

Note: This entry applies to portable fire extinguishers, even if some components that are necessary for their proper functioning (e.g. hoses and nozzles) are

temporarily detached, as long as the safety of the pressurized extinguishing agent containers is not compromised and the fire extinguishers continue to be identified as a portable fire extinguisher.

- b) fire extinguishers for installation in aircraft;
- c) fire extinguishers mounted on wheels for manual handling;
- d) fire extinguishing equipment or machinery mounted on wheels or wheeled platforms or units carried similar to small trailers, and
- e) fire extinguishers composed of a non-rollable pressure drum and equipment, and handled e.g. by fork lift or crane when loaded or unloaded.

Note: *Pressure receptacles which contain gases for use in the above-mentioned fire extinguishers or for use in stationary fire-fighting installations shall meet the requirements of Chapter 6.2 and all requirements applicable to the relevant dangerous gas when these pressure receptacles are carried separately.*

- 226 Formulations of this substance containing not less than 30% non-volatile, non-flammable phlegmatizer are not subject to the requirements of Annex 2 to SMGS.
- 227 When phlegmatized with water and inorganic inert material the content of urea nitrate may not exceed 75% by mass and the mixture shall not be capable of being detonated by the Series 1, type (a), test in the *Manual of Tests and Criteria, Part I*.
- 228 Mixtures not meeting the criteria for flammable gases (see 2.2.2.1.5) shall be carried under UN No. 3163.
- 230 Lithium cells and batteries may be carried under this entry if they meet the provisions of 2.2.9.1.7.1. Sodium ion cells and batteries may be carried under this entry if they meet the provisions of 2.2.9.1.7.2.
- 235 This entry applies to articles which contain Class 1 explosive substances and which may also contain dangerous goods of other classes. These articles are used to enhance safety in vehicles, vessels or aircraft – e.g. air bag inflators, air bag modules, seat-belt pretensioners, and pyromechanical devices.
- 236 Polyester resin kits consist of two components: a base material (either Class 3 or Class 4.1, packing group II or III) and an activator (organic peroxide). The organic peroxide shall be type D, E, or F, not requiring temperature control. The packing group shall be II or III, according to the criteria of either Class 3 or Class 4.1, as appropriate, applied to the base material. The quantity limit shown in column (7a) of Table A of Chapter 3.2 applies to the base material.
- 237 The membrane filters, including paper separators, coating or backing materials, etc., that are present in carriage, shall not be liable to propagate a detonation as tested by one of the tests described in the *Manual of Tests and Criteria, Part I*, Test series 1 (a).

In addition, the competent authority may determine, on the basis of the results of suitable burning rate tests taking account of the standard tests in the *Manual of Tests and Criteria, Part III*, subsection 33.2, that nitrocellulose membrane filters in the form in which they are to be carried are not subject to the requirements applicable to flammable solids in Class 4.1.
- 238 a) Batteries can be considered as non-spillable, provided that they are capable of withstanding the vibration and pressure differential tests given below, without leakage of battery fluid.

Vibration test: The battery is rigidly clamped to the platform of a vibration machine and a simple harmonic motion having an amplitude of 0.8 mm (1.6 mm maximum total excursion) is applied. The frequency is varied at the rate of 1 Hz/min between the limits of 10 Hz and 55 Hz. The entire range of frequencies and return is traversed in 95 ± 5 minutes for each mounting position (direction of vibration) of the battery. The battery is tested in three mutually perpendicular positions (to include testing with

fill openings and vents, if any, in an inverted position) for equal time periods.

Pressure differential test: Following the vibration test, the battery is stored for six hours at $24\text{ }^{\circ}\text{C} \pm 4\text{ }^{\circ}\text{C}$ while subjected to a pressure differential of at least 88 kPa. The battery is tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for at least six hours in each position.

b) Non-spillable batteries are not subject to the requirements of Annex 2 to SMGS if, at a temperature of $55\text{ }^{\circ}\text{C}$, the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow and if, as packaged for carriage, the terminals are protected from short circuit.

- 239** Batteries or cells shall not contain dangerous substances other than sodium, sulphur or sodium compounds (e.g. sodium polysulphides and sodium tetrachloroaluminate). Batteries or cells shall not be offered for carriage at a temperature such that liquid elemental sodium is present in the battery or cell unless approved and under the conditions established by the competent authority of the country of origin. If the country of origin is not an SMGS Contracting State, the approval and conditions of carriage shall be recognized by the competent authority of the first SMGS Contracting State reached by the consignment.

Cells shall consist of hermetically sealed metal casings which fully enclose the dangerous substances and which are so constructed and closed as to prevent the release of the dangerous substances under normal conditions of carriage.

Batteries shall consist of cells secured within and fully enclosed by a metal casing so constructed and closed as to prevent the release of the dangerous substances under normal conditions of carriage.

- 240** Reserved.
- 241** The formulation shall be prepared so that it remains homogeneous and does not separate during carriage. Formulations with low nitrocellulose contents and not showing dangerous properties when tested for their liability to detonate, deflagrate or explode when heated under defined confinement by tests of Test series 1 (a), 2 (b) and 2 (c) respectively in the Manual of Tests and Criteria, Part I and not being a flammable solid when tested in accordance with test N. 1 in the Manual of Tests and Criteria, Part III, sub-section 33.2.4 (chips, if necessary, crushed and sieved to a particle size of less than 1.25 mm) are not subject to the requirements of Annex 2 to SMGS.
- 242** Sulphur is not subject to the requirements of Annex 2 to SMGS when it has been formed to a specific shape (e.g. prills, granules, pellets, pastilles or flakes) ⁵.
- 243** Gasoline, motor spirit and petrol for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) shall be assigned to this entry regardless of variations in volatility.
- 244** This entry includes e.g. aluminium dross, aluminium skimmings, spent cathodes, spent potliner, and aluminium salt slags.
- 247** Alcoholic beverages containing more than 24% alcohol but not more than 70% by volume, when carried as part of the manufacturing process, may be carried in wooden barrels with a capacity of more than 250 litres and not more than 500 litres meeting the general requirements of 4.1.1, as appropriate, on the following conditions:
- a) The wooden barrels shall be checked and tightened before filling;
 - b) Sufficient ullage (not less than 3%) shall be left to allow for the expansion of the liquid;

⁵ Not applicable when being transported on the territory of the Republic of Belarus, the Republic of Kazakhstan, the Russian Federation, Ukraine.

- c) The wooden barrels shall be carried with the bungholes pointing upwards;
- d) The wooden barrels shall be carried in containers meeting the requirements of the CSC. Each wooden barrel shall be secured in custom-made cradles and be wedged by appropriate means to prevent it from being displaced in any way during carriage.

249 Ferrocium, stabilized against corrosion, with a minimum iron content of 10% is not subject to the requirements of Annex 2 to SMGS.

250 This entry may only be used for samples of chemicals taken for analysis in connection with the implementation of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. The carriage of substances under this entry shall be in accordance with the chain of custody and security procedures specified by the Organisation for the Prohibition of Chemical Weapons.

The chemical sample may only be carried providing prior approval has been granted by the competent authority or the Director General of the Organisation for the Prohibition of Chemical Weapons and providing the sample complies with the following provisions:

a) It shall be packed according to packing instruction 623 in the ICAO Technical Instructions;

b) During carriage, a copy of the document of approval for transport, showing the quantity limitations and the packing provisions shall be attached to the transport document.

251 The entry CHEMICAL KIT or FIRST AID KIT is intended to apply to boxes, cases etc. containing small quantities of various dangerous goods which are used for example for medical, analytical, testing or repair purposes. Such kits shall only contain dangerous goods that are permitted as:

a) Excepted quantities not exceeding the quantity indicated by the code in column (7b) of Table A of Chapter 3.2, provided that the net quantity per inner packaging and net quantity per package are as prescribed in 3.5.1.2 and 3.5.1.3; or;

b) Limited quantities as indicated in column (7a) of Table A of Chapter 3.2, provided that the net quantity per inner packaging does not exceed 250 ml or 250 g.

Components shall not react dangerously (see "dangerous reaction" in 1.2.1). The total quantity of dangerous goods in any one kit shall not exceed either 1 l or 1 kg.

For the purposes of completion of the transport document as set out in 5.4.1.1.1, the packing group shown on the document shall be the most stringent packing group assigned to any individual substance in the kit. Where the kit contains only dangerous goods to which no packing group is assigned, no packing group need be indicated on the dangerous goods transport document.

Kits which are carried on board wagons for first-aid or operating purposes are not subject to the requirements of Annex 2 to SMGS.

Chemical kits and first aid kits containing dangerous goods in inner packagings which do not exceed the quantity limits for limited quantities applicable to individual substances as specified in column (7a) of Table A of Chapter 3.2 may be carried in accordance with Chapter 3.4.

252 1) Ammonium nitrate hot concentrated solutions can be carried under this entry provided:

a) The solution contains not more than 93% ammonium nitrate;

b) The solution contains at least 7% water;

c) The solution contains not more than 0.2% combustible material;

- d) The solution contains no chlorine compounds in quantities such that the chloride ion level exceeds 0.02%;
 - e) The pH of an aqueous solution of 10% of the substance is between 5 and 7, measured at 25 °C; and
 - f) The maximum allowable carriage temperature of the solution is 140 °C.
- 2) Additionally, ammonium nitrate hot concentrate solutions are not subject to Annex 2 to SMGS provided:
- a) The solution contains not more than 80% ammonium nitrate;
 - b) The solution contains not more than 0.2% combustible material;
 - c) The ammonium nitrate remains in solution under all conditions of carriage; and
 - d) The solution does not meet the criteria of any other class.
- 266** This substance, when containing less alcohol, water or phlegmatizer than specified, shall not be carried unless specifically authorized by the competent authority (see 2.2.1.1).
- 267** Any explosives, blasting, type C containing chlorates shall be segregated from explosives containing ammonium nitrate or other ammonium salts.
- 270** Aqueous solutions of Class 5.1 inorganic solid nitrate substances are considered as not meeting the criteria of Class 5.1 if the concentration of the substances in solution at the minimum temperature encountered during carriage is not greater than 80% of the saturation limit.
- 271** Lactose or glucose or similar materials, may be used as a phlegmatizer, provided that the substance contains not less than 90%, by mass, of phlegmatizer. The competent authority may authorize these mixtures to be classified in Class 4.1 on the basis of a test Series 6 (c) of Section 16 of Part I of the Manual of Tests and Criteria on at least three packages as prepared for carriage. Mixtures containing at least 98%, by mass, of phlegmatizer are not subject to the requirements of Annex 2 to SMGS. Packages containing mixtures with not less than 90%, by mass, of phlegmatizer need not bear a label conforming to model No. 6.1.
- 272** This substance shall not be carried under the provisions of Class 4.1 unless specifically authorized by the competent authority (see UN No. 0143 or UN No. 0150 as appropriate).
- 273** Maneb and maneb preparations stabilized against self-heating need not be classified in Class 4.2 when it can be demonstrated by testing that a cubic volume of 1 m³ of substance does not self-ignite and that the temperature at the centre of the sample does not exceed 200 °C, when the sample is maintained at a temperature of not less than 75 °C ± 2 °C for a period of 24 hours.
- 274** The provisions of 3.1.2.8 apply.
- 278** These substances shall not be classified and carried unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6 (c) test of Part I of the *Manual of Tests and Criteria* on packages as prepared for carriage (see 2.2.1.1). The competent authority shall assign the packing group on the basis of 2.2.3 criteria and the package type used for the Series 6 (c) test.
- 279** The substance is assigned to this classification or packing group based on human experience rather than the strict application of classification criteria set out in Annex 2 to SMGS.
- 280** This entry applies to safety devices for vehicles, vessels or aircraft, e.g. air bag inflators, air bag modules, seat-belt pretensioners, and pyromechanical devices, which contain dangerous goods of Class 1 or of other classes, when carried as component parts and if these articles as presented for carriage have been tested in accordance with Test Series 6 (c) of Part 1 of the *Manual of Tests and Criteria*, with no explosion of the device, no fragmentation of device casing or pressure

receptacle, and no projection hazard nor thermal effect which would significantly hinder fire-fighting or emergency response efforts in the immediate vicinity. This entry does not apply to life saving appliances described in special provision 296 (UN Nos. 2990 and 3072) or to fire suppressant dispersing devices described in special provision 407 (UN Nos. 0514 and 3559).

282 (reserved)

283 Articles, containing gas, intended to function as shock absorbers, including impact energy-absorbing devices, or pneumatic springs are not subject to the requirements of Annex 2 TO SMGS provided:

a) Each article has a gas space capacity not exceeding 1.6 litres and a charge pressure not exceeding 280 bar where the product of the capacity (litres) and charge pressure (bars) does not exceed 80 (i.e. 0.5 litres gas space and 160 bar charge pressure, 1 litre gas space and 80 bar charge pressure, 1.6 litres gas space and 50 bar charge pressure, 0.28 litres gas space and 280 bar charge pressure);

b) Each article has a minimum burst pressure of 4 times the charge pressure at 20 °C for products not exceeding 0.5 litres gas space capacity and 5 times charge pressure for products greater than 0.5 litres gas space capacity;

c) Each article is manufactured from material which will not fragment upon rupture;

d) Each article is manufactured in accordance with a quality assurance standard acceptable to the competent authority; and

e) The design type has been subjected to a fire test demonstrating that the article relieves its pressure by means of a fire degradable seal or other pressure relief device, such that the article will not fragment and that the article does not rocket. See also 1.1.3.2 d) for equipment used for the operation of the vehicle.

284 An oxygen generator, chemical, containing oxidizing substances shall meet the following conditions:

a) The generator when containing an explosive actuating device shall only be carried under this entry when excluded from Class 1 in accordance with the **Note** under paragraph 2.2.1.1.1 b);

b) The generator, without its packaging, shall be capable of withstanding a 1.8 m drop test onto a rigid, non-resilient, flat and horizontal surface, in the position most likely to cause damage, without loss of its contents and without actuation;

When a generator is equipped with an actuating device, it shall have at least two positive means of preventing unintentional actuation.

286 Nitrocellulose membrane filters covered by this entry, each with a mass not exceeding 0.5 g, are not subject to the requirements of Annex 2 to SMGS when contained individually in an article or a sealed packet.

288 These substances shall not be classified and carried unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6 (c) test of *Part I of the Manual of tests and Criteria* on packages as prepared for carriage (see 2.2.1.1).

289 Safety devices, electrically initiated and safety devices, pyrotechnic installed in wagons, vehicles, vessels or aircraft or in completed components such as steering columns, door panels, seats, etc. are not subject to Annex 2 to SMGS.

290 When this radioactive material meets the definitions and criteria of other classes as defined in Part 2, it shall be classified in accordance with the following:

a) Where the substance meets the criteria for dangerous goods in excepted quantities as set out in Chapter 3.5, the packagings shall be in accordance with 3.5.2 and meet the testing requirements of 3.5.3. All other requirements applicable to radioactive material, excepted packages as set out in 1.7.1.5 shall apply without reference to the other class;

b) Where the quantity exceeds the limits specified in 3.5.1.2 the substance shall be classified in accordance with the predominant subsidiary risk. The transport document shall describe the substance with the UN number and proper shipping name applicable to the other class supplemented with the name applicable to the radioactive excepted package according to Column (2) of Table A of Chapter 3.2, and the substance shall be carried in accordance with the provisions applicable to that UN number. An example of the information shown on the transport document is: "UN 1993 FLAMMABLE LIQUID, N.O.S. (ethanol and toluene mixture), Radioactive material, excepted package – limited quantity of material, 3, PG II".

In addition, the requirements of 2.2.7.2.4.1 shall apply;

c) The provisions of Chapter 3.4 for the carriage of dangerous goods packed in limited quantities shall not apply to substances classified in accordance with subparagraph (b);

d) When the substance meets a special provision that exempts this substance from all dangerous goods provisions of the other classes it shall be classified in accordance with the applicable UN number of Class 7 and all requirements specified in 1.7.1.5 shall apply.

- 291** Flammable liquefied gases shall be contained within refrigerating machine components. These components shall be designed and tested to at least three times the working pressure of the machinery. The refrigerating machines shall be designed and constructed to contain the liquefied gas and preclude the risk of bursting or cracking of the pressure retaining components during normal conditions of carriage. Refrigerating machines and refrigerating-machine components are not subject to the requirements of Annex 2 to SMGS if they contain less than 12 kg of gas.

Note: For the purposes of carriage, heat pumps may be considered as refrigerating machines.

- 292** (reserved)

- 293** The following definitions apply to matches:

- a) Fusee matches are matches the heads of which are prepared with a friction-sensitive igniter composition and a pyrotechnic composition which burns with little or no flame, but with intense heat;
- b) Safety matches are matches that are combined with or attached to the box, book or card that can be ignited by friction only on a prepared surface;
- c) Strike anywhere matches are matches that can be ignited by friction on a solid surface;
- d) Wax Vesta matches are matches that can be ignited by friction either on a prepared surface or on a solid surface.

- 295** Batteries need not be individually marked and labelled if the pallet bears the appropriate mark and label.

- 296** These entries apply to life-saving appliances such as life rafts, personal flotation devices and self-inflating slides. UN No. 2990 applies to self-inflating appliances and UN No. 3072 applies to life-saving appliances that are not self-inflating. Life-saving appliances may contain:

- a) Signal devices (Class 1) which may include smoke and illumination signal flares packed in packagings that prevent them from being inadvertently activated;
- b) For UN No. 2990 only, cartridges, power device of Division 1.4, compatibility group S, may be contained for purposes of the self-inflating mechanism and provided that the quantity of explosives per appliance does not exceed 3.2 g;
- c) Class 2 compressed or liquefied gases, group A or O, according to 2.2.2.1.3;

- d) Electric storage batteries (Class 8) and lithium batteries or sodium ion batteries (Class 9);
- e) First aid kits or repair kits containing small quantities of dangerous goods (e.g. substances of Class 3, 4.1, 5.2, 8 or 9); or
- f) "Strike anywhere" matches packed in packagings that prevent them from being inadvertently activated.

Life-saving appliances packed in strong rigid outer packagings with a total maximum gross mass of 40 kg, containing no dangerous goods other than compressed or liquefied gases of Class 2, group A or group O, in receptacles with a capacity not exceeding 120 ml, installed solely for the purpose of the activation of the appliance, are not subject to the requirements of Annex 2 to SMGS.

298 (reserved)

300 Goods shall not be loaded if the temperature at the time of loading exceeds 35 °C or 5 °C above the ambient temperature whichever is higher.. Having this quality of main criterion, the highest ambient temperature shall be taken into account.

301 This entry only applies to articles such as machinery, apparatus or devices containing dangerous goods as a residue or an integral element of the articles. It shall not be used for articles for which a proper shipping name already exists in Table A of Chapter 3.2. Articles carried under this entry shall only contain dangerous goods which are authorized to be carried in accordance with the provisions of Chapter 3.4 (Limited quantities). The quantity of dangerous goods in articles shall not exceed the quantity specified in Column (7a) of Table A of Chapter 3.2 for each item of dangerous goods contained. If the articles contain more than one item of dangerous goods, the individual dangerous goods shall be enclosed to prevent them reacting dangerously with one another during carriage (see 4.1.1.6). When it is required to ensure liquid dangerous goods remain in their intended orientation, orientation arrows shall be displayed on at least two opposite vertical sides with the arrows pointing in the correct direction in accordance with 5.2.1.10.

Note: *In this special provision the reference to "a proper shipping name which already exists" excludes specific n.o.s. entries for UN Nos. 3537 to 3548.*

302 Fumigated cargo transport units containing no other dangerous goods are only subject to the provisions of 5.5.2.

303 Receptacles shall be assigned to the classification code of the gas or mixture of gases contained therein determined in accordance with the provisions of section 2.2.2.

304 This entry may only be used for the transport of non-activated batteries which contain dry potassium hydroxide and which are intended to be activated prior to use by addition of an appropriate amount of water to the individual cells.

305 These substances are not subject to the requirements of Annex 2 to SMGS when in concentrations of not more than 50 mg/kg.

306 This entry may only be used for substances that are too insensitive for acceptance into Class 1 when tested in accordance with Test Series 2 (see *Manual of Tests and Criteria*, Part I).

307 This entry may only be used for ammonium nitrate based fertilizers. They shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39 subject to the restrictions of 2.2.51.2.2, thirteenth and fourteenth indents. When used in the said Section 39, the term "competent authority" means the competent authority of the country of origin. If the country of origin is not an Annex 2 to SMGS Contracting State, the classification and conditions of carriage shall be recognized by the competent authority of the first Annex 2 to SMGS Contracting State reached by the consignment.

- 309** This entry applies to non-sensitized emulsions, suspensions and gels consisting primarily of a mixture of ammonium nitrate and fuel, intended to produce a Type E blasting explosive only after further processing prior to use.

The mixture for emulsions typically has the following composition: 60-85% ammonium nitrate, 5-30% water, 2-8% fuel, 0.5-4% emulsifier agent, 0-10% soluble flame suppressants, and trace additives. Other inorganic nitrate salts may replace part of the ammonium nitrate.

The mixture for suspensions and gels typically has the following composition: 60-85% ammonium nitrate, 0-5% sodium or potassium perchlorate, 0-17% hexamine nitrate or monomethylamine nitrate, 5-30% water, 2-15% fuel, 0.5-4% thickening agent, 0-10% soluble flame suppressants, and trace additives. Other inorganic nitrate salts may replace part of the ammonium nitrate.

Substances shall satisfy the criteria for classification as an ammonium nitrate emulsion, suspension or gel, intermediate for blasting explosives (ANE) of Test Series 8 of the Manual of Tests and Criteria, Part I, Section 18 and be approved by the competent authority.

- 310** Cells or batteries from production runs of not more than 100 cells or batteries, or pre-production prototypes of cells or batteries when these prototypes are carried for testing shall meet the provisions of 2.2.9.1.7.1 with the exception of (a), (e) (vii), (f) (iii) if applicable, (f) (iv) if applicable and (g).

Note: "Carried for testing" includes, but is not limited to, testing described in the Manual of Tests and Criteria, Part III, sub-section 38.3, integration testing and product performance testing.

These cells and batteries shall be packaged in accordance with packing instruction P 910 of 4.1.4.1 or LP 905 of 4.1.4.3, as applicable.

Articles (UN Nos. 3537, 3538, 3540, 3541, 3546, 3547 or 3548) may contain such cells or batteries provided that the applicable parts of packing instruction P 006 of 4.1.4.1 or LP 03 of 4.1.4.3, as applicable, are met.

The transport document shall include the following statement:

"TRANSPORT IN ACCORDANCE WITH SPECIAL PROVISION 310"

Damaged or defective cells, batteries, or cells and batteries contained in equipment shall be carried in accordance with special provision 376 and packaged in accordance with packing instructions P 908 of 4.1.4.1 or LP 904 of 4.1.4.3, as applicable.

Cells, batteries or cells and batteries contained in equipment carried for disposal or recycling may be pack-aged in accordance with special provision 377 and packing instruction P 909 of 4.1.4.1.

- 311** Substances shall not be carried under this entry unless approved by the competent authority on the basis of the results of appropriate tests according to Part I of the Manual of Tests and Criteria. Packaging shall ensure that the percentage of diluent does not fall below that stated in the competent authority approval, at any time during carriage.

- 312** (reserved)

- 313** (reserved)

- 314** a) These substances are liable to exothermic decomposition at elevated temperatures. Decomposition can be initiated by heat or by impurities (e.g. powdered metals (iron, manganese, cobalt, magnesium) and their compounds);
b) During the course of carriage, these substances shall be shaded from direct sunlight and all sources of heat and be placed in adequately ventilated areas.

- 315** This entry shall not be used for Class 6.1 substances which meet the inhalation toxicity criteria for packing group I described in 2.2.61.1.8.

- 316 This entry applies only to calcium hypochlorite, dry, when carried in non-friable tablet form.
- 317 "Fissile-excepted" applies only to those fissile material and packages containing fissile material which are excepted in accordance with 2.2.7.2.3.5.
- 318 For the purposes of documentation, the proper shipping name shall be supplemented with the technical name (see 3.1.2.8). When the infectious substances to be carried are unknown, but suspected of meeting the criteria for inclusion in Category A and assignment to UN No. 2814 or 2900, the words "suspected Category A infectious substance" shall be shown, in parentheses, following the proper shipping name on the transport document.
- 319 Substances packed and packages marked in accordance with packing instruction P650 are not subject to any other requirements of Annex 2 to SMGS.
- 320 (reserved)
- 321 These storage systems shall always be considered as containing hydrogen.
- 322 When carried in non-friable tablet form, these goods are assigned to packing group III.
- 323 (reserved)
- 324 This substance needs to be stabilized when in concentrations of not more than 99%.
- 325 In the case of non-fissile or fissile excepted uranium hexafluoride, the material shall be classified under UN No. 2978.
- 326 In the case of fissile uranium hexafluoride, the material shall be classified under UN No. 2977.
- 327 Waste aerosols and waste gas cartridges consigned in accordance with 5.4.1.1.3.1 may be carried under UN Nos. 1950 or 2037, as appropriate, for the purposes of reprocessing or disposal. They need not be protected against movement and inadvertent discharge, provided that measures to prevent dangerous buildup of pressure and dangerous atmospheres are addressed. Waste aerosols, other than those leaking or severely deformed, shall be packed in accordance with packing instruction P 207 and special provision PP 87, or packing instruction LP 200 and special packing provision L 2. Waste gas cartridges, other than those leaking or severely deformed, shall be packed in accordance with packing instruction P 003 and special packing provisions PP 17 and PP 96, or packing instruction LP 200 and special packing provision L 2. Leaking or severely deformed aerosols and gas cartridges shall be carried in salvage pressure receptacles or salvage packagings provided appropriate measures are taken to ensure there is no dangerous build up of pressure.

Note: For maritime carriage, waste gas cartridges shall not be carried in closed containers. Waste gas cartridges that were filled with non-flammable, non-toxic gases of Class 2, group A or O and have been pierced are not subject to Annex 2 to SMGS.

- 328 This entry applies to fuel cell cartridges including when contained in equipment or packed with equipment. Fuel cell cartridges installed in or integral to a fuel cell system are regarded as contained in equipment. Fuel cell cartridge means an article that stores fuel for discharge into the fuel cell through (a) valve(s) that control(s) the discharge of fuel into the fuel cell. Fuel cell cartridges, including when contained in equipment, shall be designed and constructed to prevent fuel leakage under normal conditions of carriage.

Fuel cell cartridge design types using liquids as fuels shall pass an internal pressure test at a pressure of 100 kPa (gauge) without leakage. Except for fuel cell cartridges containing hydrogen in metal hydride which shall be in compliance with special provision 339, each fuel cell cartridge design type shall be shown to pass a 1.2 meter drop test onto an unyielding surface in the orientation most likely to result in failure of the containment system with no loss of contents.

When lithium metal, lithium ion or sodium ion batteries are contained in the fuel cell system, the consignment shall be consigned under this entry and under the appropriate entries for UN 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT, UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or UN 3552 SODIUM ION BATTERIES CONTAINED IN EQUIPMENT.

- 329** (reserved)
- 330** (reserved)
- 331** (reserved)
- 332** Magnesium nitrate hexahydrate is not subject to the requirements of Annex 2 to SMGS.
- 333** Ethanol and gasoline, motor spirit or petrol mixtures (UN No 1203) for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) shall be assigned to this entry regardless of the initial boiling point.
- 334** A fuel cell cartridge may contain an activator provided it is fitted with two independent means of preventing unintended mixing with the fuel during carriage.
- 335** Mixtures of solids which are not subject to the requirements of Annex 2 to SMGS and environmentally hazardous liquids or solids shall be classified as UN 3077 and may be carried under this entry provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. Each cargo transport unit shall be leakproof when used for carriage in bulk. If free liquid is visible at the time the mixture is loaded or at the time the packaging or cargo transport unit is closed, the mixture shall be classified as UN 3082. Sealed packets and articles containing less than 10 ml of an environmentally hazardous liquid, absorbed into a solid material but with no free liquid in the packet or article, or containing less than 10 g of an environmentally hazardous solid, are not subject to the requirements of Annex 2 to SMGS.
- 336** A single package of non-combustible solid LSA-II or LSA-III material, if carried by air, shall not contain an activity greater than 3 000 A₂.
- 337** Type B(U) and Type B(M) packages, if carried by air, shall not contain activities greater than the following:
 - a) For low dispersible radioactive material: as authorized for the package design as specified in the certificate of approval;
 - b) For special form radioactive material: 3 000 A₁ or 100 000 A₂, whichever is the lower; or
 - c) For all other radioactive material: 3 000 A₂.
- 338** Each fuel cell cartridge carried under this entry and designed to contain a liquefied flammable gas shall:
 - a) Be capable of withstanding, without leakage or bursting, a pressure of at least two times the equilibrium pressure of the contents at 55 °C;
 - b) Not contain more than 200 ml liquefied flammable gas, the vapour pressure of which shall not exceed 1 000 kPa at 55 °C; and pass the hot water bath test prescribed in 6.2.6.3.1.
- 339** Fuel cell cartridges containing hydrogen in a metal hydride carried under this entry shall have a water capacity less than or equal to 120 ml.

 The pressure in the fuel cell cartridge shall not exceed 5 MPa at 55 °C. The design type shall withstand, without leaking or bursting, a pressure of twice the design pressure of the cartridge at 55 °C or 200 kPa more than the design pressure of the cartridge at 55 °C, whichever is greater. The pressure at which this test is conducted is referred to in the drop test and the hydrogen cycling test as the "minimum shell burst pressure".

Fuel cell cartridges shall be filled in accordance with procedures provided by the manufacturer. The manufacturer shall provide the following information with each fuel cell cartridge:

- a) Inspection procedures to be carried out before initial filling and before refilling of the fuel cell cartridge;
- b) Safety precautions and potential hazards to be aware of;
- c) Method for determining when the rated capacity has been achieved;
- d) Minimum and maximum pressure range;
- e) Minimum and maximum temperature range; and
- f) Any other requirements to be met for initial filling and refilling including the type of equipment to be used for initial filling and refilling.

The fuel cell cartridges shall be designed and constructed to prevent fuel leakage under normal conditions of carriage. Each cartridge design type, including cartridges integral to a fuel cell, shall be subjected to and shall pass the following tests:

Drop test

A 1.8 metre drop test onto an unyielding surface in four different orientations:

- a) Vertically, on the end containing the shut-off valve assembly;
- b) Vertically, on the end opposite to the shut-off valve assembly;
- c) Horizontally, onto a steel apex with a diameter of 38 mm, with the steel apex in the upward position; and
- d) At a 45° angle on the end containing the shut-off valve assembly.

There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations, when the cartridge is charged to its rated charging pressure. The fuel cell cartridge shall then be hydrostatically pressurized to destruction. The recorded burst pressure shall exceed 85% of the minimum shell burst pressure.

Fire test

A fuel cell cartridge filled to rated capacity with hydrogen shall be subjected to a fire engulfment test. The cartridge design, which may include a vent feature integral to it, is deemed to have passed the fire test if:

- a) The internal pressure vents to zero-gauge pressure without rupture of the cartridge; or
- b) The cartridge withstands the fire for a minimum of 20 minutes without rupture.

Hydrogen cycling test

This test is intended to ensure that a fuel cell cartridge design stress limits are not exceeded during use.

The fuel cell cartridge shall be cycled from not more than 5% rated hydrogen capacity to not less than 95% rated hydrogen capacity and back to not more than 5% rated hydrogen capacity. The rated charging pressure shall be used for charging and temperatures shall be held within the operating temperature range. The cycling shall be continued for at least 100 cycles.

Following the cycling test, the fuel cell cartridge shall be charged and the water volume displaced by the cartridge shall be measured. The cartridge design is deemed to have passed the hydrogen cycling test if the water volume displaced by the cycled cartridge does not exceed the water volume displaced by an uncycled cartridge

charged to 95% rated capacity and pressurized to 75% of its minimum shell burst pressure.

Production leak test

Each fuel cell cartridge shall be tested for leaks at $15\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, while pressurized to its rated charging pressure. There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations.

Each fuel cell cartridge shall be permanently marked with the following information:

- a) The rated charging pressure in MPa;
- b) The manufacturer's serial number of the fuel cell cartridges or unique identification number; and
- c) The date of expiry based on the maximum service life (year in four digits; month in two digits).

- 340** Chemical kits, first aid kits and polyester resin kits containing dangerous substances in inner packagings which do not exceed the quantity limits for excepted quantities applicable to individual substances as specified in column (7b) of Table A of Chapter 3.2, may be carried in accordance with Chapter 3.5. Class 5.2 substances, although not individually authorized as excepted quantities in column (7b) of Table A of Chapter 3.2, are authorized in such kits and are assigned Code E2 (see 3.5.1.2).
- 341 (reserved)**
- 342** Glass inner receptacles (such as ampoules or capsules) intended only for use in sterilization devices, when containing less than 30 ml of ethylene oxide per inner packaging with not more than 300 ml per outer packaging, may be carried in accordance with the provisions in Chapter 3.5, irrespective of the indication of "E0" in column (7b) of Table A of Chapter 3.2 provided that:
- a) After filling, each glass inner receptacle has been determined to be leak-tight by placing the glass inner receptacle in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at $55\text{ }^{\circ}\text{C}$ is achieved. Any glass inner receptacle showing evidence of leakage, distortion or other defect under this test shall not be carried under the terms of this special provision;
 - b) In addition to the packaging required by 3.5.2, each glass inner receptacle is placed in a sealed plastics bag compatible with ethylene oxide and capable of containing the contents in the event of breakage or leakage of the glass inner receptacle; and
 - c) Each glass inner receptacle is protected by a means of preventing puncture of the plastics bag (e.g. sleeves or cushioning) in the event of damage to the packaging (e.g. by crushing).
- 343** This entry applies to crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard. The packing group assigned shall be determined by the flammability hazard and inhalation hazard, in accordance with the degree of danger presented.
- 344** The provisions of 6.2.6 shall be met.
- 345** This gas contained in open cryogenic receptacles with a maximum capacity of 1 litre constructed with glass double walls having the space between the inner and outer wall evacuated (vacuum insulated) is not subject to Annex 2 to SMGS

provided each receptacle is carried in an outer packaging with suitable cushioning or absorbent materials to protect it from impact damage.

- 346** Open cryogenic receptacles conforming to the requirements of packing instruction P 203 of 4.1.4.1 and containing no dangerous goods except for UN No. 1977 nitrogen, refrigerated liquid, which is fully absorbed in a porous material are not subject to any other requirements of Annex 2 to SMGS.
- 347** This entry shall only be used if the results of Test series 6 (d) of Part I of the Manual of Tests and Criteria have demonstrated that any hazardous effects arising from functioning are confined within the package.
- 348** Lithium batteries manufactured after 31 December 2011 and sodium ion batteries manufactured after 31 December 2025 shall be marked with the Watt-hour rating on the outside case.
- 349** Mixtures of a hypochlorite with an ammonium salt are not to be accepted for carriage. UN No. 1791 hypochlorite solution is a substance of Class 8.
- 350** Ammonium bromate and its aqueous solutions and mixtures of a bromate with an ammonium salt are not to be accepted for carriage.
- 351** Ammonium chlorate and its aqueous solutions and mixtures of a chlorate with an ammonium salt are not to be accepted for carriage.
- 352** Ammonium chlorite and its aqueous solutions and mixtures of a chlorite with an ammonium salt are not to be accepted for carriage.
- 353** Ammonium permanganate and its aqueous solutions and mixtures of a permanganate with an ammonium salt are not to be accepted for carriage.
- 354** This substance is toxic by inhalation.
- 355** Oxygen cylinders for emergency use carried under this entry may include installed actuating cartridges (cartridges, power device of Division 1.4, Compatibility Group C or S), without changing the classification in Class 2 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per oxygen cylinder. The cylinders with the installed actuating cartridges as prepared for carriage shall have an effective means of preventing inadvertent activation.
- 356** Metal hydride storage systems intended to be installed in wagons, vehicles, vessels, machinery, engines or aircraft shall be approved by the competent authority of the country of manufacture⁶ before acceptance for carriage. The transport document shall include an indication that the package was approved by the competent authority of the country of manufacture or a copy of the competent authority of the country of manufacture⁶ approval shall accompany each consignment.
- 357** Petroleum crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard shall be consigned under the entry UN 3494 PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC.

⁶ If the country of manufacture is not an SMGS, RID or ADR Contracting State, the approval shall be recognized by the competent authority of an SMGS, RID or ADR Contracting State.

- 358** Nitroglycerin solution in alcohol with more than 1% but not more than 5% nitroglycerin may be classified in Class 3 and assigned to UN No. 3064 provided all the requirements of packing instruction P 300 of 4.1.4.1 are complied with.
- 359** Nitroglycerin solution in alcohol with more than 1% but not more than 5% nitroglycerin may be classified in Class 3 and assigned to UN No. 3064 provided all the requirements of packing instruction P 300 of 4.1.4.1 are complied with.
- 360** Vehicles only powered by lithium metal, lithium ion or sodium ion batteries shall be assigned to the entries UN 3556 VEHICLE, LITHIUM ION BATTERY POWERED or UN 3557 VEHICLE, LITHIUM METAL BATTERY POWERED or UN 3558 VEHICLE, SODIUM ION BATTERY POWERED, as applicable. Lithium batteries installed in cargo transport units, designed only to provide power external to the transport unit shall be assigned to entry UN 3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries.
- 361** This entry applies to electric double layer capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh. or less are not subject to Annex 2 to SMGS. Energy storage capacity means the energy held by a capacitor, as calculated using the nominal voltage and capacitance. All capacitors to which this entry applies, including capacitors containing an electrolyte that does not meet the classification criteria of any class of dangerous goods, shall meet the following conditions:
- a) Capacitors not installed in equipment shall be carried in an uncharged state. Capacitors installed in equipment shall be carried either in an uncharged state or protected against short circuit;
 - b) Each capacitor shall be protected against a potential short circuit hazard in carriage as follows:
 - I) When a capacitor's energy storage capacity is less than or equal to 10 Wh. or when the energy storage capacity of each capacitor in a module is less than or equal to 10 Wh. , the capacitor or module shall be protected against short circuit or be fitted with a metal strap connecting the terminals; and
 - II) When the energy storage capacity of a capacitor or a capacitor in a module is more than 10 Wh., the capacitor or module shall be fitted with a metal strap connecting the terminals;
 - c) Capacitors containing dangerous goods shall be designed to withstand a 95 kPa pressure differential;
 - d) Capacitors shall be designed and constructed to relieve safely pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid which is released upon venting shall be contained by the packaging or by the equipment in which a capacitor is installed; and
 - e) Capacitors shall be marked with the energy storage capacity in Wh.

Capacitors containing an electrolyte not meeting the classification criteria of any class of dangerous goods, including when installed in equipment, are not subject to other provisions of SMGS.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods, with an energy storage capacity of 10 Wh. or less are not subject to other provisions of Annex 2 to SMGS when they are capable of withstanding a 1.2 metre drop test unpackaged on an unyielding surface without loss of contents.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods that are not installed in equipment and with an energy storage capacity of more than 10 Wh are subject to SMGS.

Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class of dangerous goods, are not subject to other provisions of Annex 2 to SMGS provided the equipment is packaged in a strong outer packaging constructed of suitable material, and of adequate strength and design in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during carriage. Large robust equipment containing capacitors may be offered for carriage unpackaged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained.

Note: *Capacitors which by design maintain a terminal voltage (e.g. asymmetrical capacitors) do not belong to this entry.*

362 (reserved)

363 This entry may only be used when the conditions of this special provision are met. No other requirements of Annex 2 to SMGS apply.

a) This entry applies to engines or machinery, powered by fuels classified as dangerous goods via internal combustion systems or fuel cells (e.g. combustion engines, generators, compressors, turbines, heating units, etc.), except vehicle equipment assigned to UN No. 3166 referred to in SP 666.

Note: *This entry does not apply to equipment referred to in 1.1.3.2 (a), (d) and (e), 1.1.3.3 and 1.1.3.7.*

b) Engines or machinery which are empty of liquid or gaseous fuels and which do not contain other dangerous goods, are not subject to Annex 2 to SMGS.

Note 1: *An engine or machinery is considered to be empty of liquid fuel when the liquid fuel tank has been drained and the engine or machinery cannot be operated due to a lack of fuel. Engine or machinery components such as fuel lines, fuel filters and injectors do not need to be cleaned, drained or purged to be considered empty of liquid fuels. In addition, the liquid fuel tank does not need to be cleaned or purged.*

Note 2: *An engine or machinery is considered to be empty of gaseous fuels when the gaseous fuel tanks are empty of liquid (for liquefied gases), the pressure in the tanks does not exceed 2 bar and the fuel shut-off or isolation valve is closed and secured.*

c) Engines and machinery containing fuels meeting the classification criteria of Class 3, shall be assigned to the entries UN 3528 ENGINE, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or UN 3528 ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or UN 3528 MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or UN 3528 MACHINERY, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate.

d) Engines and machinery containing fuels meeting the classification criteria of flammable gases of Class 2, shall be assigned to the entries UN 3529 ENGINE, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or UN 3529 ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or UN 3529 MACHINERY, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or UN 3529 MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED, as appropriate.

Engines and machinery powered by both a flammable gas and a flammable liquid shall be assigned to the appropriate UN No. 3529 entry.

e) Engines and machinery containing liquid fuels meeting the classification criteria of 2.2.9.1.10 for environmentally hazardous substances and not meeting the classification criteria of any other class shall be assigned to the entries UN 3530 ENGINE, INTERNAL COMBUSTION or UN 3530 MACHINERY, INTERNAL COMBUSTION, as appropriate.

f) Engines or machinery may contain other dangerous goods than fuels (e.g. batteries, fire extinguishers, compressed gas accumulators or safety devices)

required for their functioning or safe operation without being subject to any additional requirements for these other dangerous goods, unless otherwise specified in Annex 2 to SMGS. However, lithium batteries shall meet the provisions of 2.2.9.1.7.1, except that that (a), (e) (vii), (f) (iii) if applicable, (f) (iv) if applicable and (g) do not apply when batteries of a production run of not more than 100 cells or batteries, or pre-production prototypes of cells or batteries when these prototypes are carried for testing, are installed in machinery or engines. Furthermore, sodium ion batteries shall meet the provisions of 2.2.9.1.7.2, except that (a), (e) and (f) do not apply when batteries of a production run of not more than 100 cells or batteries, or pre-production prototypes of cells or batteries when these prototypes are carried for testing, are installed in machinery or engines.

g) The engine or machinery, including the means of containment containing dangerous goods, shall be in compliance with the construction requirements specified by the competent authority of the country of manufacture⁷;

h) Any valves or openings (e.g. venting devices) shall be closed during carriage;

i) The engines or machinery shall be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during carriage which would change the orientation or cause them to be damaged;

j) for UN No. 3528 and UN No. 3530:

Where the engine or machinery contains more than 60 l of liquid fuel and has a capacity of more than 450 l but not more than 3 000 l, it shall be labelled on two opposite sides in accordance with 5.2.2.

Where the engine or machinery contains more than 60 l of liquid fuel and has a capacity of more than 3 000 l, it shall be placarded on two opposite sides. Placards shall correspond to the labels required in Column (5) of Table A of Chapter 3.2 and shall conform to the specifications given in 5.3.1.7. Placards shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line.

Note: *On engines and machinery with a capacity of more than 450 l but containing 60 l of liquid fuel or less, labelling and placarding compliant with the above requirements are permitted.*

k) for UN No. 3529:

Where the fuel tank of the engine or machinery has a water capacity of more than 450 l but not more than 1 000 l, it shall be labelled on two opposite sides in accordance with 5.2.2.

Where the fuel tank of the engine or machinery has a water capacity of more than 1 000 l, it shall be placarded on two opposite sides. Placards shall correspond to the labels required in Column (5) of Table A of Chapter 3.2 and shall conform to the specifications given in 5.3.1.7. Placards shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line.

l) A transport document in accordance with 5.4.1 is required only when the engine or machinery contains more than 1 000 l of liquid fuels, for UN 3528 and UN 3530, or the fuel tank has a water capacity of more than 1 000 l, for UN 3529.

This transport document shall contain the following additional statement:

"TRANSPORT IN ACCORDANCE WITH SPECIAL PROVISION 363".

m) The requirements specified in packing instruction P 005 of 4.1.4.1 shall be met.

364 This article may only be carried under the provisions of Chapter 3.4 if, as presented for carriage, the package is capable of passing the test in accordance with Test Series 6 (d) of Part I of the Manual of Tests and Criteria as determined by the competent authority.

⁷ For example, in compliance with the relevant provisions of Document No. 14 of the List.

- 365** For manufactured instruments and articles containing mercury or gallium, see UN Nos. 3506 or 3554, as appropriate.
- 366** Manufactured instruments and articles containing not more than 1 kg of mercury or gallium are not subject to Annex 2 to SMGS.
- 367** For the purposes of documentation:
- The proper shipping name "Paint related material" may be used for consignments of packages containing "Paint" and "Paint related material" in the same package;
- The proper shipping name "Paint related material, corrosive, flammable" may be used for consignments of packages containing "Paint, corrosive, flammable" and "Paint related material, corrosive, flammable" in the same package;
- The proper shipping name "Paint related material, flammable, corrosive" may be used for consignments of packages containing "Paint, flammable, corrosive" and "Paint related material, flammable, corrosive" in the same package; and
- The proper shipping name "Printing ink related material" may be used for consignments of packages containing "Printing ink" and "Printing ink related material" in the same package.
- 368** In the case of non-fissile or fissile-excepted uranium hexafluoride, the material shall be classified under UN No. 3507 or UN No. 2978.
- 369** In accordance with 2.1.3.5.3 (a), this radioactive material in an excepted package possessing toxic and corrosive properties is classified in Class 6.1 with radioactivity and corrosivity subsidiary hazards.
- Uranium hexafluoride may be classified under this entry only if the conditions of 2.2.7.2.4.1.2, 2.2.7.2.4.1.5, 2.2.7.2.4.5.2 and, for fissile-excepted material, of 2.2.7.2.3.5 are met.
- In addition to the provisions applicable to the carriage of Class 6.1 substances with a corrosivity subsidiary hazard, the provisions of 5.1.3.2, 5.1.5.2.2, 5.1.5.4.1 (b), 7.5.11 CW 33 (3.1), (5.1) to (5.4) and (6) shall apply.
- No Class 7 label is required to be displayed.
- 370** This entry only applies to ammonium nitrate that meets one of the following criteria:
- a) ammonium nitrate with more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any added substance; or
- b) ammonium nitrate with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any added substance, that gives a positive result when tested in accordance with Test Series 2 (see Manual of Tests and Criteria, Part I). See also UN No. 1942. This entry shall not be used for ammonium nitrate for which a proper shipping name already exists in Table A of Chapter 3.2 including ammonium nitrate mixed with fuel oil (ANFO) or any of the commercial grades of ammonium nitrate.
- 371** 1) This entry also applies to articles, containing a small pressure receptacle with a release device. Such articles shall comply with the following requirements:
- a) The water capacity of the pressure receptacle shall not exceed 0.5 litres and the working pressure shall not exceed 25 bar at 15 °C;
- b) The minimum burst pressure of the pressure receptacle shall be at least four times the pressure of the gas at 15 °C;
- c) Each article shall be manufactured in such a way that unintentional firing or release is avoided under normal conditions of handling, packing, carriage and use. This may be fulfilled by an additional locking device linked to the activator;
- d) Each article shall be manufactured in such a way as to prevent hazardous projections of the pressure receptacle or parts of the pressure receptacle;
- e) Each pressure receptacle shall be manufactured from material which will not fragment upon rupture;

f) The design type of the article shall be subjected to a fire test. For this test, the provisions of paragraphs 16.6.1.2 except letter g, 16.6.1.3.1 to 16.6.1.3.4, 16.6.1.3.6, 16.6.1.3.7 (b) and 16.6.1.3.8 of the Manual of Tests and Criteria shall be applied. It shall be demonstrated that the article relieves its pressure by means of a fire degradable seal or other pressure relief device, in such a way that the pressure receptacle will not fragment and that the article or fragments of the article do not rocket more than 10 metres;

g) The design type of the article shall be subjected to the following test. A stimulating mechanism shall be used to initiate one article in the middle of the packaging. There shall be no hazardous effects outside the package such as disruption of the package, metal fragments or a receptacle which passes through the packaging.

2) The manufacturer shall produce technical documentation of the design type, manufacture as well as the tests and their results. The manufacturer shall apply procedures to ensure that articles produced in series are made of good quality, conform to the design type and are able to meet the requirements in (1). The manufacturer shall provide such information to the competent authority on request.

372 This entry applies to asymmetric capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to Annex 2 to SMGS.

Energy storage capacity means the energy stored in a capacitor, as calculated according to the following equation,

$$Wh = \frac{1}{2} C_N (U_R^2 - U_L^2) \times \frac{1}{3600}$$

where C_N is the nominal capacitance;
 U_R is the rated voltage;
 U_L is the rated lower limit voltage.

All asymmetric capacitors to which this entry applies shall meet the following conditions:

- a) Capacitors or modules shall be protected against short circuit;
- b) Capacitors shall be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid which is released upon venting shall be contained by packaging or by equipment in which a capacitor is installed;
- c) Capacitors shall be marked with the energy storage capacity in Wh; and
- d) Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods shall be designed to withstand a 95 kPa pressure differential;

Capacitors containing an electrolyte not meeting the classification criteria of any class of dangerous goods, including when configured in a module or when installed in equipment are not subject to other provisions of Annex 2 to SMGS.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods, with an energy storage capacity of 20 Wh or less, including when configured in a module, are not subject to other provisions of Annex 2 to SMGS when the capacitors are capable of withstanding a 1.2 metre drop test unpack- aged on an unyielding surface without loss of contents.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods that are not installed in equipment and with an energy storage capacity of more than 20 Wh are subject to Annex 2 to SMGS.

Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class of dangerous goods, are not subject to other provisions of Annex 2 to SMGS provided that the equipment is pack- aged in a strong outer packaging constructed of suitable material, and of adequate strength and design, in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during carriage. Large robust equipment

containing capacitors may be offered for carriage unpack aged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained.

Note: Notwithstanding the provisions of this special provision, nickel-carbon asymmetric capacitors containing Class 8 alkaline electrolytes shall be carried as UN 2795 BATTERIES, WET, FILLED WITH ALKALI, electric storage.

373 Neutron radiation detectors containing non-pressurized boron trifluoride gas may be carried under this entry provided that the following conditions are met:

a) Each radiation detector shall meet the following conditions.

- 1) The pressure in each detector shall not exceed 105 kPa absolute at 20 °C;
- 2) The amount of gas shall not exceed 13 g per detector;
- 3) Each detector shall be manufactured under a registered quality assurance programme;

Note: ISO 9001 may be used for this purpose.

4) Each neutron radiation detector shall be of welded metal construction with brazed metal to ceramic feed through assemblies. These detectors shall have a minimum burst pressure of 1800 kPa as demonstrated by design type qualification testing; and

5) Each detector shall be tested to a 1×10^{-10} cm³/s leaktightness standard before filling.

b) Radiation detectors carried as individual components shall be carried as follows:

- 1) Detectors shall be packed in a sealed intermediate plastics liner with sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents
- 2) They shall be packed in strong outer packaging. The completed package shall be capable of withstanding a 1.8 m drop test without leakage of gas contents from detectors;
- 3) The total amount of gas from all detectors per outer packaging shall not exceed 52 g.

c) Completed neutron radiation detection systems containing detectors meeting the conditions of paragraph a) shall be carried as follows:

- 1) The detectors shall be contained in a strong sealed outer casing;
- 2) The casing shall contain sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents;
- 3) The completed systems shall be packed in strong outer packagings capable of withstanding a 1.8 m drop test without leakage unless a system's outer casing affords equivalent protection. Packing instruction P 200 of 4.1.4.1 is not applicable.

Packing instruction P 200 of 4.1.4.1 is not applicable.

The transport document shall include the following statement:

"TRANSPORT IN ACCORDANCE WITH SPECIAL PROVISION 373".

Neutron radiation detectors containing not more than 1 g of boron trifluoride, including those with solder glass joints, are not subject to Annex 2 to SMGS provided they meet the requirements in paragraph a) and are packed in accordance with paragraph b). Radiation detection systems containing such detectors are not subject to Annex 2 to SMGS provided they are packed in accordance with paragraph c).

374 (reserved)

375 These substances when carried in single or combination packagings containing a net quantity per single or inner packaging of 5 l or less for liquids or having a net mass per single or inner packaging of 5 kg or less for solids, are not subject to any other provisions of Annex 2 to SMGS provided the packagings meet the general provisions

of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

- 376** Lithium metal, lithium ion or sodium ion cells or batteries identified as being damaged or defective such that they do not conform to the type tested according to the applicable provisions of the Manual of Tests and Criteria shall comply with the requirements of this special provision.

For the purposes of this special provision, these may include, but are not limited to:

- Cells or batteries identified as being defective for safety reasons;
- Cells or batteries that have leaked or vented;
- Cells or batteries that cannot be diagnosed prior to carriage; or
- Cells or batteries that have sustained physical or mechanical damage.

Note: *In assessing a cell or battery as damaged or defective, an assessment or evaluation shall be performed based on safety criteria from the cell, battery or product manufacturer or by a technical expert with knowledge of the cell's or battery's safety features. An assessment or evaluation may include, but is not limited to, the following criteria:*

- a) Acute hazard, such as gas, fire, or electrolyte leaking;*
- b) The use or misuse of the cell or battery;*
- c) Signs of physical damage, such as deformation to cell or battery casing, or colours on the casing;*
- d) External and internal short circuit protection, such as voltage or isolation measures;*
- e) The condition of the cell or battery safety features; or*
- f) Damage to any internal safety components, such as the battery management system.*

Cells and batteries shall be carried according to the provisions applicable to UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552, as appropriate, except special provision 230 and as otherwise stated in this special provision.

Cells and batteries shall be packed in accordance with packing instructions P 908 of 4.1.4.1 or LP 904 of 4.1.4.3, as applicable.

Cells and batteries identified as damaged or defective and liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage shall be packed and carried in accordance with packing instruction P 911 of 4.1.4.1 or LP 906 of 4.1.4.3, as applicable. Alternative packing and/or carriage conditions may be authorized by the competent authority of any SMGS Contracting State who may also recognize an approval granted by the competent authority of a country which is not an SMGS Contracting State provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions. In both cases the cells and batteries are assigned to transport category 0.

Packages shall be marked "DAMAGED/DEFECTIVE LITHIUM ION BATTERIES", "DAMAGED/DEFECTIVE LITHIUM METAL BATTERIES or "DAMAGED/DEFECTIVE SODIUM ION BATTERIES", as applicable.

The transport document shall include the following statement: "Transport in accordance with special provision 376".

If applicable, a copy of the competent authority approval shall accompany the carriage.

- 377** Lithium metal, lithium ion and sodium ion cells and batteries and equipment containing such cells and batteries carried for disposal or recycling, either packed together with or packed without non-lithium or non-sodium ion batteries, may be packaged in accordance with packing instruction P 909 of 4.1.4.1.

These cells and batteries are not subject to the requirements of 2.2.9.1.7.1 (a) to (g) or

2.2.9.1.7.2 (a) to (f), as appropriate.

Packages shall be marked "LITHIUM BATTERIES FOR DISPOSAL", "SODIUM ION BATTERIES FOR DISPOSAL", "LITHIUM BATTERIES FOR RECYCLING" or "SODIUM ION BATTERIES FOR RECYCLING", as appropriate.

Identified damaged or defective batteries shall be carried in accordance with special provision 376.

378 Radiation detectors containing this gas in non-refillable pressure receptacles not meeting the requirements of Chapter 6.2 and packing instruction P 200 of 4.1.4.1 may be carried under this entry provided:

- a) The working pressure in each receptacle does not exceed 50 bar;
- b) The receptacle capacity does not exceed 12 litres;
- c) Each receptacle has a minimum burst pressure of at least 3 times the working pressure when a relief device is fitted and at least 4 times the working pressure when no relief device is fitted;
- d) Each receptacle is manufactured from material which will not fragment upon rupture;
- e) Each detector is manufactured under a registered quality assurance programme;

Note: ISO 9001 may be used for this purpose.

f) Detectors are carried in strong outer packagings. The complete package shall be capable of withstanding a 1.2 metre drop test without breakage of the detector or rupture of the outer packaging. Equipment that includes a detector shall be packed in a strong outer packaging unless the detector is afforded equivalent protection by the equipment in which it is contained; and

g) The transport document includes the following statement:

"TRANSPORT IN ACCORDANCE WITH SPECIAL PROVISION 378".

Radiation detectors, including detectors in radiation detection systems, are not subject to any other requirements of Annex 2 to SMGS if the detectors meet the requirements in (a) to (f) above and the capacity of detector receptacles does not exceed 50 ml.

379 Anhydrous ammonia adsorbed or absorbed on a solid contained in ammonia dispensing systems or receptacles intended to form part of such systems are not subject to the other provisions of Annex 2 to SMGS if the following conditions are observed:

- a) The adsorption or absorption presents the following properties:
 - 1) The pressure at a temperature of 20 °C in the receptacle is less than 0.6 bar;
 - 2) The pressure at a temperature of 35 °C in the receptacle is less than 1 bar;
 - 3) The pressure at a temperature of 85 °C in the receptacle is less than 12 bar.
- b) The adsorbent or absorbent material shall not have dangerous properties listed in classes 1 to 8;
- c) The maximum contents of a receptacle shall be 10 kg of ammonia; and
- d) Receptacles containing adsorbed or absorbed ammonia shall meet the following conditions:
 - 1) Receptacles shall be made of a material compatible with ammonia as specified in ISO 11114-1:2020;
 - 2) Receptacles and their means of closure shall be hermetically sealed and able to contain the generated ammonia;
 - 3) Each receptacle shall be able to withstand the pressure generated at 85 °C with a volumetric expansion no greater than 0.1%;

4) Each receptacle shall be fitted with a device that allows for gas evacuation once pressure exceeds 15 bar without violent rupture, explosion or projection; and

5) Each receptacle shall be able to withstand a pressure of 20 bar without leakage when the pressure relief device is deactivated.

When carried in an ammonia dispenser, the receptacles shall be connected to the dispenser in such a way that the assembly is guaranteed to have the same strength as a single receptacle.

The properties of mechanical strength mentioned in this special provision shall be tested using a prototype of a receptacle and/or dispenser filled to nominal capacity, by increasing the temperature until the specified pressures are reached.

The test results shall be documented, shall be traceable and shall be communicated to the relevant authorities upon request.

380- 381 (reserved)

382 Polymeric beads may be made from polystyrene, poly (methyl methacrylate) or other polymeric material. When it can be demonstrated that no flammable vapour, resulting in a flammable atmosphere, is evolved according to test U1 (Test method for substances liable to evolve flammable vapours) of Part III, sub-section 38.4.4 of the *Manual of Tests and Criteria*, polymeric beads, expandable need not be classified under this UN number. This test should only be performed when de-classification of a substance is considered.

383 Table tennis balls manufactured from celluloid are not subject to Annex 2 to SMGS where the net mass of each table tennis ball does not exceed 3.0 g and the total net mass of table tennis balls does not exceed 500 g per package.

384 (reserved)

385 (reserved)

386 Substances stabilized by temperature control are not accepted for carriage by rail (see 2.2.41.2.3). When chemical stabilization is employed, the person offering the packaging, IBC or tank for carriage shall ensure that the level of stabilization is sufficient to prevent the substance in the packaging, IBC or tank from dangerous polymerization at a bulk mean temperature of 50 °C, or, in the case of a portable tank, 45 °C. Where chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of carriage, carriage by rail is not permitted. In making this determination factors to be taken into consideration include, but are not limited to, the capacity and geometry of the packaging, IBC or tank and the effect of any insulation present, the temperature of the substance when offered for carriage, the duration of the journey and the ambient temperature conditions typically encountered in the journey (considering also the season of year), the effectiveness and other properties of the stabilizer employed, applicable operational controls imposed by regulation (e.g. requirements to protect from sources of heat, including other cargo carried at a temperature above ambient) and any other relevant factors

387 Lithium batteries in conformity with 2.2.9.1.7.1 f) containing both primary lithium metal cells and rechargeable lithium ion cells shall be assigned to UN Nos. 3090 or 3091 as appropriate. When such batteries are carried in accordance with special provision 188, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh.

388 UN No. 3166 entries apply to vehicles powered by flammable liquid or gas internal combustion engines or fuel cells.

Vehicles powered by a fuel cell engine shall be assigned to the entries UN 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed.

Other vehicles which contain an internal combustion engine shall be assigned to the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed.

If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it shall be assigned to UN 3166 VEHICLE, FLAMMABLE GAS POWERED.

Entry UN 3171 only applies to vehicles and equipment powered by wet batteries, metallic sodium batteries or sodium alloy batteries, carried with these batteries installed.

UN 3556 VEHICLE, LITHIUM ION BATTERY POWERED, UN 3557 VEHICLE, LITHIUM METAL BATTERY POWERED and UN 3558 VEHICLE, SODIUM ION BATTERY POWERED, as applicable, apply to vehicles powered by lithium ion, lithium metal or sodium ion batteries carried with the batteries installed.

For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with a motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheelchairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. This includes vehicles carried in a packaging. In this case some parts of the vehicle may be detached from its frame to fit into the packaging. When vehicles are carried in a packaging, some parts of the vehicle, other than the battery, may be detached from its frame to fit into the packaging

Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries shall be assigned to the entries UN 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or UN 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT or UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or UN 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, as appropriate. Lithium ion batteries or lithium metal batteries installed in a cargo transport unit and designed only to provide power external to the cargo 3.3-22 transport unit shall be assigned to the entry UN 3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries.

Dangerous goods, such as batteries, airbags, fire extinguishers, compressed gas accumulators, safety devices and other integral components of the vehicle that are necessary for the operation of the vehicle or for the safety of its operator or passengers, shall be securely installed in the vehicle and are not otherwise subject to Annex 2 to SMGS. However, lithium batteries shall meet the provisions of 2.2.9.1.7.1, except that (a), (e) (vii), (f) (iii) if applicable, (f) (iv) if applicable and (g) do not apply when batteries of a production run of not more than 100 cells or batteries, or pre-production prototypes of cells or batteries when these prototypes are carried for testing, are installed in vehicles. Furthermore, sodium ion batteries shall meet the provisions of 2.2.9.1.7.2, except that (a), (e) and (f) do not apply when batteries of a production run of not more than 100 cells or batteries, or pre-production prototypes of cells or batteries when these prototypes are carried for testing, are installed in vehicles.

Where a lithium battery installed in a vehicle is damaged or defective, the vehicle shall be carried in accordance with the conditions defined in special provision 667 (c).

- 389** This entry only applies to lithium ion batteries or lithium metal batteries installed in a cargo transport unit and designed only to provide power external to the cargo transport unit. The lithium batteries shall meet the provisions of 2.2.9.1.7.1 a) to g) and contain the necessary systems to prevent overcharge and over discharge between the batteries.

The batteries shall be securely attached to the interior structure of the cargo transport unit (e.g., by means of placement in racks, cabinets, etc.) in such a manner as to prevent short circuits, accidental operation, and significant movement relative to the cargo transport unit under the shocks, loadings and vibrations normally incident to carriage. Dangerous goods necessary for the safe and proper operation of the cargo transport unit (e.g., fire extinguishing systems and air conditioning systems), shall be properly secured to or installed in the cargo transport unit and are not otherwise subject to Annex 2 to SMGS. Dangerous goods not necessary for the safe and proper operation of the cargo transport unit shall not be carried within the cargo transport unit.

The batteries inside the cargo transport unit are not subject to marking or labelling requirements. The cargo transport unit shall bear orange-coloured plates in accordance with 5.3.2.2 and placards in accordance with 5.3.1.1 on two opposing sides.

390 When a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment, the following requirements apply for the purposes of package marking and documentation:

a) the package shall be marked "UN 3091" or "UN 3481", as appropriate. If a package contains both lithium ion batteries and lithium metal batteries packed with and contained in equipment, the package shall be marked as required for both battery types. However, button cell batteries installed in equipment (including circuit boards) need not be considered;

b) the transport document shall indicate "UN 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT" or "UN 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT", as appropriate. If a package contains both lithium metal batteries and lithium ion batteries packed with and contained in equipment, then the transport document shall indicate both "UN 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT" and "UN 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT".

391 (Reserved)

392 For the carriage of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of 4.1.4.1 and Chapter 6.2 need not be applied when carried for disposal, recycling, repair, inspection, maintenance or from where they are manufactured to a vehicle assembly plant, provided the following conditions are met:

a) The fuel gas containment systems shall meet the requirements of the standards or regulations for fuel tanks for vehicles, as applicable. Examples of applicable standards and regulations are:

LPG tanks	
UN Regulation No. 67 Revision 2	Uniform provisions concerning: I. Approval of specific equipment of vehicles of category M and N using liquefied petroleum gases in their propulsion system; II. Approval of vehicles of category M and N fitted with specific equipment for the use of liquefied petroleum gases in their propulsion system with regard to the installation of such equipment

UN Regulation No. 115	Uniform provisions concerning the approval of: I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion systems; II Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system
CNG and LNG tanks	
UN Regulation No. 110	Uniform provisions concerning the approval of: I. Specific components of motor vehicles using compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system II. Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system
UN Regulation No. 115	Uniform provisions concerning the approval of: I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion systems; II Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system
ISO 11439:2013	Gas cylinders – High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles
ISO 15500-Series	Road vehicles – Compressed natural gas (CNG) fuel system components (several parts as applicable).
ANSI NGV 2	Compressed natural gas vehicle fuel containers
CSA B51 Part 2:2014	Boiler, pressure vessel, and pressure piping code Part 2 Requirements for high-pressure cylinders for on-board storage of fuels for automotive vehicles
Hydrogen pressure tanks	
Global Technical Regulation (GTR) No. 13	Global technical regulation on hydrogen and fuel cell vehicles (ECE/TRANS/180/Add.13)
ISO/TS 15869:2009	Gaseous hydrogen and hydrogen blends – Land vehicle fuel tanks
<i>Document No. 15 of the List</i>	Official type approval of hydrogen-powered motor vehicles
<i>Document No. 16 of the List</i>	Official type approval of hydrogen-powered motor vehicles

UN Regulation No. 134	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogen-fuelled vehicles
CSA B51 Part 2: 2014	Boiler, pressure vessel, and pressure piping code – Part 2: Requirements for high-pressure cylinders for on-board storage of fuels for automotive vehicles

Gas tanks designed and constructed in accordance with previous versions of relevant standards or regulations for gas tanks for motor vehicles, which were applicable at the time of the certification of the vehicles for which the gas tanks were designed and constructed may continue to be carried;

b) The fuel gas containment systems shall be leakproof and shall not exhibit any signs of external damage which may affect their safety;

Note 1: Criteria may be found in standard ISO 11623:2015 Transportable gas cylinders – Periodic inspection and testing of composite gas cylinders (or ISO 19078:2013 Gas cylinders – Inspection of the cylinder installation, and requalification of high pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles).

Note 2: If the fuel gas containment systems are not leakproof or are overfilled or if they exhibit damage that could affect their safety (e.g. in case of a safety related recall), they shall only be carried in salvage pressure receptacles in conformity with Annex 2 to SMGS.

c) If a fuel gas containment system is equipped with two valves or more integrated in line, the two valves shall be closed as to be gastight under normal conditions of carriage. If only one valve exists or only one valve works, all openings with the exception of the opening of the pressure relief device shall be closed as to be gastight under normal conditions of carriage;

d) Fuel gas containment systems shall be carried in such a way as to prevent obstruction of the pressure relief device or any damage to the valves and any other pressurised part of the fuel gas containment systems and unintentional release of the gas under normal conditions of carriage. The fuel gas containment system shall be secured in order to prevent slipping, rolling or vertical movement;

e) Valves shall be protected by one of the methods described in 4.1.6.8 (a) to (e);

f) Except for the case of fuel gas containment systems removed for disposal, recycling, repair, inspection or maintenance, they shall be filled with not more than 20% of their nominal filling ratio or nominal working pressure, as applicable;

g) Notwithstanding the provisions of Chapter 5.2, when fuel gas containment systems are consigned in a handling device, marks and labels may be affixed to the handling device; and

h) Notwithstanding the provisions of 5.4.1.1.1 (f) the information on the total quantity of dangerous goods may be replaced by the following information:

- 1) The number of fuel gas containment systems; and
- 2) In the case of liquefied gases the total net mass (kg) of gas of each fuel gas containment system and, in the case of compressed gases, the total water capacity (l) of each fuel gas containment system followed by the nominal working pressure.

Examples for information in the transport document:

Example 1: "UN 1971 NATURAL GAS, COMPRESSED, 2.1, 1 FUEL GAS CONTAINMENT SYSTEM OF 50 L IN TOTAL, 200 BAR".

Example 2: "UN 1965 HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S., 2.1, 3 FUEL GAS CONTAINMENT SYSTEMS, EACH OF 15 KG NET MASS OF GAS".

- 393** The nitrocellulose shall meet the criteria of the Bergmann-Junk test or methyl violet paper test in the Manual of Tests and Criteria Appendix 10. Tests of type 3 (c) need not be applied.
- 394** The nitrocellulose shall meet the criteria of the Bergmann-Junk test or methyl violet paper test in the Manual of Tests and Criteria Appendix 10.
- 395** This entry shall only be used for solid medical waste of Category A carried for disposal
- 396** Large and robust articles, if they are able to withstand impacts and loads occurring under normal conditions of carriage, may be carried with connected gas cylinders with the valves open regardless of 4.1.6.5 provided:
- a) The gas cylinders contain nitrogen of UN No. 1066 or compressed gas of UN No. 1956 or compressed air of UN No. 1002;
 - b) The gas cylinders are connected with the article through pressure regulators and fixed piping in such a way that the pressure of the gas (gauge pressure) in the article does not exceed 35 kPa (0.35 bar);
 - c) The gas cylinders are properly secured so that they cannot move in relation to the article and are fitted with strong and pressure resistant hoses and pipes;
 - d) The gas cylinders, pressure regulators, piping and other components are protected from damage and impacts during carriage by wooden crates or other suitable means;
 - e) The transport document includes the following statement: "Transport in accordance with special provision 396";
 - f) Cargo transport units containing articles carried with cylinders with open valves containing a gas presenting a risk of asphyxiation are well ventilated and marked in accordance with 5.5.3.6.
- 397** Mixtures of nitrogen and oxygen containing not less than 19.5% and not more than 23.5% oxygen by volume may be carried under this entry when no other oxidizing gases are present. A Class 5.1 subsidiary hazard label (model No. 5.1, see 5.2.2.2.2) is not required for any concentrations within this limit.
- 398** This entry applies to mixtures of butylenes, 1-butylene, cis-2-butylene and trans-2-butylene. For isobutylene, see UN No. 1055.
- Note:** For additional information to be added in the transport document, see 5.4.1.2.2 e).
- 399** (reserved)
- 400** Sodium ion cells and batteries and sodium ion cells and batteries contained in or packed with equipment, prepared and offered for carriage, are not subject to other provisions of Annex 2 to SMGS if they meet the following:
- a) The cell or battery is short-circuited, in a way that the cell or battery does not contain electrical energy. The short-circuiting of the cell or battery is easily verifiable (e.g. busbar between terminals);
 - b) Each cell or battery meets the provisions of 2.2.9.1.7.2 (a), (b), (d), (e) and (f);
 - c) Each package is marked according to 5.2.1.9;
 - d) Except when cells or batteries are installed in equipment, each package is capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents;
 - e) Cells and batteries, when installed in equipment are protected from damage. When batteries are installed in equipment, the equipment is packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;

- f) Each cell, including when it is a component of a battery, only contains dangerous goods that are authorized to be carried in accordance with the provisions of Chapter 3.4 and in a quantity not exceeding the quantity specified in column (7a) of Table A of Chapter 3.2.
- 401** Sodium ion cells and batteries with organic electrolyte shall be carried as UN No. 3551 or 3552, as appropriate. Sodium ion cells and batteries with aqueous alkali electrolyte shall be carried as UN No. 2795. Batteries containing metallic sodium or sodium alloy shall be carried as UN No. 3292.
- 402** Substances carried under this entry shall have a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l.
- 403** Nitrocellulose membrane filters covered by this entry with nitrocellulose content not exceeding 53 g/m² and a nitrocellulose net mass not exceeding 300 g per inner packaging, are not subject to the requirements of Annex 2 to SMGS if they meet the following conditions:
- a) They are packed with paper separators of minimum 80 g/m² placed between each layer of nitrocellulose membrane filters;
 - b) They are packed to maintain the alignment of the nitrocellulose membrane filters and the paper separators in any of the following configurations:
 - 1) Rolls tightly wound and packed in plastic foil of minimum 80 g/m² or aluminium pouches with an oxygen permeability equal to or less than 0.1% in accordance with standard SO 15105-1:2007;
 - 2) Sheets packed in cardboard of minimum 250 g/m² or aluminium pouches with an oxygen permeability equal to or less than 0.1% in accordance with standard ISO 15105-1:2007;
 - 3) Round filters packed in disc holders or cardboard packaging of minimum 250 g/m² or single packed in pouches of paper and plastic material of total minimum 100 g/m².
- 404** Vehicles powered by sodium ion batteries, containing no other dangerous goods, are not subject to other provisions of Annex 2 to SMGS if the battery is short-circuited in a way that the battery does not contain electrical energy. The short-circuiting of the battery shall be easily verifiable (e.g. busbar between terminals).
- 405** (reserved)
- 406** Substances under this entry may be carried in accordance with the limited quantity provisions of Chapter 3.4 when carried in pressure receptacles containing not more than 1 000 ml. The pressure receptacles shall meet the requirements of packing instruction P 200 of 4.1.4.1 and have a test pressure capacity product not exceeding 15.2 MPa·l (152 bar·l). The pressure receptacles shall not be packed together with other dangerous goods.
- 407** Fire suppressant dispersing devices are articles which contain a pyrotechnic substance, which are intended to disperse a fire extinguishing agent (or aerosol) when activated, and which do not contain any other dangerous goods. These articles, as packaged for carriage, shall fulfil the criteria for Division 1.4, Compatibility Group S, when tested in accordance with test series 6 (c) of Section 16 of Part I of the Manual of Tests and Criteria. The device shall be carried with either the means of activation removed or equipped with at least two independent means to prevent accidental activation.
- Fire suppressant dispersing devices shall only be assigned to Class 9, UN No. 3559 if the following additional conditions are met:
- a) The device meets the exclusion criteria in 2.2.1.1.8.2 (b), (c) and (d);
 - b) The suppressant is deemed safe for normally occupied spaces in compliance with international or regional standards (e.g. the United States of America National

Fire Protection Association standard for fixed aerosol fire-extinguishing systems NFPA 2010);

- c) The article is packaged in a manner such that when activated, temperatures of the outside of the package do not exceed 200 °C;
- d) This entry is used only with the approval of the competent authority of the country of manufacture⁸.

This entry does not apply to "SAFETY DEVICES, electrically initiated" described in special provision 280 (UN No. 3268).

408 This entry applies only to aqueous solutions comprised of water, tetramethylammonium hydroxide (TMAH), and no more than 1% of other constituents. Other formulations containing tetramethylammonium hydroxide shall be assigned to an appropriate generic or n.o.s. entry (e.g. UN 2927 TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.), except as follows:

- a) Other formulations containing a surfactant in a concentration > 1% and with not less than 8.75% tetramethylammonium hydroxide shall be assigned to UN 2927 TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S., PG I; and
- b) Other formulations containing a surfactant in a concentration > 1% and with more than 2.38% but less than 8.75% tetramethylammonium hydroxide shall be assigned to UN 2927 TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S., PG II.

409 (reserved)

501 For naphthalene, molten, see UN No. 2304.

502 UN No. 2006 plastics, nitrocellulose-based, self-heating, n.o.s., and 2002 celluloid scrap are substances of Class 4.2.

503 For phosphorus, white, molten, see UN No. 2447.

504 UN No. 1847 potassium sulphide, hydrated with not less than 30% water of crystallization, UN No. 1849 sodium sulphide, hydrated with not less than 30% water of crystallization and UN No. 2949 sodium hydrosulphide, hydrated with not less than 25% water of crystallization are substances of Class 8.

505 UN No. 2004 magnesium diamide is a substance of Class 4.2.

506 Alkaline earth metals and alkaline earth metal alloys in pyrophoric form are substances of Class 4.2. UN No. 1869 magnesium or magnesium alloys containing more than 50% magnesium as pellets, turnings or ribbons, are substances of Class 4.1.

507 UN No. 3048 aluminium phosphide pesticides, with additives inhibiting the emission of toxic flammable gases are substances of Class 6.1.

508 UN No. 1871 titanium hydride and UN No. 1437 zirconium hydride are substances of Class 4.1. UN No. 2870 aluminium borohydride is a substance of Class 4.2.

509 UN No. 1908 chlorite solution is a substance of Class 8.

510 UN No. 1755 chromic acid solution is a substance of Class 8.

511 UN No. 1625 mercuric nitrate, UN No. 1627 mercurous nitrate and UN No. 2727 thallium nitrate are substances of Class 6.1. Thorium nitrate, solid, uranyl nitrate hexahydrate solution and uranyl nitrate, solid are substances of Class 7.

512 UN No. 1730 antimony pentachloride, liquid, UN No. 1731 antimony pentachloride solution, UN No. 1732 antimony pentafluoride and UN No. 1733 antimony trichloride are substances of Class 8.

513 UN No. 0224 barium azide, dry or wetted with less than 50% water, by mass, is not permitted for carriage by rail. UN No. 1571 barium azide, wetted with not less than 50% water, by mass, is a substance of Class 4.1. UN No. 1854 barium alloys,

³ If the country of manufacture is not a Contracting Party to SMGS, the approval shall be recognized by the competent authority of a Contracting Party SMGS.

- pyrophoric, are substances of Class 4.2. UN No. 1445 barium chlorate, solid, UN No. 1446 barium nitrate, UN No. 1447 barium perchlorate, solid, UN No. 1448 barium permanganate, UN No. 1449 barium peroxide, UN No. 2719 barium bromate, UN No. 2741 barium hypochlorite with more than 22% available chlorine, UN No. 3405 barium chlorate, solution and UN No. 3406 barium perchlorate, solution, are substances of Class 5.1. UN No. 1565 barium cyanide and UN No. 1884 barium oxide are substances of Class 6.1.
- 514** UN No. 2464 beryllium nitrate is a substance of Class 5.1.
- 515** UN No. 1912 methyl chloride and methylene chloride mixture is a substance of class 2.
- 516** UN No. 1912 methyl chloride and methylene chloride mixture is a substance of Class 2
- 517** UN No. 1690 sodium fluoride, solid, UN No. 1812 potassium fluoride, solid, UN No. 2505 ammonium fluoride, UN No. 2674 sodium fluorosilicate, UN No. 2856 fluorosilicates, n.o.s., UN No. 3415 sodium fluoride, solution and UN No. 3422 potassium fluoride, solution, are substances of Class 6.1.
- 518** UN No. 1463 chromium trioxide, anhydrous (chromic acid, solid) is a substance of Class 5.1.
- 519** UN No. 1048 hydrogen bromide, anhydrous, is a substance of Class 2.
- 520** UN No. 1050 hydrogen chloride, anhydrous, is a substance of Class 2.
- 521** Solid chlorites and hypochlorites are substances of Class 5.1.
- 522** UN No. 1873 perchloric acid aqueous solution with more than 50% but not more than 72% pure acid, by mass are substances of Class 5.1. Perchloric acid solutions containing more than 72% pure acid, by mass, or mixtures of perchloric acid with any liquid other than water, are not to be accepted for carriage.
- 523** UN No. 1382 anhydrous potassium sulphide and UN No. 1385 anhydrous sodium sulphide and their hydrates with less than 30% water of crystallization, and UN No. 2318 sodium hydrosulphide with less than 25% water of crystallization are substances of Class 4.2.
- 524** UN No. 2858 finished zirconium products of a thickness of 18 µm or more are substances of Class 4.1.
- 525** Solutions of inorganic cyanides with a total cyanide ion content of more than 30% shall be classified in packing group I, solutions with a total cyanide ion content of more than 3% and not more than 30% in packing group II and solutions with a cyanide ion content of more than 0.3% and not more than 3% in packing group III.
- 526** UN No. 2000 celluloid is assigned to Class 4.1.
- 528** UN No. 1353 fibres or fabrics impregnated with weakly nitrated cellulose, non-self heating are substances of Class 4.1.
- 529** UN No. 0135 mercury fulminate, wetted with not less than 20% water, or mixture of alcohol and water, by mass, is not permitted for carriage by rail. Mercurous chloride (calomel) is a substance of Class 6.1 (UN No. 2025).
- 530** UN No. 3293 hydrazine, aqueous solution with not more than 37% hydrazine, by mass, is a substance of Class 6.1.
- 531** Mixtures having a flash-point below 23 °C and containing more than 55% nitrocellulose, whatever its nitrogen content or containing not more than 55% nitrocellulose with a nitrogen content above 12.6% (by dry mass), are substances of Class 1 (see UN Nos. 0340 or 0342) or of Class 4.1 (UN Nos. 2555, 2556 or 2557). (reserved).
- 532**
- 533** UN No. 1198 formaldehyde solutions, flammable are substances of Class 3. Formaldehyde solutions, non-flammable, with less than 25% formaldehyde are not subject to the requirements of Annex 2 to SMGS.
- 534** While in some climatic conditions, petrol (gasoline) may have a vapour pressure at 50 °C of more than 110 kPa (1.10 bar) but not more than 150 kPa (1.50 bar) it is to continue to be considered as a substance having a vapour pressure at 50 °C of not more than 110 kPa (1.10 bar).

- 535** UN No. 1469 lead nitrate, UN No. 1470 lead perchlorate, solid and UN No. 3408 lead perchlorate, solution are substances of Class 5.1.
- 536** For naphthalene, solid, see UN No. 1334.
- 537** UN No. 2869 titanium trichloride mixture, not pyrophoric, is a substance of Class 8.
- 538** For sulphur (in the solid state), see UN No. 1350.
- 539** Solutions of isocyanates having a flash-point of not less than 23 °C are substances of Class 6.1.
- 540** UN No. 1326 hafnium powder, wetted, UN No. 1352 titanium powder, wetted or UN No. 1358 zirconium powder, wetted, with not less than 25% water, are substances of Class 4.1.
- 541** Nitrocellulose mixtures with a water content, alcohol content or plasticizer content lower than the stated limits are substances of Class 1.
- 542** Talc containing tremolite and/or actinolite is covered by this entry.
- 543** (reserved).
- 544** UN No. 1032 dimethylamine, anhydrous, UN No. 1036 ethylamine, UN No. 1061 methylamine, anhydrous and UN No. 1083 trimethylamine, anhydrous, are substances of Class 2.
- 545** UN No. 0401 dipicryl sulphide, wetted with less than 10% water by mass is a substance of Class 1.
- 546** UN No. 2009 zirconium, dry, finished sheets, strip or coiled wire, in thicknesses of less than 18 µm, is a substance of Class 4.2. Zirconium, dry, finished sheets, strip or coiled wire, in thicknesses of 254 µm or more, is not subject to the requirements of Annex 2 to SMGS.
- 547** UN No. 2210 maneb or UN No. 2210 maneb preparations in self-heating form are substances of Class 4.2.
- 548** Chlorosilanes which, in contact with water, emit flammable gases, are substances of Class 4.3.
- 549** Chlorosilanes having a flash-point of less than 23 °C and which, in contact with water, do not emit flammable gases are substances of Class 3. Chlorosilanes having a flash-point equal to or greater than 23 °C and which, in contact with water, do not emit flammable gases are substances of Class 8.
- 550** UN No. 1333 cerium in slabs, rods or ingots is a substance of Class 4.1.
- 551** Solutions of these isocyanates having a flash-point below 23 °C are substances of Class 3.
- 552** Metals and metal alloys in powdered or other flammable form, liable to spontaneous combustion, are substances of Class 4.2. Metals and metal alloys in powdered or other flammable form which, in contact with water, emit flammable gases are substances of Class 4.3.
- 553** This mixture of hydrogen peroxide and peroxyacetic acid shall, in laboratory testing (see Manual of Tests and Criteria, Part II, section 20), neither detonate in the cavitated state nor deflagrate at all and shall show no effect when heated under confinement nor any explosive power. The formulation shall be thermally stable (self-accelerating decomposition temperature 60 °C or higher for a 50 kg package), and a liquid compatible with peroxyacetic acid shall be used for desensitization. Formulations not meeting these criteria are to be regarded as substances of Class 5.2 (see Manual of Tests and Criteria, Part II, paragraph 20.4.3 (g)).
- 554** Metal hydrides which, in contact with water, emit flammable gases are substances of Class 4.3. UN No. 2870 aluminium borohydride or UN No. 2870 aluminium borohydride in devices is a substance of Class 4.2.

- 555** Dust and powder of metals in non-spontaneously combustible form, non-toxic which nevertheless, in contact with water, emit flammable gases, are substances of Class 4.3.
- 556** (reserved).
- 557** Dust and powder of metals in pyrophoric form are substances of Class 4.2.
- 558** Metals and metal alloys in pyrophoric form are substances of Class 4.2. Metals and metal alloys which, in contact with water, do not emit flammable gases and are not pyrophoric or self-heating, but which are easily ignited, are substances of Class 4.1.
- 559** (reserved)
- 560** An elevated temperature liquid, n.o.s. at or above 100 °C (including molten metals and molten salts) and, for a substance having a flashpoint, at a temperature below its flashpoint, is a substance of Class 9 (UN No. 3257).
- 561** Chloroformates having predominantly corrosive properties are substances of Class 8.
- 562** Spontaneously combustible organometallic compounds are substances of Class 4.2. Water-reactive organometallic compounds, flammable, are substances of Class 4.3.
- 563** UN No. 1905 selenic acid is a substance of Class 8.
- 564** UN No. 2443 vanadium oxytrichloride, UN No. 2444 vanadium tetrachloride and UN No. 2475 vanadium trichloride are substances of Class 8.
- 565** Unspecified wastes resulting from medical/veterinary treatment of humans/animals or from biological research, and which are unlikely to contain substances of Class 6.2 shall be assigned to this entry. Decontaminated clinical wastes or wastes resulting from biological research which previously contained infectious substances are not subject to the requirements of Class 6.2.
- 566** UN No. 2030 hydrazine aqueous solution, with more than 37% hydrazine, by mass, is a substance of Class 8.
- 567** (reserved)
- 568** Barium azide with a water content lower than the stated limit is a substance of Class 1, UN No. 0224 and is not permitted for carriage by rail.
- 580** (reserved).
- 581** This entry covers mixtures of propadiene with 1 to 4% methylacetylene as well as the following mixtures:

Mixture	contains, % by volume			Permitted technical name for purpose of 5.4.1.1
	methylacetylene and propadiene by volume and not more	propane and propylene, not more	C4-saturated hydrocarbons, not less	
P1	63	24	14	«Mixture P1»
P2	48	50	5	«Mixture P2»

- 582** This entry covers, inter alia, mixtures of gases, with the following properties:

Mixture	Maximum vapour pressure at 70 °C (MPa)	Minimum density at 50 °C	Permitted technical name for purposes of 5.4.1.1
F1	1,3	1,30	«Mixture F1»
F2	1,9	1,21	«Mixture F2»
F3	3,0	1,09	«Mixture F3»

Note 1: Trichlorofluoromethane (refrigerant R 11), 1,1,2-trichloro-1,2,2-trifluoroethane (refrigerant R 113), 1,1,1-trichloro-2,2,2-trifluoroethane (refrigerant R 113a), 1-chloro-1,2,2-trifluoroethane (refrigerant R 133) and 1-chloro-1,1,2-trifluoroethane (refrigerant R 133b) are not substances of Class 2. They may, however, enter into the composition of mixtures F 1 to F 3.

Note 2: The reference densities correspond to the densities of dichlorofluoromethane (1.30 kg/l), dichlorodifluoromethane (1.21 kg/l) and chlorodifluoromethane (1.09 kg/l).

583 This entry covers, inter alia, mixtures of gases, with the following properties:

Mixture	Maximum vapour pressure at 70 °C (MPa)	Minimum density at 50 °C	Permitted technical name ^{a)} for purpose of 5.4.1.1
A	1,1	0,525	"Mixture A" or "Butane"
A01	1,6	0,516	"Mixture A01" or "Butane"
A02	1,6	0,505	"Mixture A02" or "Butane"
A0	1,6	0,495	"Mixture A0" or "Butane"
A1	2,1	0,485	"Mixture A1"
B1	2,6	0,474	"Mixture B1"
B2	2,6	0,463	"Mixture B2"
B	2,6	0,450	"Mixture B"
C	3,1	0,440	"Mixture C" or "Propane"

^{a)} For carriage in tanks, the trade names "Butane" or "Propane" may be used only as a complement.

584 This gas is not subject to the requirements of Annex 2 to SMGS when:

- it contains not more than 0.5% air in the gaseous state;
- it is contained in metal capsules (sodors, sparklets) free from defects which may impair their strength;
- the leak proofness of the closure of the capsule is ensured;

- a capsule contains not more than 25 g of this gas;
- a capsule contains not more than 0.75 g of this gas per cm³ of capacity.

- 585** (reserved).
- 586** Hafnium, titanium and zirconium powders shall contain a visible excess of water. Hafnium, titanium and zirconium powders, wetted, mechanically produced, of a particle size of 53 µm and over, or chemically produced, of a particle size of 840 µm and over, are not subject to the requirements of Annex 2 to SMGS.
- 587** Barium stearate and barium titanate are not subject to the requirements of Annex 2 to SMGS.
- 588** Solid hydrated forms of aluminium bromide and aluminium chloride are not subject to the requirements of Annex 2 to SMGS.
- 589** (reserved).
- 590** Ferric chloride hexahydrate is not subject to the requirements of Class 8 of Annex 2 to SMGS.
- 591** Lead sulphate with not more than 3% free acid is not subject to the requirements of Annex 2 to SMGS.
- 592** Uncleaned empty packagings (including empty IBCs and large packagings), empty tank-wagons, empty demountable tanks, empty portable tanks, empty tank-containers and empty small containers which have contained this substance are not subject to the requirements of Annex 2 to SMGS.
- 593** This gas, when used for cooling goods not fulfilling the criteria of any class, e.g. medical or biological specimens, if contained in double wall receptacles which comply with the provisions of packing instruction P 203, paragraph (6) (requirements to open cryogenic receptacles) of 4.1.4.1 is not subject to the requirements of Annex 2 to SMGS except the requirements specified in 5.5.3.
- 594** The following articles, manufactured and filled according to the provisions applied in the country of manufacture, are not subject to the requirements of Annex 2 to SMGS:
- a) UN No. 1044 fire extinguishers provided with protection against inadvertent discharge, when:
 - they are packaged in a strong outer packaging; or
 - they are large fire extinguishers which meet the requirements of special packing provision PP 91 of packing instruction P 003 in 4.1.4.1;
 - b) UN No. 3164 articles, pressurized pneumatic or hydraulic, designed to withstand stresses greater than the internal gas pressure by virtue of transmission of force, intrinsic strength or construction, when they are packaged in a strong outer packaging.
- Note:** "Provisions applied in the country of manufacture" means the provisions applicable in the country of manufacture or those applicable in the country of use.
- 596** Cadmium pigments, such as cadmium sulphides, cadmium sulphoselenides and cadmium salts of higher fatty acids (e.g. cadmium stearate), are not subject to the requirements of Annex 2 to SMGS.
- 597** Acetic acid solutions with not more than 10% pure acid by mass, are not subject to the requirements of Annex 2 to SMGS.
- 598** The following are not subject to the requirements of Annex 2 to SMGS:
- a) New storage batteries when:
 - they are secured in such a way that they cannot slip, fall or be damaged;
 - they are provided with carrying devices, unless they are suitably stacked, e.g. on pallets;

- there are no dangerous traces of alkalis or acids on the outside;
 - they are protected against short circuits.
- b) Used storage batteries when:
- their cases are undamaged;
 - they are secured in such a way that they cannot leak, slip, fall or be damaged, e.g. by stacking on pallets;
 - there are no dangerous traces of alkalis or acids on the outside of the articles;
 - they are protected against short circuits.

"Used storage batteries" means storage batteries carried for recycling at the end of their normal service life.

- 599** (reserved).
- 600** Vanadium pentoxide, fused and solidified, is not subject to the requirements of Annex 2 to SMGS.
- 601** Pharmaceutical products (medicines) ready for use, which are substances manufactured and packaged for retail sale or distribution for personal or household consumption are not subject to the requirements of Annex 2 to SMGS.
- 602** Phosphorus sulphides which are not free from yellow and white phosphorus are not to be accepted for carriage.
- 603** Anhydrous hydrogen cyanide not meeting the description for UN No. 1051 or UN No. 1614 is not to be accepted for carriage. Hydrogen cyanide (hydrocyanic acid) containing less than 3% water is stable, if the pH-value is 2.5 ± 0.5 and the liquid is clear and colourless.
- 604 – 606** (reserved)
- 607** Mixtures of potassium nitrate and sodium nitrite with an ammonium salt are not to be accepted for carriage.
- 608** (reserved)
- 609** Tetranitromethane not free from combustible impurities is not to be accepted for carriage.
- 610** The carriage of this substance, when it contains more than 45% hydrogen cyanide is prohibited.
- 611** Ammonium nitrate containing more than 0.2% combustible substances (including any organic substance calculated as carbon) is not to be accepted for carriage unless it is a constituent of a substance or article of Class 1.
- 613** Chloric acid solution containing more than 10% chloric acid and mixtures of chloric acid with any liquid other than water is not to be accepted for carriage.
- 614** 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in concentrations considered highly toxic according to the criteria in 2.2.61.1 is not to be accepted for carriage.
- 616** Substances containing more than 40% liquid nitric esters shall satisfy the exudation test specified in 2.3.1.
- 617** In addition to the type of explosive, the commercial name of the particular explosive shall be marked on the package.
- 618** In receptacles containing 1,2-butadiene, the oxygen concentration in the gaseous phase shall not exceed 50 ml/m^3 .
- 623** UN No. 1829 sulphur trioxide shall be inhibited. Sulphur trioxide, at least 99.95% pure, without inhibitor (non-stabilized), shall not be accepted for carriage by rail. Sulphur trioxide, at least 99.95% pure may be carried by road without inhibitor in tanks, provided its temperature is maintained at 32.5°C or above.

- 625** Packages containing these articles shall be clearly marked as follows: "UN 1950 AEROSOLS".
- 632** Considered to be spontaneously flammable (pyrophoric).
- 633** Packages and small containers containing this substance shall bear the following mark:
"KEEP AWAY FROM ANY SOURCE OF IGNITION".
This mark shall be in an official language of the forwarding country, and also, if that language is not English, French, German or Italian, in English, French, German or Italian, unless any agreements concluded between the countries concerned in the transport operation provide otherwise.
- 634** (reserved)
- 635** Packages containing these articles need not bear a label conforming to model No. 9 unless the article is fully enclosed by packaging, crates or other means that prevent the ready identification of the article.
- 636** Up to the intermediate processing facility, lithium cells and batteries or sodium ion cells and batteries with a gross mass of not more than 500 g each, lithium ion or sodium ion cells with a Watt-hour rating of not more than 20 Wh, lithium ion or sodium ion batteries with a Watt-hour rating of not more than 100 Wh, lithium metal cells with a lithium content of not more than 1 g and lithium metal batteries with an aggregate lithium content of not more than 2 g, not contained in equipment, collected and handed over for carriage for sorting, disposal or recycling, together with or without other cells or batteries, are not subject to the other provisions of annex 2 to SMGS, including special provision 376 and 2.2.9.1.7.1 and 2.2.9.1.7.2, if the following conditions are met:
a) The cells and batteries are packed according to packing instruction P 909 of 4.1.4.1 except for the additional requirements 1 and 2;
b) A quality assurance system is in place to ensure that the total amount of lithium cells and batteries and sodium ion cells and batteries per wagon or large container does not exceed 333 kg;
Note: The total quantity of lithium cells and batteries in the mix may be assessed by means of a statistical method included in the quality assurance system. A copy of the quality assurance records shall be made available to the competent authority upon request.
c) Packages are marked "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING" "SODIUM ION BATTERIES FOR DISPOSAL" or "SODIUM ION BATTERIES FOR RECYCLING", as appropriate.
- 637** Genetically modified microorganisms and genetically modified organisms are those which are not dangerous for humans and animals, but which could alter animals, plants, microbiological substances and ecosystems in such a way as cannot occur naturally.
Genetically modified microorganisms and genetically modified organisms are not subject to the provisions of Annex 2 to SMGS when authorized for use by the competent authorities of the countries of origin, transit and destination*.
Live vertebrate or invertebrate animals shall not be used to carry these substances classified under this UN number unless the substance can be carried in no other way.
(* See also the List, document No. 11)
- 638** Substances related to self-reactive substances (see 2.2.41.1.19).
- 639** See 2.2.2.3, classification code 2F, UN No. 1965, **Note** 2.
- 640** The physical and technical characteristics mentioned in column (2) of Table A of Chapter 3.2 determine different tank codes for the carriage of substances of the same packing group in Annex 2 to SMGS tanks.

In order to identify these physical and technical characteristics of the product carried in the tank, the following shall be added, to the particulars required in the transport document, only in case of carriage in Annex 2 to SMGS tanks:

"Special provision 640X" where "X" is the applicable capital letter appearing after the reference to special provision 640 in column (6) of Table A of Chapter 3.2.

These particulars may, however, be dispensed with in the case of carriage in the type of tank which, for substances of a specific packing group of a specific UN number, meets at least the most stringent requirements.

642 Except as authorized under 1.1.4.2, this entry of the UN Model Regulations shall not be used for the carriage of fertilizer ammoniating solutions with free ammonia. Otherwise, for carriage of ammonia solution, see UN Nos. 2073, 2672 and 3318.

643 Stone or aggregate asphalt mixture is not subject to the requirements for Class 9.

644 (reserved)

645 The classification code as mentioned in Column (3b) of Table A of Chapter 3.2 shall be used only with the approval of the competent authority prior to carriage. The approval shall be given in writing as a classification approval certificate (see 5.4.1.2.1 (g)) and shall be provided with a unique reference. When assignment to a division is made in accordance with the procedure in 2.2.1.1.7.2, the competent authority may require the default classification to be verified on the basis of test data derived from Test Series 6 of the Manual of Tests and Criteria, Part I, Section 16.

646 Carbon made by steam activation process is not subject to the requirements of Annex 2 to SMGS.

647 The carriage of vinegar and acetic acid food grade with not more than 25% pure acid by mass is subject only to the following requirements:

a) Packagings, including IBCs and large packagings, and tanks shall be manufactured from stainless steel or plastic material which is permanently resistant to corrosion of vinegar/acetic acid food grade;

b) Packagings, including IBCs and large packagings, and tanks shall be subjected to a visual inspection by the owner at least once a year. The results of the inspections shall be recorded and the records kept for at least one year. Damaged packagings, including IBCs and large packagings, and tanks shall not be filled;

c) Packagings, including IBCs and large packagings, and tanks shall be filled in a way that no product is spilled or adheres to the outer surface;

d) Seals and closures shall be resistant to vinegar/acetic acid food grade. Packagings, including IBCs and large packagings, and tanks shall be hermetically sealed by the packer or the filler so that under normal conditions of carriage there will be no leakage;

e) Combination packagings with inner packaging made of glass or plastic (see packing instruction P001 in 4.1.4.1) which fulfil the general packing requirements of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.5, 4.1.1.6, 4.1.1.7 and 4.1.1.8 may be used;

The other provisions of Annex 2 to SMGS do not apply.

648 Articles impregnated with this pesticide, such as fibreboard plates, paper strips, cotton-wool balls, sheets of plastics material, in hermetically closed wrappings, are not subject to the provisions of Annex 2 to SMGS.

649 (reserved).

650 Waste consisting of packaging residues, solidified residues and liquid residues of paint may be carried under the conditions of UN No. 1263, packing group II, or UN No. 3082, as appropriate. In addition to the provisions for UN No. 1263, packing group II, and UN No. 3082 the waste may also be packed and carried as follows:

a) The waste may be packed in accordance with packing instruction P002 of 4.1.4.1 or to packing instruction IBC06 of 4.1.4.2; Mixed packing of waste classified as UN No. 1263 and waste water-based paints classified as UN No. 3082 is permitted;

b) The waste may be packed in flexible IBCs of types 13H3, 13H4 and 13H5 in overpacks with complete walls;

c) Testing of packagings and IBCs indicated under a) or b) may be carried out in accordance with the requirements of Chapters 6.1 or 6.5, as appropriate, in relation to solids, at the packing group II performance level.

The tests shall be carried out on packagings and IBCs, filled with a representative sample of the waste, as prepared for carriage;

d) Carriage in bulk in sheeted wagons, movable roof wagons, closed containers or sheeted large containers, all with complete walls is allowed. Waste classified as UN No. 1263 may be mixed and loaded with waste water-based paints classified as UN No. 3082 in the same vehicle/wagon or container. In the case of such mixed loading the entire contents shall be assigned to UN No. 1263. The body of wagons or containers shall be leakproof or rendered leakproof, for example by means of a suitable and sufficiently stout inner lining;

e) If the waste is carried under the conditions of this special provision, the goods shall be declared in accordance with 5.4.1.1.3.1 with the appropriate UN number(s) in the transport document, as follows:

“UN 1263 WASTE PAINT, 3, II” or

“UN 3082 WASTE ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (PAINT), 9, III”

651 – 653 (reserved)

654 Waste lighters collected separately and consigned in accordance with 5.4.1.1.3 may be carried under this entry for the purposes of disposal. They need not be protected against inadvertent discharge, provided that measures are taken to prevent the dangerous buildup of pressure and dangerous atmospheres.

Waste lighters, other than those leaking or severely deformed, shall be packed in accordance with packing instruction P003. In addition, the following provisions shall apply:

- only rigid packagings of a maximum capacity of 60 litres shall be used;
- the packagings shall be filled with water or any other appropriate protection material to avoid any ignition;
- under normal conditions of carriage all ignition devices of the lighters shall fully be covered by the protection material;
- the packagings shall be adequately vented to prevent the creation of flammable atmosphere and the build up of pressure;
- the packages shall only be carried in ventilated or open wagons or containers.

Leaking or severely deformed lighters shall be carried in salvage packagings, provided appropriate measures are taken to ensure there is no dangerous build up of pressure.

Note: Special provision 201 and special packing provisions PP84 and RR5 of packing instruction P002 in 4.1.4.1 do not apply to waste lighters.

- 655** Cylinders designed, constructed, approved and marked in accordance with documents No. 17 and 18 of the List and used for breathing apparatus may be carried without conforming to Chapter 6.2, provided that they are subject to inspections and tests specified in 6.2.1.6.1 and the interval between tests specified in packing instruction P200 in 4.1.4.1 is not exceeded. The pressure used for the hydraulic pressure test is the pressure marked on the cylinder in accordance with documents No. 17 and 18 of the List.
- 656** (reserved)
- 657** This entry shall be used for the technically pure substance only; for mixtures of LPG components, see UN No. 1965 or see UN No. 1075 in conjunction with **Note 2** in 2.2.2.3. for UN No. 1965.
- 658** UN No. 1057 LIGHTERS complying with standard EN ISO 9994:2019 "Lighters – Safety Specification" and UN No. 1057 LIGHTER REFILLS, may be carried subject only to the provisions of 3.4.1 (a) to (g), 3.4.2 (except for the total gross mass of 30 kg), 3.4.3 (except for the total gross mass of 20 kg), 3.4.11 and 3.4.12, first sentence, provided the following conditions are met:
- a) The total gross mass of each package is not more than 10 kg;
 - b) Not more than 100 kg gross mass of such packages is carried in a wagon or large container; and
 - c) Each outer packaging is clearly and durably marked with "UN 1057 LIGHTERS" or "UN 1057 LIGHTER REFILLS", as appropriate.
- 659** Substances to which PP 86 or TP 7 are assigned in Column (9a) and Column (11) of Table A in Chapter 3.2 and therefore require air to be eliminated from the vapour space, shall not be used for carriage under this UN number but shall be carried under their respective UN numbers as listed in Table A of Chapter 3.2.
- Note:** See also 2.2.2.1.7.
- 660** (reserved)
- 661** (reserved)
- 662** Cylinders not conforming to the provisions of Chapter 6.2 which are used exclusively on board a ship or aircraft, may be carried for the purpose of filling or inspection and subsequent return, provided the cylinders are designed and constructed in accordance with a standard recognized by the competent authority of the country of approval and all the other relevant requirements of Annex 2 to SMGS are met including:
- a) The cylinders shall be carried with valve protection in conformity with 4.1.6.8;
 - b) The cylinders shall be marked and labelled in conformity with 5.2.1 and 5.2.2; and
 - c) All the relevant filling requirements of packing instruction P 200 of 4.1.4.1 shall be complied with. The transport document shall include the following statement:
"CARRIAGE IN ACCORDANCE WITH SPECIAL PROVISION 662".
- 663** This entry may only be used for packagings, large packagings or IBCs, or parts thereof, which have contained dangerous goods which are carried for disposal, recycling or recovery of their material, other than reconditioning, repair, routine maintenance, remanufacturing or reuse, and which have been emptied to the extent that only residues of dangerous goods adhering to the packaging parts are present when they are handed over for carriage.

Scope:

Residues present in the packagings, discarded, empty, uncleaned shall only be of dangerous goods of classes 3, 4.1, 5.1, 6.1, 8 or 9. In addition, they shall not be:

- Substances assigned to packing group I or that have "0" assigned in Column (7a) of Table A of Chapter 3.2; nor
- Substances classified as desensitized explosive substances of Class 3 or Class 4.1; nor
- Substances classified as self-reactive substances of Class 4.1; nor
- Radioactive material; nor
- Asbestos (UN 2212 and UN 2590), polychlorinated biphenyls (UN 2315 and UN 3432) and polyhalogen-ated biphenyls, halogenated monomethyldiphenylmethanes or polyhalogenated terphenyls (UN 3151 and UN 3152).

General provisions:

Packagings, discarded, empty, uncleaned with residues presenting a primary or subsidiary hazard of Class 5.1 shall not be loaded in bulk together with packagings, discarded, empty, uncleaned with residues presenting a hazard of other classes. Packagings, discarded, empty, uncleaned with residues presenting a primary or subsidiary hazard of Class 5.1 shall not be packed with other packagings, discarded, empty, uncleaned with residues presenting hazards of other classes in the same outer packaging.

Documented sorting procedures shall be implemented on the loading site to ensure compliance with the provisions applicable to this entry.

Note: All the other provisions of Annex 2 to SMGS apply.

664 (reserved)

665 When carried in bulk, hard coal, coke and anthracite, meeting the classification criteria of Class 4.2, packing group III may also be carried in open wagons or containers, provided that

- a) The coal is conveyed from fresh extraction directly into the wagon or container (without measuring the temperature) or
- b) The temperature of the cargo is not higher than 60 °C during or immediately after loading into the wagon or container. Using suitable measuring methods, the filler shall ensure and document that the maximum permissible temperature of the cargo is not exceeded during or immediately after loading the wagons or containers.

The consignor shall ensure that the following statement is included in the consignment:

"Carriage in accordance with special provision 665".

The other provisions of Annex 2 to SMGS do not apply.

666 Vehicles and battery powered equipment, referred to by special provision 388, when carried as a load, as well as any dangerous goods they contain that are necessary for their operation or the operation of their equipment, are not subject to any other provisions of Annex 2 to SMGS, provided the following conditions are met:

- a) For liquid fuels, any valves between the engine or equipment and the fuel tank shall be closed during carriage unless it is essential for the equipment to remain operational. Where appropriate, the vehicles shall be loaded upright and secured against falling;
- b) For gaseous fuels, the valve between the gas tank and engine shall be closed and the electric contact open unless it is essential for the equipment to remain operational;

c) Metal hydride storage systems shall be approved by the competent authority of the country of manufacture. If the country of manufacture is not an Annex 2 to SMGS Contracting State the approval shall be recognized by the competent authority of an Annex 2 to SMGS Contracting State;

d) The provisions of (a) and (b) do not apply to vehicles which are empty of liquid or gaseous fuels.

Note 1: *A vehicle is considered to be empty of liquid fuel when the liquid fuel tank has been drained and the vehicle cannot be operated due to a lack of fuel. Vehicle components such as fuel lines, fuel filters and injectors do not need to be cleaned, drained or purged to be considered empty of liquid fuels. In addition, the liquid fuel tank does not need to be cleaned or purged.*

Note 2: *A vehicle is considered to be empty of gaseous fuels when the gaseous fuel tanks are empty of liquid (for liquefied gases), the pressure in the tanks does not exceed 2 bar and the fuel shut-off or isolation valve is closed and secured.*

e) Vehicles that are fully enclosed by packagings, crates or other means that prevent ready identification are subject to the marking and labelling requirements of Chapter 5.2.

Alternatively, for sodium ion battery powered vehicles, see special provision 404.

667

a) reserved;

b) The provisions of 2.2.9.1.7.1 and 2.2.9.1.7.2 do not apply to lithium cells or batteries or sodium ion cells or batteries installed in damaged or defective vehicles, engines or machinery. In such cases the following conditions shall be met:

1) If the damage or defect has no significant impact on the safety of the cell or battery, damaged and defective vehicles, engines or machinery, may be carried under the conditions defined in special provisions 363 or 666, as appropriate;

2) If the damage or defect has a significant impact on the safety of the cell or battery, the lithium cell or battery or the sodium ion cell or battery shall be removed and carried according to special provision 376. However, if it is not possible to safely remove the cell or battery or it is not possible to verify the status of the cell or battery, the vehicle, engine or machinery may be towed or carried as specified in (i).

c) The procedures described in (b) also apply to damaged lithium cells or Substances for the purpose of applying road markings and bitumen or similar products for the purpose of repairing cracks and crevices in existing road surfaces, carried at elevated temperature to the requirements of Annex 2 to SMGS, provided that the following conditions are met:

a) They do not fulfil the criteria of any class other than Class 9;

b) The temperature of the outer surface of the boiler does not exceed 70 °C;

c) The boiler is closed in such a way that any loss of product is prevented during carriage;

d) The maximum capacity of the boiler is limited to 3 000 l.

669

A trailer fitted with equipment, powered by a liquid or gaseous fuel or an electric energy storage and production system, that is intended for use during carriage operated by this trailer, shall be assigned to UN No. 3166, 3171, 3556, 3557 or 3558, as appropriate and be subject to the same conditions as specified for these UN numbers, when carried as a load on a wagon, provided that the total capacity of the tanks containing liquid fuel does not exceed 500 litres.

670

a) Lithium cells and batteries and sodium ion cells and batteries installed in equipment from private households collected and handed over for carriage for depollution, dismantling, recycling or disposal are not subject to the other provisions of Annex 2 to SMGS including special provision 376, 2.2.9.1.7.1 and 2.2.9.1.7.2 when:

- 1) They are not the main power source for the operation of the equipment in which they are contained;
- 2) The equipment in which they are contained does not contain any other lithium cell or battery used as the main power source; and
- 3) They are afforded protection by the equipment in which they are contained.

Examples for cells and batteries covered by this paragraph are button cells used for data integrity in household appliances (e.g. refrigerators, washing machines, dishwashers) or in other electrical or electronic equipment;

b) Up to the intermediate processing facility lithium cells and batteries and sodium ion cells and batteries contained in equipment from private households not meeting the requirements of (a) collected and handed over for carriage for depollution, dismantling, recycling or disposal are not subject to the other provisions of Annex 2 to SMGS including special provision 376, 2.2.9.1.7.1 and 2.2.9.1.7.2., if the following conditions are met:

1) The equipment is packed in accordance with packing instruction P 909 of 4.1.4.1 except for the additional requirements 1 and 2; or it is packed in strong outer packagings, e.g. specially designed collection receptacles, which meet the following requirements:

– The packagings shall be constructed of suitable material and be of adequate strength and design in relation to the packaging capacity and its intended use. The packagings need not meet the requirements of 4.1.1.3;

– Appropriate measures shall be taken to minimize the damage of the equipment when filling and handling the packaging, e.g. use of rubber mats; and

– The packagings shall be constructed and closed so as to prevent any loss of contents during carriage, e.g. by lids, strong inner liners, covers for transport. Openings designed for filling are acceptable if they are constructed so as to prevent loss of content;

2) A quality assurance system is in place to ensure that the total amount of lithium cells and batteries and sodium ion cells and batteries per wagon or large container unit does not exceed 333 g;

Note: *The total quantity of lithium cells and batteries and sodium ion cells and batteries contained in the equipment from private households may be assessed by means of a statistical method included in the quality assurance system. A copy of the quality assurance records shall be made available to the competent authority upon request.*

3) Packages are marked "LITHIUM BATTERIES FOR DISPOSAL", "LITHIUM BATTERIES FOR RECYCLING", "SODIUM ION BATTERIES FOR DISPOSAL" or "SODIUM ION BATTERIES FOR RECYCLING", as appropriate. If equipment containing lithium cells or batteries or sodium ion cells or batteries is carried unpackaged or on pallets in accordance with packing instruction P 909 (3) of 4.1.4.1, this mark may alternatively be affixed to the external surface of the wagons or large containers).

Note: *"Equipment from private households" means equipment which comes from private households and equipment which comes from commercial, industrial, institutional and other sources which, because of its nature and quantity, is similar to that from private households. Equipment likely to be used by both private households and users other than private households shall in any event be considered to be equipment from private households.*

671 For the purposes of the exemption related to quantities carried per wagon or large container (see 1.1.3.6), the transport category shall be determined in relation to the packing group (see paragraph 3 of special provision 251):

- Transport category 3 for kits assigned to packing group III;
- Transport category 2 for kits assigned to packing group II;
- Transport category 1 for kits assigned to packing group I.

Kits containing only dangerous goods to which no packing group is assigned shall be allocated to transport category 2 for completion of transport documents and the exemption related to quantities carried per wagon or large container (see 1.1.3.6).

672 Articles such as machinery, apparatus or devices carried under this entry and in conformity with special provision 301 are not subject to any other provision of Annex 2 to SMGS provided they are either:

- packed in a strong outer packaging constructed of suitable material, and of adequate strength and design in relation to the packaging's capacity and its intended use, and meeting the applicable requirements of 4.1.1.1; or
- carried without outer packaging if the article is constructed and designed so that the receptacles containing the dangerous goods are afforded adequate protection.

673 For the carriage of this article the requirements of Chapter 1.10 and 5.3, of Section 5.4.3 and of Chapter 7.2 need not be applied.

674 This special provision applies to periodic inspection and test of over-moulded cylinders as defined in 1.2.1.

Over-moulded cylinders subject to 6.2.3.5.3.1 shall be subject to periodic inspection and test in accordance with 6.2.1.6.1, adapted by the following alternative method:

- Substitute test required in 6.2.1.6.1 d) by alternative destructive tests;
- Perform specific additional destructive tests related to the characteristics of over-moulded cylinders.

The procedures and requirements of this alternative method are described below.

Alternative method:

a) General

The following provisions apply to over-moulded cylinders produced serially and based on welded steel cylinder shells in accordance with documents No.19, 20 and 21 of the *List*. The design of the over-moulding shall prevent water from penetrating on to the inner steel cylinder shell. The conversion of the steel cylinder shell to an over-moulded cylinder shall comply with the relevant requirements of No.19 and 20 of the *List*.

Over-moulded cylinders shall be equipped with self-closing valves.

b) Basic population

A basic population of over-moulded cylinders is defined as the production of cylinders from only one over-moulding manufacturer using new inner steel cylinder shells manufactured by only one manufacturer within one calendar year, based on the same design type, the same materials and production processes.

c) Sub-groups of a basic population

Within the above defined basic population, over-moulded cylinders belonging to different owners shall be separated into specific sub-groups, one per owner.

If the whole basic population is owned by one owner, the sub-group equals the basic population.

d) Traceability

Inner steel cylinder shell marks in accordance with 6.2.3.9 shall be repeated on the over-moulding. In addition, each over-moulded cylinder shall be fitted with an individual resilient electronic identification device. The detailed characteristics of the over-moulded cylinders shall be recorded by the owner in a central database. The database shall be used to:

- Identify the specific sub-group;
- Make available to inspection bodies, filling centres and competent authorities the specific technical characteristics of the cylinders consisting of at least the following: serial number, steel cylinder shell production batch, over-moulding production batch, date of over-moulding;
- Identify the cylinder by linking the electronic device to the database with the serial number;
- Check individual cylinder history and determine measures (e.g. filling, sampling, retesting, withdrawal);
- Record performed measures including the date and the address of where it was done.

The recorded data shall be kept available by the owner of the over-moulded cylinders for the entire life of the sub-group.

e) Sampling for statistical assessment

The sampling shall be random among a sub-group as defined in sub-paragraph c). The size of each sample per sub-group shall be in accordance with the Table in sub-paragraph g).

f) Test procedure for destructive testing

The inspection and test required by 6.2.1.6.1 shall be carried out except d) which shall be substituted by the following test procedure:

- Burst test (according to documents No.19 and 20 of the *List*).

In addition, the following tests shall be performed:

- Adhesion test (according to documents No.19 and 20 of the *List*);
- Peeling and Corrosion tests (according to EN ISO 4628-3:2016).

Adhesion test, peeling and corrosion tests, and burst test shall be performed on each related sample according to the Table in sub-paragraph (g) and shall be conducted after the first 3 years in service and every 5 years thereafter.

g) Statistical evaluation of test results – Method and minimum requirements

The procedure for statistical evaluation according to the related rejection criteria is described in the following table.

Test interval (years)	Type of test	Standard	Rejection criteria	Sampling out of a sub-group
After 3 years in service (see f))	Burst test	Document No. 19 of the <i>List</i>	Burst pressure point of the representative sample must be above the lower limit of tolerance interval on the Sample Performance Chart $\Omega_m \geq 1 + \Omega_s \times k3(n;p;1-\alpha)^a$ No individual test result shall be less than the test	$\sqrt[3]{Q}$ or $Q/200$ which-ever is lower, and with a minimum of 20 per sub-group (Q)

			pressure	
	Peeling and corrosion	EN ISO 4628-3:2016	Max corrosion grade: Ri2	Q/1 000
	Adhesion of polyurethane	ISO 2859-1:1999 + A1: 2011 Documents No. 19 and 20 of the List	Adhesion value > 0.5 N/mm ²	See ISO 2859-1:1999 + A1: 2011 applied to Q/1000
Every 5 years thereafter (see f))	Burst test	Document No. 19 of the List	Burst pressure point of the representative sample must be above the lower limit of tolerance interval on the Sample Performance Chart $\Omega_m \geq 1 + \Omega_s \times k3(n;p;1-\alpha)^a$ No individual test result shall be less than the test pressure	$6\sqrt[3]{Q}$ or Q/100 whichever is lower, and with a minimum of 40 per sub-group (Q)
	Peeling and corrosion	EN ISO 4628-3:2016	Max corrosion grade: Ri2	Q/1 000
	Adhesion of polyurethane	ISO 2859-1:1999 + A1: 2011 Documents No. 19 and 20 of the List	Adhesion value > 0.5 N/mm ²	See ISO 2859-1:1999 + A1: 2011 applied to Q/1 000

^a Burst pressure point (BPP) of the representative sample is used for the evaluation of test results by using a Sample Performance Chart:

Step 1: Determination of the burst pressure point (BPP) of a representative sample

Each sample is represented by a point whose coordinates are the mean value of burst test results and the standard deviation of burst test results, each normalised to the relevant test pressure.

$$BPP: (\Omega_s = \frac{s}{PH}; \Omega_m = \frac{x}{PH}),$$

where

x = sample mean value;

s = sample standard deviation;

PH = test pressure

Step 2: Plotting on a Sample Performance Chart

Each BPP is plotted on a Sample Performance Chart with following axis:

– Abscissa: Standard Deviation normalised to test pressure (Ω_s)

– **Ordinate: Mean value normalised to test pressure (Ω_m)**

Step 3: Determination of the relevant lower limit of tolerance interval in the Sample Performance Chart

Results for burst pressure shall first be checked according to the Joint Test (multidirectional test) using a significance level of $\alpha = 0.05$ (see paragraph 7 of ISO 5479:1997) to determine whether the distribution of results for each sample is normal or non-normal.

- For a normal distribution, the determination of the relevant lower limit of tolerance is given in step 3.1.
- For a non-normal distribution, the determination of the relevant lower limit of tolerance is given in step 3.2.

Step 3.1: Lower limit of tolerance interval for results following a normal distribution

In accordance with the standard ISO 16269-6:2014, and considering that the variance is unknown, the unilateral statistical tolerance interval shall be considered for a confidence level of 95% and a fraction of population equal to 99.9999%.

By application in the Sample Performance Chart, the lower limit of tolerance interval is represented by a line of constant survival rate defined by the formula:

$$\Omega_m = 1 + \Omega_s \times k_3(n;p;1-\alpha),$$

where

k_3 = factor function of n , p and $1-\alpha$;

p = proportion of the population selected for the tolerance interval (99.9999%);

$1-\alpha$ = confidence level (95%);

n = sample size.

The value for k_3 dedicated to Normal Distributions shall be taken from the Table at end of Step 3.

Step 3.2: Lower limit of tolerance interval for results following a non-normal distribution

The unilateral statistical tolerance interval shall be calculated for a confidence level of 95% and a fraction of population equal to 99.9999%.

The lower limit of tolerance is represented by a line of constant survival rate defined by the formula given in previous step 3.1, with factors k_3 based and calculated on the properties of a Weibull Distribution.

The value for k_3 dedicated to Weibull Distributions shall be taken from the Table below at end of Step 3.

Table for k_3 $p = 99,9999\%$ and $(1-\alpha) = 0,95$		
Sample size n	Normal distribution k_3	Weibull distribution k_3
20	6,901	16,021
22	6,765	15,722
24	6,651	15,472
26	6,553	15,258

Table for k_3 $p = 99,9999\%$ and $(1-\alpha) = 0,95$		
Sample size n	Normal distribution k_3	Weibull distribution k_3
28	6,468	15,072
30	6,393	14,909
35	6,241	14,578
40	6,123	14,321
45	6,028	14,116
50	5,949	13,947
60	5,827	13,683
70	5,735	13,485
80	5,662	13,329
90	5,603	13,203
100	5,554	13,098
150	5,393	12,754
200	5,300	12,557
250	5,238	12,426
300	5,193	12,330
400	5,131	12,199
500	5,089	12,111
1 000	4,988	11,897
∞	4,753	11,408

Note: If sample size is between two values, the closest lower sample size shall be selected.

- h) Measures if the acceptance criteria are not met
 If a result of the burst test, peeling and corrosion test or adhesion test does not comply with the criteria detailed in the Table in paragraph (g), the affected sub-group of over-moulded cylinders shall be seg-regated by the owner for further investigations and not be filled or made available for transport and use.
 In agreement with the competent authority or the Xa-body which issued the design approval, additional tests shall be performed to determine the root cause of the failure.
 If the root cause cannot be proved to be limited to the affected sub-group of the owner, the competent authority or the Xa-body shall take measures concerning the whole basic population and potentially other years of production.
 If the root cause can be proved to be limited to a part of the affected sub-group, not affected parts may be authorized by the competent authority to return to service. It shall be proved that no individual over-moulded cylinder returning to service is affected.

- i) Filling centre requirements

The owner shall make available to the competent authority documentary evidence that the filling centres:

- Comply with the provisions of packing instruction P 200 (7) of 4.1.4.1 and that the requirements of the standard on pre-fill inspections referenced in the Table of packing instruction P 200 (11) of 4.1.4.1 are fulfilled and correctly applied;
- Have the appropriate means to identify over-moulded cylinders through the electronic identification device;
- Have access to the database as defined in (d);
- Have the capacity to update the database;
- Apply a quality system, according to the standard ISO 9000 (series) or equivalent, certified by an accredited independent body recognized by the competent authority.

675 For packages containing these dangerous goods, mixed loading with substances and articles of Class 1, with the exception of 1.4S, shall be prohibited.

676 For the carriage of packages containing polymerizing substances the provisions of special provision 386 need not be applied, when carried for disposal or recycling provided the following conditions are met:

- a) Before loading an examination has shown that there is no significant deviation between the outside temperature of the package and the ambient temperature;
- b) The carriage is effected within a period of not more than 24 hours from that examination;
- c) The packages are protected from direct sunlight and from the impact of other sources of heat (e.g. additional loads that are being carried above ambient temperature) during carriage;
- d) The ambient temperatures during the carriage are below 45 °C;
- e) Wagons and containers are adequately ventilated;
- f) The substances are packed in packages with a maximum capacity of 1000 litres.

In assessing the substances for carriage under the conditions of this special provision, additional measures to prevent dangerous polymerization may be considered, for example the addition of inhibitors.

677 Cells and batteries which, in accordance with special provision 376, are identified as damaged or defective and liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage, shall be assigned to transport category 0. In the transport document, the words "CARRIAGE IN ACCORDANCE WITH SPECIAL PROVISION 376" shall be supplemented by the words "TRANSPORT CATEGORY 0"

678 Waste consisting of objects and materials contaminated with free asbestos (UN Nos. 2212 and 2590), which is not fixed or immersed in a binder in such a way that no emission of hazardous quantities of respirable asbestos can occur, may be carried under the provisions of Chapter 7.3 provided the following provisions are complied with:

- a) The waste is carried only from the site where it is generated to a final disposal facility. Between these two types of sites, only intermediate storage operations, without unloading or transferring the container-bag, are authorized;

b) The waste belongs to one of these categories:

1) Solid waste from roadworks, including asphalt milling waste contaminated with free asbestos and its sweeping residues;

2) Soil contaminated with free asbestos;

3) Objects (for example furniture) contaminated with free asbestos from damaged structures or buildings;

4) Materials from damaged structures or buildings contaminated with free asbestos which, because of their volume or mass, cannot be packed in accordance with the packing instruction applicable to the UN number used (UN No. 2212 or 2590, as appropriate); or

5) Construction site waste contaminated with free asbestos from demolished or rehabilitated structures or buildings which, because of their size or mass, cannot be packed in accordance with the packing instruction applicable to the UN number used (UN No. 2212 or 2590, as appropriate);

c) Waste covered by these provisions shall not be mixed or loaded with other asbestos-containing waste or any other hazardous or non-hazardous waste;

d) Each shipment shall be considered a full load as defined in 1.2.1; and

e) The transport document shall be in conformity with 5.4.1.1.4.

CHAPTER 3.4

Dangerous goods packed in limited quantities

Note: When transported on the territory of the CIS countries in one wagon with a full load of the car with goods packed in accordance with the requirements of Chapter 3.4, and the total mass is more than 8 tons, then the provisions of chapters 5.3, 5.4 and part 7, as well as the corresponding columns of Table A of Chapter 3.2 of Annex 2 to SMGS shall apply.

3.4.1 This Chapter provides the provisions applicable to the carriage of dangerous goods of certain classes packed in limited quantities. The applicable quantity limit for the inner packaging or article is specified for each substance in Column (7a) of Table A of Chapter 3.2. In addition, the quantity "0" has been indicated in this column for each entry not permitted to be carried in accordance with this Chapter.

Limited quantities of dangerous goods packed in such limited quantities, meeting the provisions of this Chapter are not subject to any other provisions of Annex 2 to SMGS except the relevant provisions of:

- a) Part 1, Chapters 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9;
- b) Part 2;
- c) Part 3, Chapters 3.1, 3.2, 3.3 (except special provisions 61, 178, 181, 220, 274, 625, 633 and 650 (e));
- d) Part 4, paragraphs 4.1.1.1, 4.1.1.2, 4.1.1.4 to 4.1.1.8;
- e) Part 5, 5.1.2.1(a) (i) and (b), 5.1.2.2, 5.1.2.3, 5.2.1.10, 5.4.2;
- f) Part 6, construction requirements of 6.1.4 and paragraphs 6.2.5.1 and 6.2.6.1 to 6.2.6.3;
- g) Part 7 - Chapter 7.1 and sections 7.2.1, 7.2.2, 7.5.1 (except 7.5.1.4), 7.5.2.4, 7.5.7 and 7.5.8 as well as special provision CW 59 section 7.5.11

3.4.2 Dangerous goods shall be packed only in inner packagings placed in suitable outer packagings. Intermediate packagings may be used. In addition, for articles of division 1.4, compatibility group S, the provisions of section 4.1.5 shall be fully complied with. The use of inner packagings is not necessary for the carriage of articles such as aerosols or "receptacles, small, containing gas". The total gross mass of the package shall not exceed 30 kg.

3.4.3 Except for articles of division 1.4, compatibility group S shrink-wrapped or stretch-wrapped trays meeting the conditions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 are acceptable as outer packagings for articles or inner packagings containing dangerous goods carried in accordance with this Chapter. Inner packagings that are liable to break or be easily punctured, such as those made of glass, porcelain, stoneware or certain plastics, shall be placed in suitable intermediate packagings meeting the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8, and be so designed that they meet the construction requirements of 6.1.4. The total gross mass of the package shall not exceed 20 kg.

3.4.4 Liquid goods of Class 8, packing group II in glass, porcelain or stoneware inner packagings shall be enclosed in a compatible and rigid intermediate packaging.

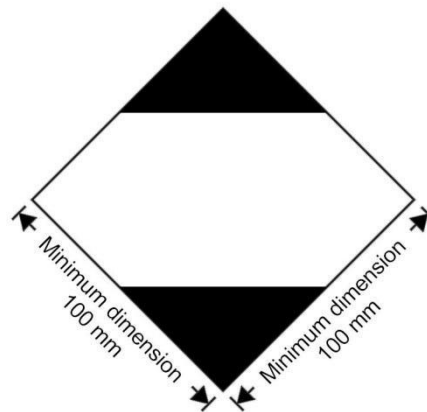
3.4.5 (Reserved)

3.4.6 (Reserved)

3.4.7 Marking of packages containing limited quantities

- 3.4.7.1** Except for air transport, packages containing dangerous goods in limited quantities shall bear the marking shown in Figure 3.4.7.1:

Figure 3.4.7.1



Marking of packages containing limited quantities

The marking shall be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness.

The marking shall be in the form of a square set at an angle of 45° (diamond-shaped). The top and bottom portions and the surrounding line shall be black. The centre area shall be white or a suitable contrasting background.

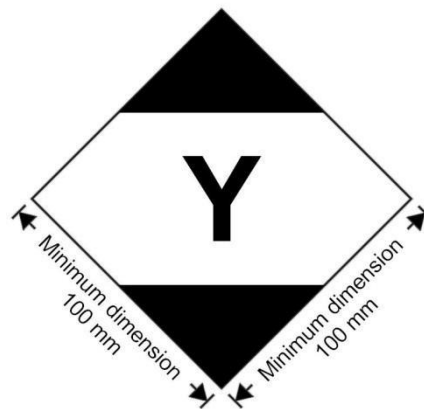
The minimum dimensions shall be 100 x 100 mm and the minimum width of the line forming the diamond shall be 2 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

- 3.4.7.2** If the size of the package so requires, the minimum outer dimensions shown in Figure 3.4.7.1 may be reduced to be not less than 50 mm provided the marking remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm.

- 3.4.8** Marking for packages containing limited quantities conforming to Part 3, Chapter 4 of the ICAO Technical Instructions

- 3.4.8.1** Packages containing dangerous goods packed in conformity with the provisions of Part 3, Chapter 4 of the ICAO Technical Instructions may bear the marking shown in Figure 3.4.8.1 to certify conformity with these provisions:

Figure 3.4.8.1



Marking of packages containing limited quantities conforming to Part 3, Chapter 4 of the ICAO Technical Instructions

The marking shall be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness.

The marking shall be in the form of a square set at an angle of 45° (diamond-shaped). The top and bottom portions and the surrounding line shall be black. The centre area shall be white or a suitable contrasting background. The minimum dimensions shall be 100 x 100 mm and the minimum width of the line forming the diamond shall be 2 mm. The symbol "Y" shall be placed in the centre of the mark and shall be clearly visible. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

- 3.4.8.2** If the size of the package so requires, the minimum outer dimensions shown in Figure 3.4.8.1 may be reduced to be not less than 50 mm provided the marking remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm. The symbol "Y" shall remain in approximate proportion to that shown in Figure 3.4.8.1.
- 3.4.9** Packages containing dangerous goods bearing the marking shown in 3.4.8 with or without the additional labels and markings for air transport shall be deemed to meet the provisions of sections 3.4.1 to 3.4.4 and need not bear the marking shown in 3.4.7.
- 3.4.10** Packages containing dangerous goods in limited quantities bearing the marking shown in 3.4.7 and conforming with the provisions of the ICAO Technical Instructions, including all necessary marks and labels specified in Parts 5 and 6, shall be deemed to meet the provisions of section 3.4.1 as appropriate and of sections 3.4.2 to 3.4.4 of Annex 2 to SMGS.

3.4.11 Use of overpacks

For an overpack containing dangerous goods packed in limited quantities, the following applies:

Unless the marks representative of all dangerous goods in an overpack are visible, the overpack shall be:

- a) marked with the word "OVERPACK". The lettering of the "OVERPACK" mark shall be at least 12 mm high. The mark shall be in an official language of the country of origin and also, if that language is not Russian or Chinese, in Russian or Chinese, unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise; and
- b) marked with the marks required by this Chapter.

Except for air transport, the other provisions of 5.1.2.1 apply only if other dangerous goods which are not packed in limited quantities are contained in the overpack and only in relation to these other dangerous goods.

3.4.12 In advance of carriage, consignors of dangerous goods packed in limited quantities shall inform the carrier in a traceable form of the total gross mass of such goods to be consigned.

Loaders of dangerous goods packed in limited quantities shall observe the provisions of 3.4.13 to 3.4.15 concerning marking.

3.4.13 a) Wagons carrying dangerous goods packed in limited quantities shall be marked in accordance with 3.4.15 on both sides except when the wagon contains other dangerous goods for which placarding in accordance with 5.3.1 is required. In this latter case, the wagon may display the required placards only, or both the placards in accordance with 5.3.1 and the marks in accordance with 3.4.15.

b) Large containers carrying dangerous goods packed in limited quantities shall be marked in accordance with 3.4.15 on all four sides except when the large container contains other dangerous goods for which placarding in accordance with 5.3.1 is required. In this latter case, the large container may display the required placards only, or both the placards in accordance with 5.3.1 and the marks in accordance with 3.4.15.

If the marks affixed to the large containers are not visible from outside the carrying wagon, the same marks shall also be affixed to both sides of the wagon.

3.4.14 The marks specified in 3.4.13 may be dispensed with, if the total gross mass of the packages containing dangerous goods packed in limited quantities carried does not exceed 8 tonnes per wagon or large container.

3.4.15 The marks specified in 3.4.13 shall be the same as the one required in 3.4.7, except that their minimum dimensions shall be 250 mm × 250 mm. These marks shall be removed or covered if no dangerous goods in limited quantities are carried.

CHAPTER 3.5
DANGEROUS GOODS PACKED IN EXCEPTED QUANTITIES

3.5.1 EXCEPTED QUANTITIES

3.5.1.1 Excepted quantities of dangerous goods of certain classes, other than articles, meeting the provisions of this Chapter are not subject to any other provisions of Annex 2 to SMGS except for:

- a) The training requirements in Chapter 1.3;
- b) The classification procedures and packing group criteria in Part 2;
- c) The packaging requirements of 4.1.1.1, 4.1.1.2, 4.1.1.4 and 4.1.1.6.

Note: *In the case of radioactive material, the requirements for radioactive material in excepted packages in 1.7.1.5 apply.*

3.5.1.2 For dangerous goods which may be carried as excepted quantities in accordance with the provisions of this Chapter in column (7b) of Table A of Chapter 3.2 the codes E1 – E5 shall be indicated:

Code	Maximum net quantity per inner packaging (in grams for solids and ml for liquids and gases)	Maximum net quantity per outer packaging (in grams for solids and ml for liquids and gases, or sum of grams and ml in the case of mixed packing)
E0	Not permitted as packed in excepted quantity	
E1	30	1000
E2	30	500
E3	30	300
E4	1	500
E5	1	300

For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer packaging.

3.5.1.3 Where dangerous goods in excepted quantities for which different codes are assigned are packaged together the total quantity per outer packaging shall be limited to that corresponding to the most restrictive code.

3.5.1.4 Excepted quantities of dangerous goods assigned to codes E 1, E 2, E 4 and E 5 with a maximum net quantity of dangerous goods per inner packaging limited to 1 ml for liquids and gases and 1 g for solids and a maximum net quantity of dangerous goods per outer packaging which does not exceed 100 g for solids or 100 ml for liquids and gases are only subject to:

- a) The provisions of 3.5.2, except that an intermediate packaging is not required if the inner packagings are securely packed in an outer packaging with cushioning material in such a way that, under normal conditions of carriage, they cannot break, be punctured, or leak their contents; and for liquids, the outer packaging contains sufficient absorbent material to absorb the entire contents of the inner packagings; and
- b) The provisions of 3.5.3.

3.5.2 PACKAGINGS

Packagings used for the carriage of dangerous goods in excepted quantities shall be in compliance with the following:

- (a) There shall be an inner packaging and each inner packaging shall be constructed of plastic (with a minimum thickness of 0.2 mm when used for

liquids), or of glass, porcelain, stoneware, earthenware or metal (see also 4.1.1.2) and the closure of each inner packaging shall be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads shall have a leak proof threaded type cap. The closure shall be resistant to the contents;

- (b) Each inner packaging shall be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents. For liquid dangerous goods, the intermediate or outer packaging shall contain sufficient absorbent material to absorb the entire contents of the inner packagings. When placed in the intermediate packaging, the absorbent material may be the cushioning material. Dangerous goods shall not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials. Regardless of its orientation, the package shall completely contain the contents in case of breakage or leakage;
- (c) The intermediate packaging shall be securely packed in a strong, rigid outer packaging (wooden, fibre- board or other equally strong material);
- (d) Each package type shall be in compliance with the provisions in 3.5.3;
- (e) Each package shall be of such a size that there is adequate space to apply all necessary marks; and
- (f) Overpacks may be used and may also contain packages of dangerous goods or goods not subject to the requirements of Annex 2 to SMGS.

3.5.3 TESTS FOR PACKAGES

3.5.3.1 The complete package as prepared for carriage, with inner packagings:

- filled to not less than 95% of their capacity for solids
- 98% for liquids

shall be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

- (a) Drops onto a rigid, non-resilient flat and horizontal surface from a height of 1.8 m:
 - (i) Where the sample is in the shape of a box, it shall be dropped in each of the following orientations:
 - flat on the base;
 - flat on the top;
 - flat on the longest side;
 - flat on the shortest side;
 - on a corner;
 - (ii) Where the sample is in the shape of a drum, it shall be dropped in each of the following orientations:
 - diagonally on the top chime, with the centre of gravity directly above the point of impact;
 - diagonally on the base chime;
 - flat on the side;

Note: Each of the above drops may be performed on different but identical packages.

- (b) A force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the sample).

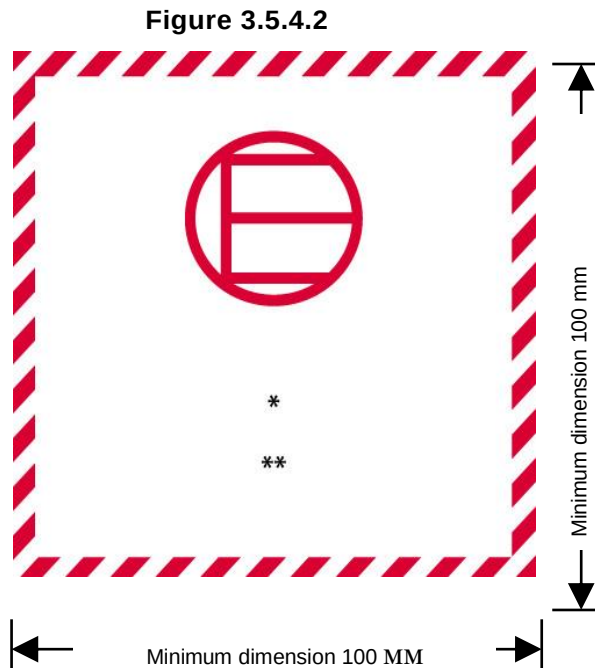
The results of the tests shall be documented.

3.5.3.2 For the purposes of testing, the substances to be carried in the packaging may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used, it must have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. In the drop tests for liquids, when another substance is used, its relative density and viscosity should be similar to those of the substance to be carried.

3.5.4 MARKING OF PACKAGES

3.5.4.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this Chapter shall be durably and legibly marked with the mark shown in 3.5.4.2. The first or only label number indicated in column (5) of Table A of Chapter 3.2 for each of the dangerous goods contained in the package shall be shown in the mark. Where the name of the consignor or consignee is not shown elsewhere on the pack- age this information shall be included within the mark.

3.5.4.2 Excepted quantities mark



Excepted quantities mark

- * The first or only label number indicated in column (5) of Table A of Chapter 3.2 shall be shown in this location.
- ** The name of the consignor or of the consignee shall be shown in this location if not shown elsewhere on the package.

The marking shall be in the form of a square. The hatching and symbol shall be of the same colour, black or red, on white or suitable contrasting background. The minimum dimensions shall be 100 mm □□100 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

3.5.4.3 *Use of overpacks*

For an overpack containing dangerous goods packed in excepted quantities, the following applies:

Unless the marks representative of all dangerous goods in an overpack are visible, the overpack shall be:

a) marked with the word "OVERPACK". The lettering of the "OVERPACK" mark shall be at least 12 mm high. The mark shall be in an official language of the country of origin and also, if that language is not Russian or Chinese, in Russian or Chinese unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise; and

b) marked with the marks required by this Chapter.

The other provisions of 5.1.2.1 apply only if other dangerous goods which are not packed in excepted quantities are contained in the overpack and only in relation to these other dangerous goods.

3.5.5 MAXIMUM NUMBER OF PACKAGES IN ANY WAGON OR CONTAINER

The number of packages in any wagon or container shall not exceed 1 000.

3.5.6 DOCUMENTATION

The consignment shall include the statement: "DANGEROUS GOODS IN EXCEPTED QUANTITIES" and indicate the number of packages.

PART 4

PACKING AND TANK PROVISIONS

CHAPTER 4.1

USE OF PACKAGINGS, INCLUDING INTERMEDIATE BULK CONTAINERS (IBCs) AND LARGE PACKAGINGS

Note: Packagings, including IBCs and large packagings, marked in accordance with 6.1.3, 6.2.2.7, 6.2.2.8, 6.2.2.9, 6.2.2.10, 6.3.4, 6.5.2 or 6.6.3 but which were approved in a country which is not an SMGS Contracting State may nevertheless be used for carriage under Annex 2 to SMGS

4.1.1 GENERAL REQUIREMENTS FOR THE PACKING OF DANGEROUS GOODS IN PACKAGINGS, INCLUDING IBCs AND LARGE PACKAGINGS

Note: For the packing of goods of Classes 2, 6.2 and 7, the general provisions of this section only apply as indicated in 4.1.8.2 (Class 6.2, UN Nos. 2814 and 2900), 4.1.9.1.5 (Class 7) and in the applicable packing instructions of 4.1.4 (P 201, P 207 and LP 200 for Class 2 and P 620, P 621, IBC 620, LP 621 and LP 622 for Class 6.2).

4.1.1.1 Dangerous goods shall be packed in good quality packagings, including IBCs and large packagings, which shall be strong enough to withstand the shocks and loadings normally encountered during carriage, including transshipment between transport units and between transport units and warehouses as well as any removal from a pallet or overpack for subsequent manual or mechanical handling. Packagings, including IBCs and large packagings, shall be constructed and closed so as to prevent any loss of contents when prepared for transport which might be caused under normal conditions of transport, by vibration, or by changes in temperature, humidity or pressure (resulting from altitude, for example). Packagings, including IBCs and large packagings, shall be closed in accordance with the information provided by the manufacturer. No dangerous residue shall adhere to the outside of packagings, IBCs and large packagings during carriage. These provisions apply, as appropriate, to new, reused, reconditioned or remanufactured packagings and to new, reused, repaired or remanufactured IBCs, and to new, reused or remanufactured large packagings.

4.1.1.2 Parts of packagings, including IBCs and large packagings, which are in direct contact with dangerous goods:

- a) shall not be affected or significantly weakened by those dangerous goods;
- b) shall not cause a dangerous effect e.g. catalysing a reaction or reacting with the dangerous goods; and
- c) shall not allow permeation of the dangerous goods that could constitute a danger under normal conditions of carriage.

Where necessary, they shall be provided with a suitable inner coating or treatment.

Note: For chemical compatibility of plastics packagings, including IBCs, made from polyethylene, see 4.1.1.21.

4.1.1.3 Design type

4.1.1.3.1 Unless otherwise provided elsewhere in Annex 2 to SMGS, each packaging, including IBCs and large packagings, except inner packagings, shall conform to a design type successfully tested in accordance with the requirements of 6.1.5, 6.3.5, 6.5.6 or 6.6.5, as applicable.

4.1.1.3.2 Packagings, including IBCs and large packagings, may conform to one or more than one successfully tested design type and may bear more than one mark.

4.1.1.4 When filling packagings, including IBCs and large packagings, with liquids, sufficient ullage (outage) shall be left to ensure that neither leakage nor permanent distortion of the packaging occurs as a result of an expansion of the liquid caused by temperatures likely to occur during

transport. Unless specific requirements are prescribed, liquids shall not completely fill a packaging at a temperature of 55 °C. However, sufficient ullage shall be left in an IBC to ensure that at the mean bulk temperature of 50 °C it is not filled to more than 98% of its water capacity. For a filling temperature of 15 °C, the maximum degree of filling shall be determined as follows, unless otherwise provided, either:

a)

Boiling point (initial boiling point) of the substance in	< 60	≥ 60 < 100	≥100 < 200	≥200 < 300	≥300
Degree of filling as a percentage of the capacity of the packaging	90	92	94	96	98

or

$$\text{b) degree of filling} = \frac{98}{1 + \alpha (50 - t_f)} \% \text{ of the capacity of the packaging}$$

Where: α is the mean coefficient of cubic expansion of the liquid substance between 15 °C and 50 °C;

t_f the mean temperature of the liquid at the time of filling.

$$\alpha = \frac{d_{15} - d_{50}}{35 \times d_{50}}$$

Where: d_{15} and d_{50} being the relative densities of the liquid at 15 °C and 50 °C.

- 4.1.1.3** Inner packagings shall be packed in an outer packaging in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the outer packaging. Inner packagings containing liquids shall be packed with their closures upward and placed within outer packagings consistent with the orientation marks prescribed in 5.2.1.10. Inner packagings that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials, etc., shall be secured in outer packagings with suitable cushioning material. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material or of the outer packaging.
- 4.1.1.5.1** Where an outer packaging of a combination packaging or a large packaging has been successfully tested with different types of inner packagings, a variety of such different inner packagings may also be assembled in this outer packaging or large packaging. In addition, provided an equivalent level of performance is maintained, the following variations in inner packagings are allowed without further testing of the package:
- a) Inner packagings of equivalent or smaller size may be used provided:
 - (i) the inner packagings are of similar design to the tested inner packagings (e.g. shape-round, rectangular, etc.);
 - (ii) the material of construction of the inner packagings (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;
 - (iii) the inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc.);
 - (iv) sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and
 - (v) inner packagings are oriented within the outer packaging in the same manner as in the tested package.
 - b) A lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in (a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the inner packagings.
- 4.1.1.5.2** Use of supplementary packagings within an outer packaging (e.g. an intermediate packaging or a receptacle inside a required inner packaging) additional to what is required by the packing instructions is authorized provided all relevant requirements are met, including those of 4.1.1.3, and, if appropriate, suitable cushioning is used to prevent movement within the packaging.
- 4.1.1.5.3** For the carriage of waste, other than articles, inner packagings of different sizes and shapes, containing liquids or solids, may be packed together in one outer packaging, provided that the following conditions are met:
- a) The waste carried in each inner packaging is not classified as class 1, 2, 6.2 or 7;
 - b) By derogation from 4.1.1.5, 4.1.1.5.1, 4.1.1.5.2, 4.1.1.21, 4.1.3.1 to 4.1.3.5, 4.1.3.7, 4.1.4, 6.1.5.2.1, 6.5.6.1.2 and 6.6.5.2.1:
 - 1) The outer packaging is one of the following types:
 - 1H2, 1A2, 3A2, 3H1, 3H2, 4A or 4H2;
 - 11A, 11H1 or 11H2;
 - 50A or 50H;
 - 2) The outer packaging is tested for packing group I;
 - 3) The outer packaging does not need to be tested according to the tests required for packagings intended to contain liquids, but it shall be capable of retaining liquids under normal conditions of carriage;
 - 4) Sufficient cushioning material is used to prevent significant movement of the inner packagings under normal conditions of carriage;
 - 5) If the outer packaging contains inner packagings that are liable to break easily, such as those made of glass, porcelain or stoneware, or non-leakproof inner packagings, the outer packaging has a means of retaining any free liquid that might escape from the inner packagings during carriage, e.g. absorbent material or other equally efficient means of retention;

- 6) For polyethylene outer packaging, proof of sufficient chemical compatibility is deemed to have been provided if the chemical compatibility of the material of the outer packaging with all the standard liquids described in 6.1.6.1 has been verified as part of a design type test and approval for packaging of the same material with code 1H1 or 3H1;
- c) Depending on the waste identified in each inner packaging, inner packagings are packed together in an appropriate outer packaging only by trained and competent personnel in accordance with 1.3.2.2, with the use of instructions or procedures ensuring compliance with 4.1.1.6 and the provisions of mixed packing of 4.1.10.4;
- d) The waste contained in one outer packaging is assigned to the most appropriate entry of Table A in Chapter 3.2. More than one entry may be used, if needed. By derogation from 5.1.4, the marking and labelling on the outer packaging corresponds to the entry or entries assigned to the outer packaging.

4.1.1.6 Dangerous goods shall not be packed together in the same outer packaging or in large packagings, with dangerous or other goods if they react dangerously with each other (see definition of "dangerous reaction" in 1.2.1).

Note: For mixed packing special provisions, see 4.1.10.

4.1.1.7 The closures of packagings containing wetted or diluted substances shall be such that the percentage of liquid (water, solvent or phlegmatizer) does not fall below the prescribed limits during transport.

4.1.1.7.1 Where two or more closure systems are fitted in series on an IBC, that nearest to the substance being carried shall be closed first.

4.1.1.8 Where pressure may develop in a package by the emission of gas from the contents (as a result of temperature increase or other causes), the packaging or IBC may be fitted with a vent provided that the gas emitted will not cause danger on account of its toxicity, its flammability or the quantity released, for example.

A venting device shall be fitted if dangerous overpressure may develop due to normal decomposition of substances. The vent shall be so designed that, when the packaging or IBC is in the attitude in which it is intended to be carried, leakages of liquid and the penetration of foreign substances are prevented under normal conditions of carriage.

Note: Venting of the package is not permitted for air carriage.

4.1.1.8.1 Liquids may only be filled into inner packagings which have an appropriate resistance to internal pressure that may be developed under normal conditions of carriage.

4.1.1.9 New, remanufactured or reused packagings, including IBCs and large packagings, or reconditioned packagings and repaired or routinely maintained IBCs shall be capable of passing the tests prescribed in 6.1.5, 6.3.5, 6.5.6 or 6.6.5, as applicable. Before being filled and handed over for carriage, every packaging, including IBCs and large packagings, shall be inspected to ensure that it is free from corrosion, contamination or other damage and every IBC shall be inspected with regard to the proper functioning of any service equipment. Any packaging which shows signs of reduced strength as compared with the approved design type shall no longer be used or shall be so reconditioned, that it is able to withstand the design type tests. Any IBC which shows signs of reduced strength as compared with the tested design type shall no longer be used or shall be so repaired or routinely maintained that it is able to withstand the design type tests.

4.1.1.10 Liquids shall be filled only into packagings, including IBCs, which have an appropriate resistance to the internal pressure that may develop under normal conditions of carriage. Packagings and IBCs marked with the hydraulic test pressure prescribed in 6.1.3.1 (d) and 6.5.2.2.1, respectively shall be filled only with a liquid having a vapour pressure:

- a) such that the total gauge pressure in the packaging or IBC (i.e. the vapour pressure of the filling substance plus the partial pressure of air or other inert gases, less 100 kPa) at 55 °C, determined on the basis of a maximum degree of filling in accordance with 4.1.1.4 and a filling temperature of 15 °C, will not exceed two-thirds of the marked test pressure; or
- b) at 50 °C less than four-sevenths of the sum of the marked test pressure plus 100 kPa; or
- c) at 55 °C less than two-thirds of the sum of the marked test pressure plus 100 kPa.

IBCs intended for the carriage of liquids shall not be used to carry liquids having a vapour pressure of more than 110 kPa (1.1 bar) at 50 °C or 130 kPa (1.3 bar) at 55 °C.

Examples of required marked test pressures for packagings, including IBCs, calculated as in 4.1.1.10 (c)

UN No	Name	Class	Packing group	Vp55 (kPa)	(Vp ₅₅ × 1,5) (kPa)	(Vp ₅₅ × 1,5) minus 100 (kPa)	Required minimum test pressure gauge under 6.1.5.5.4 (c) (kPa)	Minimum test pressure (gauge) to be marked on the packaging (kPa)
2056	Tetrahydrofuran	3	II	70	105	5	100	100
2247	n-Decane	3	III	1,4	2,1	– 97,9	100	100
1593	Dichloromethane	6.1	III	164	246	146	146	150
1155	Diethyl ether	3	I	199	299	199	199	250

Note 1: For pure liquids the vapour pressure at 55 °C (Vp₅₅) can often be obtained from scientific tables.

2: The table refers to the use of 4.1.1.10 (c) only, which means that the marked test pressure shall exceed 1.5 times the vapour pressure at 55 °C less 100 kPa. When, for example, the test pressure for n-decane is determined according to 6.1.5.5.4 (a), the minimum marked test pressure may be lower.

3: For diethyl ether the required minimum test pressure under 6.1.5.5.5 is 250 kPa.

4.1.1.11 Empty packagings, including IBCs and large packagings, that have contained a dangerous substance are subject to the same requirements as those for a filled packaging, unless adequate measures have been taken to nullify any hazard.

Note: When such packagings are carried for disposal, recycling or recovery of their material, they may also be carried under UN 3509 provided the conditions of special provision 663 of Chapter 3.3 are met.

4.1.1.12 Every packaging as specified in Chapter 6.1 intended to contain liquids shall successfully undergo a suitable leakproofness test. This test is part of a quality assurance programme as stipulated in 6.1.1.4 which shows the capability of meeting the appropriate test level indicated in 6.1.5.4.3:

- a) Before it is first used for carriage;
- b) After remanufacturing or reconditioning of any packaging, before it is re-used for carriage.

For this test the packaging need not have its closures fitted. The inner receptacle of a composite packaging may be tested without the outer packaging, provided the test results are not affected.

This test is not required for:

- inner packagings of combination packagings or large packagings;
- inner receptacles of composite packagings (glass, porcelain or stoneware) marked with the symbol "SMGS/RID/ADR" in accordance with 6.1.3.1 a) (ii);
- light gauge metal packagings marked with the symbol "SMGS/RID/ADR" in accordance with 6.1.3.1 a) (ii).

4.1.1.13 Packagings, including IBCs, used for solids which may become liquid at temperatures likely to be encountered during carriage shall also be capable of containing the substance in the liquid state.

4.1.1.14 Packagings, including IBCs, used for powdery or granular substances shall be sift-proof or shall be provided with a liner.

4.1.1.15 For plastics drums and jerricans, rigid plastics IBCs and composite IBCs with plastics inner

receptacles, unless otherwise approved by the competent authority, the period of use permitted for the carriage of dangerous substances shall be five years from the date of manufacture of the receptacles, except where a shorter period of use is prescribed because of the nature of the substance to be carried.

Note: For composite IBCs the period of use refers to the date of manufacture of the inner receptacle.

4.1.1.16 Where ice is used as a coolant it shall not affect the integrity of the packaging.

4.1.1.17 (Reserved)

4.1.1.18 Explosives, self-reactive substances and organic peroxides

Unless specific provision to the contrary is made in Annex 2 to SMGS, the packagings, including IBCs and large packagings, used for goods of Class 1, self-reactive substances of Class 4.1 and organic peroxides of Class 5.2 shall comply with the provisions for the medium danger group (packing group II).

4.1.1.19 Use of salvage packagings and large salvage packagings

4.1.1.19.1 Damaged, defective, leaking or non-conforming packages, or dangerous goods that have spilled or leaked may be carried in salvage packagings mentioned in 6.1.5.1.11 and in large salvage packagings mentioned in 6.6.5.1.9. This does not prevent the use of a larger size packaging, an IBC of type 11A or a large packaging of appropriate type and performance level and under the conditions of 4.1.1.19.2 and 4.1.1.19.3.

4.1.1.19.2 Appropriate measures shall be taken to prevent excessive movement of the damaged or leaking packages within a salvage packaging or large salvage packaging. When the salvage packaging or large salvage packaging contains liquids, sufficient inert absorbent material shall be added to eliminate the presence of free liquid.

4.1.1.19.3 Appropriate measures shall be taken to ensure that there is no dangerous build-up of pressure.

4.1.1.20 Use of salvage pressure receptacles

4.1.1.20.1 In the case of damaged, defective, leaking or non-conforming pressure receptacles, salvage pressure receptacles according to 6.2.3.11 may be used.

Note: A salvage pressure receptacle may be used as an overpack in accordance with 5.1.2. When used as an overpack, marks shall be in accordance with 5.1.2.1 instead of 5.2.1.3.

4.1.1.20.2 Pressure receptacles shall be placed in salvage pressure receptacles of suitable size. More than one pressure receptacle may be placed in the same salvage pressure receptacle only if the contents are known and do not react dangerously with each other (see 4.1.1.6). In this case the total sum of water capacities of the placed pressure receptacles shall not exceed 3 000 litres. Appropriate measures shall be taken to prevent movement of the pressure receptacles within the salvage pressure receptacle e.g. by partitioning, securing or cushioning.

4.1.1.20.3 A pressure receptacle may only be placed in a salvage pressure receptacle if:

- a) The salvage pressure receptacle is in accordance with 6.2.3.11 and a copy of the approval certificate is available;
- b) Parts of the salvage pressure receptacle which are, or are likely to be in direct contact with the dangerous goods will not be affected or weakened by those dangerous goods and will not cause a dangerous effect (e.g. catalyzing reaction or reacting with the dangerous goods); and
- c) The contents of the contained pressure receptacle(s) are limited in pressure and volume so that if totally discharged into the salvage pressure receptacle, the pressure in the salvage pressure receptacle at 65 °C will not exceed the test pressure of the salvage pressure receptacle (for gases, see packing instruction in P 200 (3) in 4.1.4.1). The reduction of the useable water capacity of the salvage pressure receptacle, e.g. by any contained equipment and cushioning, shall be taken into account.

4.1.1.20.4 The proper shipping name, the UN number preceded by the letters "UN" and label(s) as required for packages in Chapter 5.2 applicable to the dangerous goods inside the contained pressure receptacle(s) shall be applied to the salvage pressure receptacle for carriage.

4.1.1.20.5 Salvage pressure receptacles shall be cleaned, purged and visually inspected internally and externally

after each use. They shall be periodically inspected and tested in accordance with 6.2.3.5 at least once every five years.

4.1.1.21 Verification of the chemical compatibility of plastics packagings, including IBCs, by assimilation of filling substances to standard liquids

4.1.1.21.1 Scope

For polyethylene packagings as specified in 6.1.5.2.6 and for polyethylene IBCs as specified in 6.5.6.3.5, the chemical compatibility with filling substances may be verified by assimilation to standard liquids following the procedures as set out in 4.1.1.21.3 to 4.1.1.21.5 and using the list in Table 4.1.1.21.6, provided that the particular design types have been tested with these standard liquids in accordance with 6.1.5 or 6.5.6, taking into account 6.1.6 and that the conditions in 4.1.1.21.2 are met. When assimilation in accordance with this sub-section is not possible, the chemical compatibility needs to be verified by design type testing in accordance with 6.1.5.2.5 or by laboratory tests in accordance with 6.1.5.2.7 for packagings, and in accordance with 6.5.6.3.3 or 6.5.6.3.6 for IBCs, respectively.

Note: *Irrespective of the provisions of this sub-section, the use of packagings, including IBCs, for a specific filling substance is subject to the limitations of Table A of Chapter 3.2, and the packing instructions in Chapter 4.1.*

4.1.1.21.2 Conditions

The relative densities of the filling substances shall not exceed that used to determine the height for the drop test performed successfully according to 6.1.5.3.5 or 6.5.6.9.4 and the mass for the stacking test performed successfully according to 6.1.5.6 or where necessary according to 6.5.6.6 with the assimilated standard liquid(s). The vapour pressures of the filling substances at 50 °C or 55 °C shall not exceed that used to determine the pressure for the internal pressure (hydraulic) test performed successfully according to 6.1.5.5.4 or 6.5.6.8.4.2 with the assimilated standard liquid(s). In case that filling substances are assimilated to a combination of standard liquids, the corresponding values of the filling substances shall not exceed the minimum values derived from the applied drop heights, stacking masses and internal test pressures.

Example: UN 1736 Benzoyl chloride is assimilated to the combination of standard liquids "Mixture of hydrocarbons and wetting solution". It has a vapour pressure of 0.34 kPa at 50 °C and a relative density of approximately 1.2. Design type tests for plastics drums and jerricans were frequently performed at minimum required test levels. In practice this means that the stacking test is commonly performed with stacking loads considering only a relative density of 1.0 for the "Mixture of hydrocarbons" and a relative density of 1.2 for the "Wetting solution" (see definition of standard liquids in 6.1.6). As a consequence, chemical compatibility of such tested design types would not be verified for benzoyl chloride by reason of the inadequate test level of the design type with the standard liquid "mixture of hydrocarbons". (Due to the fact that in the majority of cases the applied internal hydraulic test pressure is not less than 100 kPa, the vapour pressure of benzoyl chloride would be covered by such test level according to 4.1.1.10).

All components of a filling substance, which may be a solution, mixture or preparation, such as wetting agents in detergents and disinfectants, irrespective of whether dangerous or non-dangerous, shall be included in the assimilation procedure.

4.1.1.21.3 Assimilation procedure

The following steps shall be taken to assign filling substances to listed substances or groups of substances in Table 4.1.1.21.6 (see also scheme in Figure 4.1.1.21.1):

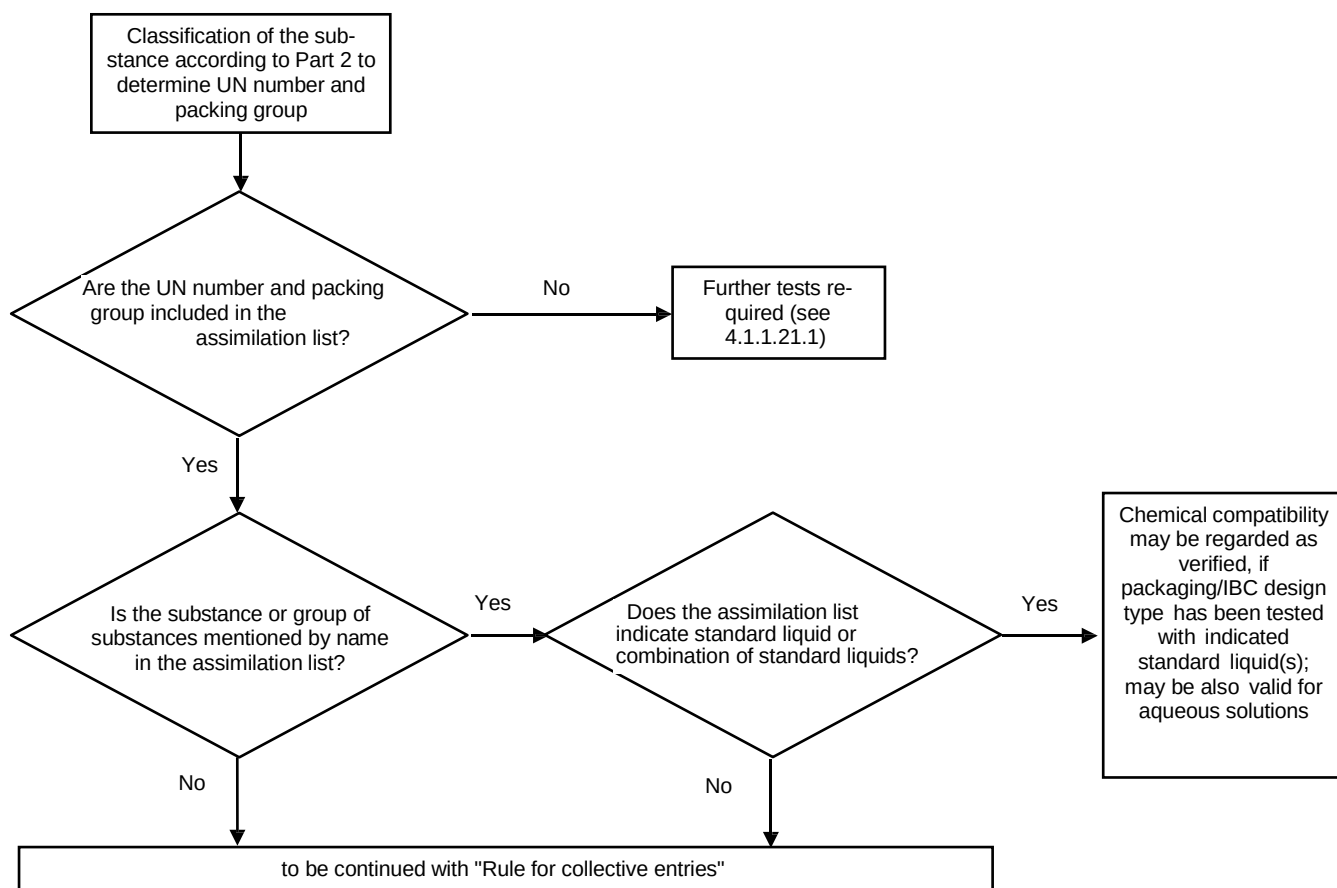
- Classify the filling substance in accordance with the procedures and criteria of Part 2 (determination of the UN number and packing group);
- If it is included there, go to the UN number in column (1) of Table 4.1.1.21.6;
- Select the line that corresponds in terms of packing group, concentration, flashpoint, the presence of non-dangerous components etc. by means of the information given in columns 2a), 2b) and (4), if there is more than one entry for this UN number.

If this is not possible, the chemical compatibility shall be verified in accordance with 6.1.5.2.5 or

6.1.5.2.7 for packagings, and in accordance with 6.5.6.3.3 or 6.5.6.3.6 for IBCs (however, in the case of aqueous solutions, see 4.1.1.21.4);

- a) If the UN number and packing group of the filling substance determined in accordance with (a) is not included in the assimilation list, the chemical compatibility shall be proved in accordance with 6.1.5.2.5 or 6.1.5.2.7 for packagings, and in accordance with 6.5.6.3.3 or 6.5.6.3.6 for IBCs;
- b) Apply the "Rule for collective entries", as described in 4.1.1.21.5, if this is indicated in column (5) of the selected line;
- c) The chemical compatibility of the filling substance may be regarded as verified taking into account 4.1.1.21.1 and 4.1.1.21.2, if a standard liquid or a combination of standard liquids is assimilated in column (5) and the design type is approved for that/those standard liquid(s).

Figure 4.1.1.21.1: Scheme for the assimilation of filling substances to standard liquids



4.1.1.21.4 Aqueous solutions

Aqueous solutions of substances and groups of substances assimilated to specific standard liquid(s) in accordance with 4.1.1.21.3 may also be assimilated to that (those) standard liquid(s) provided the following conditions are met:

- a) the aqueous solution can be assigned to the same UN number as the listed substance in accordance with the criteria of 2.1.3.3, and
- b) the aqueous solution is not specifically mentioned by name otherwise in the assimilation list in 4.1.1.21.6, and
- c) no chemical reaction is taking place between the dangerous substance and the solvent water.

Example: Aqueous solutions of UN 1120 tert-Butanol:

- Pure tert-Butanol itself is assigned to the standard liquid "acetic acid" in the assimilation list.
- Aqueous solutions of tert-Butanol can be classified under the entry UN 1120 BUTANOLS in accordance with 2.1.3.3, because the aqueous solution of tert-Butanol does not differ from the entries of the pure substances relating to the class, the packing group(s) and the physical state. Furthermore, the entry "1120 BUTANOLS" is not explicitly limited to the pure substances, and aqueous solutions of these substances are not specifically mentioned by name otherwise in Table A of Chapter 3.2 as well as in the assimilation list.
- UN 1120 BUTANOLS do not react with water under normal conditions of carriage.

As a consequence, aqueous solutions of UN 1120 tert-Butanol may be assigned to the standard liquid "acetic acid".

4.1.1.21.5 Rule for collective entries

For the assimilation of filling substances for which "Rule for collective entries" is indicated in column 5), the following steps shall be taken and conditions be met (see also scheme in Figure 4.1.1.21.2):

- a) Perform the assimilation procedure for each dangerous component of the solution, mixture or preparation in accordance with 4.1.1.21.3 taking into account the conditions in 4.1.1.21.2. In the case of generic entries, components may be neglected, that are known to have no damaging effect on high density polyethylene (e.g. solid pigments in UN 1263 PAINT or PAINT RELATED MATERIAL);
- b) A solution, mixture or preparation cannot be assimilated to a standard liquid, if:
 - (i) the UN number and packing group of one or more of the dangerous components does not appear in the assimilation list; or
 - (ii) "Rule for collective entries" is indicated in column 5) of the assimilation list for one or more of the dangerous components; or
 - (iii) (with the exception of UN 2059 NITROCELLULOSE SOLUTION, FLAMMABLE) the classification code of one or more of its dangerous components differs from that of the solution, mixture or preparation.
- c) If all dangerous components are listed in the assimilation list, and its classification codes are in accordance with the classification code of the solution, mixture or preparation itself, and all dangerous components are assimilated to the same standard liquid or combination of standard liquids in column 5), the chemical compatibility of the solution, mixture or preparation may be regarded as verified taking into account 4.1.1.21.1 and 4.1.1.21.2;
- d) If all dangerous components are listed in the assimilation list and its classification codes are in accordance with the classification code of the solution, mixture or preparation itself, but different standard liquids are indicated in column 5), the chemical compatibility may only be regarded as verified for the following combinations of standard liquids taking into account 4.1.1.21.1 and 4.1.1.21.2:
 - (iv) water/nitric acid 55%; with the exception of inorganic acids with classification code C1, which are assigned to standard liquid "water";
 - (v) water/wetting solution;
 - (vi) water/acetic acid;
 - (vii) water/mixture of hydrocarbons;
 - (viii) water/n-butyl acetate – n-butyl acetate-saturated wetting solution.

e) In the context of this rule, chemical compatibility is not regarded as verified for other combinations of standard liquids than those specified in d) and for all cases specified in b). In such cases the chemical compatibility shall be verified by other means (see 4.1.1.21.3 d).

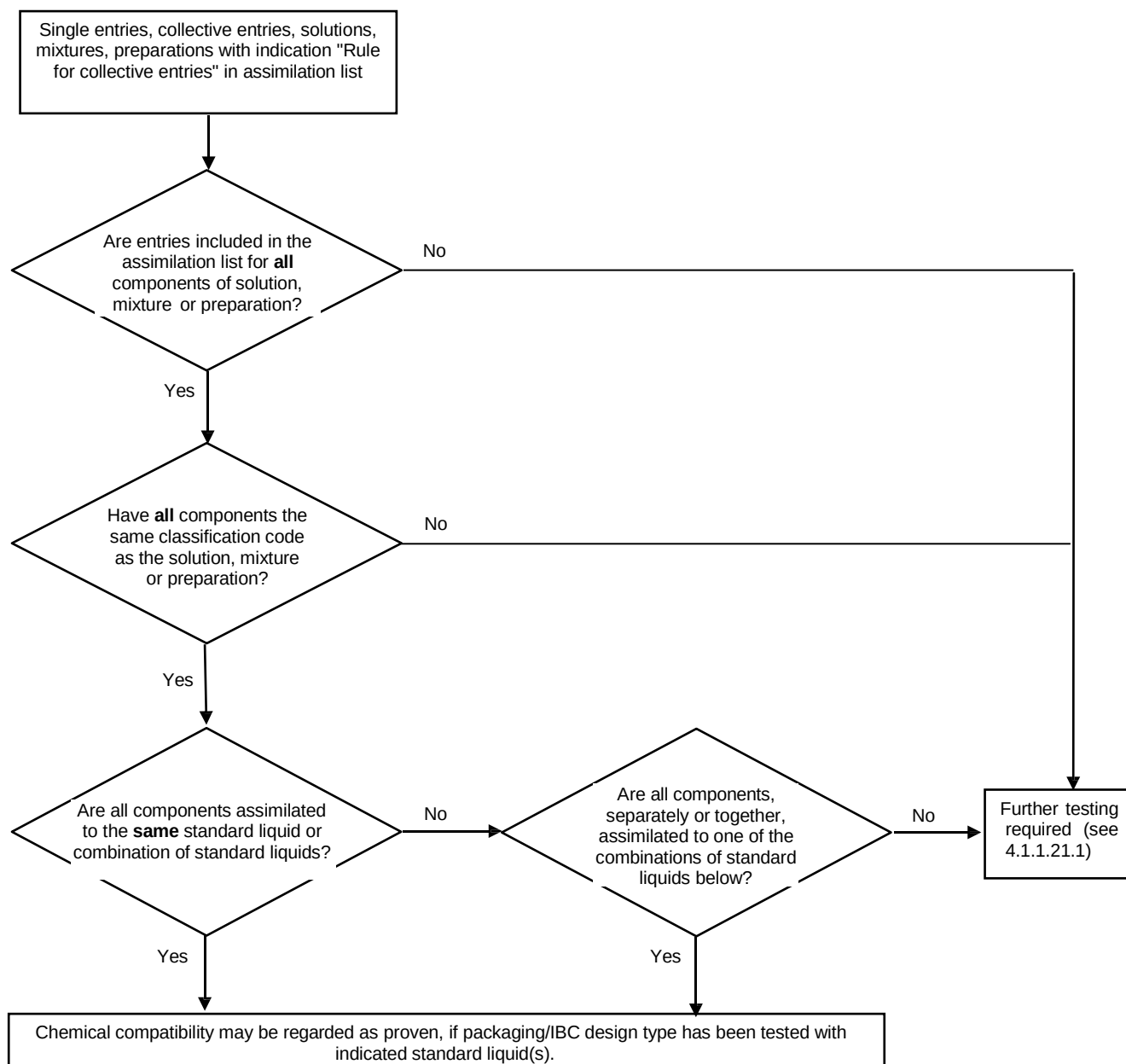
Example 1: Mixture of UN 1940 THIOGLYCOLIC ACID (50%) and UN 2531 METHACRYLIC ACID, STABILIZED (50%); classification of the mixture: UN 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.

- Both the UN numbers of the components and the UN number of the mixture are included in the assimilation list;
- Both the components and the mixture have the same classification code: C3;
- UN 1940 THIOGLYCOLIC ACID is assimilated to standard liquid "acetic acid", and UN 2531 METHACRYLIC ACID, STABILIZED is assimilated to standard liquid "n-butyl acetate/n-butyl acetatesaturated wetting solution". According to paragraph d) this is not an acceptable combination of standard liquids. The chemical compatibility of the mixture has to be verified by other means.

Example 2: Mixture of UN 1793 ISOPROPYL ACID PHOSPHATE (50%) and UN 1803 PHENOLSULPHONIC ACID, LIQUID (50%); classification of the mixture: UN 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.

- Both the UN numbers of the components and the UN number of the mixture are included in the assimilation list;
- Both the components and the mixture have the same classification code: C3;
- UN 1793 ISOPROPYL ACID PHOSPHATE is assimilated to standard liquid "wetting solution", and UN 1803 PHENOLSULPHONIC ACID, LIQUID is assimilated to standard liquid "water". According to paragraph d) this is one of the acceptable combinations of standard liquids. As a consequence, the chemical compatibility may be regarded as verified for this mixture, provided the packaging design type is approved for the standard liquids "wetting solution" and "water".

Figure 4.1.1.21.2: Scheme "Rules for collective entries"



Acceptable combinations of standard liquids:

- water/nitric acid (55%), with the exception of inorganic acids of classification code C1 which are assigned to standard liquid "water";
- water/wetting solution;
- water/acetic acid;
- water/mixture of hydrocarbons;
- water/n-butyl acetate – n-butyl acetate saturated wetting solution

4.1.1.21.6 Assimilation list

In the following table (assimilation list) dangerous substances are listed in the numerical order of their UN numbers. As a rule, each line deals with a dangerous substance, single entry or collective entry covered by a specific UN number. However, several consecutive lines may be used for the same UN number, if substances belonging to the same UN number have different names (e.g. individual isomers of a group of substances), different chemical properties, different physical properties and/or different transport conditions. In such cases the single entry or collective entry within the particular packing group is the last one of such consecutive lines.

Columns (1) to (4) of Table 4.1.1.21.6, following a structure similar to that of Table A of Chapter 3.2, are used to identify the substance for the purpose of this sub-section. The last column indicates the standard liquid(s) to which the substance can be assimilated.

Explanatory notes for each column:

Column (1) UN No.

Contains the UN number

- of the dangerous substance, if the substance has been assigned its own specific UN number, or
- of the collective entry to which dangerous substances not listed by name have been assigned in accordance with the criteria ("decision trees") of Part 2.

Column (2a) Proper shipping name or technical name

Contains the name of the substance, the name of the single entry, which may cover various isomers, or the name of the collective entry itself.

The indicated name can deviate from the applicable proper shipping name.

Column (2b) Description

Contains a descriptive text to clarify the scope of the entry in those cases when the classification, the transport conditions and/or the chemical compatibility of the substance may be variable.

Column (3a) Class

Contains the number of the class, whose heading covers the dangerous substance. This class number is assigned in accordance with the procedures and criteria of Part 2.

Column (3b) Classification code

Contains the classification code of the dangerous substance in accordance with the procedures and criteria of Part 2.

Column (4) Packing group

Contains the packing group number(s) (I, II or III) assigned to the dangerous substance. These packing group numbers are assigned in accordance with the procedures and criteria of Part 2. Certain substances are not assigned to packing groups.

Column (5) Standard liquid

This column indicates, as definite information, either a standard liquid or a combination of standard liquids to which the substance can be assimilated, or a reference to the rule for collective entries in 4.1.1.21.5.

Table 4.1.1.21.6: Assimilation list

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
(1)	3.1.2 (2a)	3.1.2 (2b)	2.2 (3a)	(3b)	2.1.1.3 (4)	(5)
1090	Acetone		3	F1	II	Mixture of hydrocarbons Remark: applicable only, if it is proved that the permeability of the substance out of the package intended for carriage has an acceptable level
1093	Acrylonitrile, stabilized		3	FT1	I	n-Butyl acetate/
1104	Amyl acetates	pure isomers and isomeric mixture	3	F1	III	n-butyl acetate-saturated wetting solution
1105	Pentanol	pure isomers and isomeric mixture	3	F1	II/III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1106	Amylamines	pure isomers and isomeric mixture	3	FC	II/III	Mixture of hydrocarbons and wetting solution
1109	Amyl formates	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1120	Butanol	pure isomers and isomeric mixture	3	F1	II/III	Acetic acid
1123	Butyl acetates	pure isomers and isomeric mixture	3	F1	II/III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1125	n-Butylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
1128	n-Butyl formate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1129	Butyraldehyde		3	F1	II	Mixture of hydrocarbons
1133	Adhesives	containing flammable liquid	3	F1	I/II/III	Rule for collective entries
1139	Coating solution	includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining	3	F1	I/II/III	Rule for collective entries

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1145	Cyclohexane		3	F1	II	Mixture of hydrocarbons
1146	Cyclopentane		3	F1	II	Mixture of hydrocarbons
1153	Ethylene glycol diethyl ether		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
1154	Diethylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
1158	Diisopropylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
1160	Dimethylamine aqueous solution		3	FC	II	Mixture of hydrocarbons and wetting solution
1090	Acetone		3	F1	II	Mixture of hydrocarbons Remark: applicable only, if it is proved that the permeability of the substance out of the package intended for carriage has an acceptable level
1093	Acrylonitrile, stabilized		3	FT1	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1104	Amyl acetates	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1105	Pentanol	pure isomers and isomeric mixture	3	F1	II/III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1106	Amylamines	pure isomers and isomeric mixture	3	FC	II/III	Mixture of hydrocarbons and wetting solution
1109	Amyl formates	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1120	Butanol	pure isomers and isomeric mixture	3	F1	II/III	Acetic acid
1123	Butyl acetates	pure isomers and isomeric mixture	3	F1	II/III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1125	n-Butylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
1128	n-Butyl formate		3	F1	II	n-Butyl acetate/
1129	Butyraldehyde		3	F1	II	

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1133	Adhesives	containing flammable liquid	3	F1	I/II/III	n-butyl acetate-saturated wetting solution Mixture of hydrocarbons Rule for collective entries
1139	Coating solution	includes surface treatments or coatings used for industrial or other purposes such as vehicle under coating, drum or barrel lining	3	F1	I/II/III	Rule for collective entries
1145	Cyclohexane		3	F1	II	Mixture of hydrocarbons
1146	Cyclopentane		3	F1	II	Mixture of hydrocarbons
1153	Ethylene glycol diethyl ether		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
1154	Diethylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
1158	Diisopropylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
1160	Dimethylamine aqueous solution		3	FC	II	Mixture of hydrocarbons and wetting solution
1165	Dioxane		3	F1	II	Mixture of hydrocarbons
1169	Extracts, aromatic, liquid		3	F1	II/III	Rule for collective entries
1170	Ethanol or Ethanol solution	aqueous solution	3	F1	II/III	Acetic acid
1171	Ethylene glycol monoethyl ether		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
1172	Ethylene glycol monoethyl ether acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
1173	Ethyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1177	2-Ethylbutyl acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1178	2-Ethylbutyraldehyde		3	F1	II	Mixture of hydrocarbons
1180	Ethyl butyrate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1188	Ethylene glycol mono- methyl ether		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
1189	Ethylene glycol mono- methyl ether acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
1190	Ethyl formate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1191	Octyl aldehydes	pure isomers and isomeric mixture	3	F1	III	Mixture of hydrocarbons
1192	Ethyl lactate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1195	Ethyl propionate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1197	Extracts, liquid, for flavour or aroma		3	F1	II/III	Rule for collective entries
1198	Formaldehyde solution, flammable	aqueous solution, flash- point between 23 °C and 60 °C	3	FC	III	Acetic acid
1202	Diesel fuel	complying with document No. 13 of the <i>List</i> or with a flashpoint not more than 100 °C	3	F1	III	Mixture of hydrocarbons
1202	Gas oil	flashpoint not more than 100 °C	3	F1	III	Mixture of hydrocarbons
1202	Heating oil, light	extra light	3	F1	III	Mixture of hydrocarbons
1202	Heating oil, light	complying with document No. 13 of the <i>List</i> or with a flashpoint not more than 100 °C	3	F1	III	Mixture of hydrocarbons
1203	Motor spirit or gasoline or petrol		3	F1	II	Mixture of hydrocarbons

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1206	Heptanes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1207	Hexaldehyde	n-Hexaldehyde	3	F1	III	Mixture of hydrocarbons
1208	Hexanes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1210	Printing ink or Printing ink related material	flammable, including printing ink thinning or reducing compound	3	F1	I/II/III	Rule for collective entries
1212	Isobutanol		3	F1	III	Acetic acid
1213	Isobutyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1214	Isobutylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
1216	Isooctenes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1219	Isopropanol		3	F1	II	Acetic acid
1220	Isopropyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1221	Isopropylamine		3	FC	I	Mixture of hydrocarbons and wetting solution
1223	Kerosene		3	F1	III	Mixture of hydrocarbons
1224	3,3-Dimethyl-2-butanone		3	F1	II	Mixture of hydrocarbons
1224	Ketones, liquid, n.o.s.		3	F1	II/III	Rule for collective entries
1230	Methanol		3	FT1	II	Acetic acid
1231	Methyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1233	Methylamyl acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1235	Methylamine, aqueous solution		3	FC	II	Mixture of hydrocarbons and wetting solution
1237	Methyl butyrate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1247	Methyl methacrylate monomer, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1248	Methyl propionate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1262	Octanes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
1263	Paint or Paint related material	including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base or including paint thinning and reducing compound	3	F1	I/II/III	Rule for collective entries
1265	Pentanes	n-Pentane	3	F1	II	Mixture of hydrocarbons
1266	Perfumery products	with flammable solvents	3	F1	II/III	Rule for collective entries
1268	Coal tar naphtha	vapour pressure at 50 °C not more than 110 kPa	3	F1	II	Mixture of hydrocarbons
1268	Petroleum distillates, n.o.s. or Petroleum products, n.o.s.		3	F1	I/II/III	Rule for collective entries
1274	n-Propanol		3	F1	II/III	Acetic acid
1275	Propionaldehyde		3	F1	II	Mixture of hydrocarbons
1276	n-Propyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1277	Propylamine	n-Propylamine	3	FC	II	Mixture of hydrocarbons and wetting solution
1281	Propyl formates	pure isomers and isomeric mixture	3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1282	Pyridine		3	F1	II	Mixture of hydrocarbons
1286	Rosin oil		3	F1	II/III	Rule for collective entries
1287	Rubber solution		3	F1	II/III	Rule for collective entries
1296	Triethylamine		3	FC	II	Mixture of hydrocarbons and wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1297	Trimethylamine, aqueous solution	not more than 50% trimethylamine, by mass	3	FC	I/II/III	Mixture of hydrocarbons and wetting solution
1301	Vinyl acetate, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1306	Wood preservatives, liquid		3	F1	II/III	Rule for collective entries
1547	Aniline		6.1	T1	II	Acetic acid
1590	Dichloroanilines, liquid	pure isomers and isomeric mixture	6.1	T1	II	Acetic acid
1602	Dye, liquid, toxic, n.o.s. or Dye intermediate, liquid, toxic, n.o.s.		6.1	T1	I/II/III	Rule for collective entries
1604	Ethylenediamine		8	CF1	II	Mixture of hydrocarbons and wetting solution
1715	Acetic anhydride		8	CF1	II	Acetic acid
1717	Acetyl chloride		3	FC	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1718	Butyl acid phosphate		8	C3	III	Wetting solution
1719	Hydrogen sulphide	aqueous solution	8	C5	III	Acetic acid
1719	Caustic alkali liquid, n.o.s.	inorganic	8	C5	II/III	Rule for collective entries
1730	Antimony pentachloride, liquid	pure	8	C1	II	Water
1736	Benzoyl chloride		8	C3	II	Mixture of hydrocarbons and wetting solution
1750	Chloroacetic acid solution	aqueous solution	6.1	TC1	II	Acetic acid
1750	Chloroacetic acid solution	mixtures of mono- and dichloroacetic acid	6.1	TC1	II	Acetic acid
1752	Chloroacetyl chloride		6.1	TC1	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1755	Chromic acid solution	aqueous solution with not more than 30% chromic acid	8	C1	II/III	Nitric acid
1760	Cyanamide	aqueous solution with not more than 50% cyanamide	8	C9	II	Water
1760	O,O-Diethyl-dithiophosphoric acid		8	C9	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1760	O,O-Diisopropyl-dithiophosphoric acid		8	C9	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1760	O,O-Di-n-propyl-dithiophosphoric acid		8	C9	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1760	Corrosive liquid, n.o.s.	flashpoint more than 60 °C	8	C9	I/II/III	Rule for collective entries
1761	Cupriethylenediamine solution	aqueous solution	8	CT1	II/III	Mixture of hydrocarbons and wetting solution
1764	Dichloroacetic acid		8	C3	II	Acetic acid
1775	Fluoroboric acid	aqueous solution with not more than 50% fluoroboric acid	8	C1	II	Water
1778	Fluorosilicic acid		8	C1	II	Water
1779	Formic acid	with more than 85% acid by mass	8	CF1	II	Acetic acid
1783	Hexamethylenediamine solution	aqueous solution	8	C7	II/III	Mixture of hydrocarbons and wetting solution
1787	Hydriodic acid	aqueous solution	8	C1	II/III	Water
1788	Hydrobromic acid	aqueous solution	8	C1	II/III	Water
1789	Hydrochloric acid	not more than 38% aqueous solution	8	C1	II/III	Water
1790	Hydrogen fluoride	with not more than 60% hydrofluoric acid	8	CT1	II	Water the permissible period of use: not more than 2 years
1791	Hypochlorite solution	aqueous solution, containing wetting agents as customary in trade	8	C9	II/III	Nitric acid and wetting solution ^(*)
1791	Hypochlorite solution	aqueous solution	8	C9	II/III	Nitric acid ^(*)
^(*) For UN 1791: Test to be carried out only with vent. If the test is carried out with nitric acid as the standard liquid, an acid-resistant vent and gasket shall be used. If the test is carried out with hypochlorite solutions themselves, vents and gaskets of the same design type, resistant to hypochlorite (e.g. of silicone rubber) but not resistant to nitric acid, are also permitted.						
1793	Isopropyl acid phosphate		8	C3	III	Wetting solution
1802	Perchloric acid	aqueous solution with not more than 50% acid, by mass	8	CO1	II	Water
1803	Phenolsulphonic acid, liquid	isomeric mixture	8	C3	II	Water
1805	Phosphoric acid, solution		8	C1	III	Water
1814	Potassium hydroxide solution	aqueous solution	8	C5	II/III	Water
1824	Sodium hydroxide solution	aqueous solution	8	C5	II/III	Water

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1830	Sulphuric acid	with more than 51% pure acid	8	C1	II	Water
1832	Sulphuric acid, spent	chemical stable	8	C1	II	Water
1833	Sulphurous acid		8	C1	II	Water
1835	Tetramethylammonium hydroxide, solution	aqueous solution, flash- point more than 60 °C	8	C7	II	Water
1840	Zinc chloride solution	aqueous solution	8	C1	III	Water
1848	Propionic acid	with not less than 10% and less than 90% acid by mass	8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1862	Ethyl crotonate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1863	Fuel, aviation, turbine engine		3	F1	I/II/III	Mixture of hydrocarbons
1866	Resin solution	flammable	3	F1	I/II/III	Rule for collective entries
1902	Diisooctyl acid phosphate		8	C3	III	Wetting solution
1906	Sludge acid		8	C1	II	Nitric acid
1908	Chlorite solution	aqueous solution	8	C9	II/III	Acetic acid
1914	Butyl propionates		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1915	Cyclohexanone		3	F1	III	Mixture of hydrocarbons
1917	Ethyl acrylate, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1919	Methyl acrylate, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1920	Nonanes	pure isomers and isomeric mixture, flashpoint between 23 °C and 60 °C	3	F1	III	Mixture of hydrocarbons
1935	Cyanide solution, n.o.s.	inorganic	6.1	T4	I/II/III	Water
1940	Thioglycolic acid		8	C3	II	Acetic acid
1986	Alcohols, flammable, toxic, n.o.s.		3	FT1	I/II/III	Rule for collective entries
1987	Cyclohexanol	technical pure	3	F1	III	Acetic acid
1987	Alcohols, n.o.s.		3	F1	II/III	Rule for collective entries
1988	Aldehydes, flammable, toxic, n.o.s.		3	FT1	I/II/III	Rule for collective entries

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
1989	Aldehydes, n.o.s.		3	F1	I/II/III	Rule for collective entries
1992	2,6-cis-Dimethyl-morpholine		3	FT1	III	Mixture of hydrocarbons
1992	Flammable liquid, toxic, n.o.s.		3	FT1	I/II/III	Rule for collective entries
1993	Propionic acid vinyl ester		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1993	(1-Methoxy-2-propyl) acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
1993	Flammable liquid, n.o.s.		3	F1	I/II/III	Rule for collective entries
2014	Hydrogen peroxide, aqueous solution	with not less than 20% but not more than 60% hydrogen peroxide, stabilized as necessary	5.1	OC1	II	Nitric acid
2022	Cresylic acid	liquid mixture containing cresols, xlenols and methyl phenols	6.1	TC1	II	Acetic acid
2030	Hydrazine aqueous solution	with not less than 37% but not more than 64% hydrazine, by mass	8	CT1	II	Water
2030	Hydrazine hydrate	aqueous solution with 64% hydrazine	8	CT1	II	Water
2031	Nitric acid	other than red fuming, with not more than 55% pure acid	8	CO1	II	Nitric acid
2045	Isobutyraldehyde		3	F1	II	Mixture of hydrocarbons
2050	Diisobutylene isomeric compounds		3	F1	II	Mixture of hydrocarbons
2053	Methyl isobutyl carbinol		3	F1	III	Acetic acid
2054	Morpholine		8	CF1	I	Mixture of hydrocarbons
2057	Tripropylene		3	F1	II/III	Mixture of hydrocarbons
2058	Valeraldehyde	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2059	Nitrocellulose solution, flammable		3	D	I/II/III	Rule for collective entries: Deviating from the general procedure this rule may be applied to solvents of classification code F1
2075	Chloral, anhydrous, stabilized		6.1	T1	II	Wetting solution
2076	Cresols, liquid	pure isomers and isomeric mixture	6.1	TC1	II	Acetic acid
2078	Toluene diisocyanate	liquid	6.1	T1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2079	Diethylenetriamine		8	C7	II	Mixture of hydrocarbons
2209	Formaldehyde solution	aqueous solution with 37% Formaldehyde, methanol content: 8-10%	8	C9	III	Acetic acid
2209	Formaldehyde solution	aqueous solution, with not less than 25% formaldehyde	8	C9	III	Water
2218	Acrylic acid, stabilized		8	CF1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2227	n-Butyl methacrylate, stabilized		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2235	Chlorobenzyl chlorides, liquid	para-Chlorobenzyl chloride	6.1	T2	III	Mixture of hydrocarbons
2241	Cycloheptane		3	F1	II	Mixture of hydrocarbons
2242	Cycloheptene		3	F1	II	Mixture of hydrocarbons
2243	Cyclohexyl acetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2244	Cyclopentanol		3	F1	III	Acetic acid
2245	Cyclopentanone		3	F1	III	Mixture of hydrocarbons
2247	n-Decane		3	F1	III	Mixture of hydrocarbons
2248	Di-n-butylamine		8	CF1	II	Mixture of hydrocarbons
2258	1,2-Propylenediamine		8	CF1	II	Mixture of hydrocarbons and wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2259	Triethylenetetramine		8	C7	II	Water
2260	Tripropylamine		3	FC	III	Mixture of hydrocarbons and wetting solution
2263	Dimethylcyclohexanes	pure isomers and isomeric mixture	3	F1	II	Mixture of hydrocarbons
2264	N,N-Dimethyl-cyclohexylamine		8	CF1	II	Mixture of hydrocarbons and wetting solution
2265	N,N-Dimethyl-formamide		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2266	Dimethyl-N-propylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
2269	3,3'-Imino-dipropylamine		8	C7	III	Mixture of hydrocarbons and wetting solution
2270	Ethylamine, aqueous solution	with not less than 50% but not more than 70% ethylamine, flashpoint below 23 °C, corrosive or slightly corrosive	3	FC	II	Mixture of hydrocarbons and wetting solution
2275	2-Ethylbutanol		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2276	2-Ethylhexylamine		3	FC	III	Mixture of hydrocarbons and wetting solution
2277	Ethyl methacrylate, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2278	n-Heptene		3	F1	II	Mixture of hydrocarbons
2282	Hexanols	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2283	Isobutyl methacrylate, stabilized		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2286	Pentamethylheptane		3	F1	III	Mixture of hydrocarbons
2287	Isoheptenes		3	F1	II	Mixture of hydrocarbons
2288	Isohexenes		3	F1	II	Mixture of hydrocarbons
2289	Isophoronediamine		8	C7	III	Mixture of hydrocarbons and wetting solution
2293	4-Methoxy-4-methyl-pentan-2-one		3	F1	III	Mixture of hydrocarbons

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2296	Methylcyclohexane		3	F1	II	Mixture of hydrocarbons
2297	Methylcyclohexanone	pure isomers and isomeric mixture	3	F1	III	Mixture of hydrocarbons
2298	Methylcyclopentane		3	F1	II	Mixture of hydrocarbons
2302	5-Methylhexan-2-one		3	F1	III	Mixture of hydrocarbons
2308	Nitrosylsulphuric acid, liquid		8	C1	II	Water
2309	Octadienes		3	F1	II	Mixture of hydrocarbons
2313	Picolines	pure isomers and isomeric mixture	3	F1	III	Mixture of hydrocarbons
2317	Sodium cuprocyanide solution	aqueous solution	6.1	T4	I	Water
2320	Tetraethylenepentamine		8	C7	III	Mixture of hydrocarbons and wetting solution
2324	Triisobutylene	mixture of C12-monoolefines, flashpoint between 23 °C and 60 °C	3	F1	III	Mixture of hydrocarbons
2326	Trimethylcyclohexylamine		8	C7	III	Mixture of hydrocarbons and wetting solution
2327	Trimethylhexamethylenediamines	pure isomers and isomeric mixture	8	C7	III	Mixture of hydrocarbons and wetting solution
2330	Undecane		3	F1	III	Mixture of hydrocarbons
2336	Allyl formate		3	FT1	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2348	Butyl acrylates, stabilized	pure isomers and isomeric mixture	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2357	Cyclohexylamine	flashpoint between 23 °C and 60 °C	8	CF1	II	Mixture of hydrocarbons and wetting solution
2361	Diisobutylamine		3	FC	III	Mixture of hydrocarbons and wetting solution
2366	Diethyl carbonate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2367	alpha-Methylvaleraldehyde		3	F1	II	Mixture of hydrocarbons
2370	1-Hexene		3	F1	II	Mixture of hydrocarbons

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2372	1,2-Di-(dimethylamino)-ethane		3	F1	II	Mixture of hydrocarbons and wetting solution
2379	1,3-Dimethylbutylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
2383	Dipropylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
2385	Ethyl isobutyrate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2393	Isobutyl formate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2394	Isobutyl propionate	flashpoint between 23 °C and 60 °C	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2396	Methacrylaldehyde, stabilized		3	FT1	II	Mixture of hydrocarbons
2400	Methyl isovalerate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2401	Piperidine		8	CF1	I	Mixture of hydrocarbons and wetting solution
2403	Isopropenyl acetate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2405	Isopropyl butyrate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2406	Isopropyl isobutyrate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2409	Isopropyl propionate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2410	1,2,3,6-Tetrahydropyridine		3	F1	II	Mixture of hydrocarbons
2427	Potassium chlorate, aqueous solution		5.1	O1	II/III	Water
2428	Sodium chlorate, aqueous solution		5.1	O1	II/III	Water
2429	Calcium chlorate, aqueous solution		5.1	O1	II/III	Water
2436	Thioacetic acid		3	F1	II	Acetic acid
2457	2,3-Dimethylbutane		3	F1	II	Mixture of hydrocarbons
2491	Ethanolamine		8	C7	III	Wetting solution
2491	Ethanolamine solution	aqueous solution	8	C7	III	Wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2496	Propionic anhydride		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2524	Ethyl orthoformate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2526	Furfurylamine		3	FC	III	Mixture of hydrocarbons and wetting solution
2527	Isobutyl acrylate, stabilized		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2528	Isobutyl isobutyrate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2529	Isobutyric acid		3	FC	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2531	Methacrylic acid, stabilized		8	C3	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2542	Tributylamine		6.1	T1	II	Mixture of hydrocarbons
2560	2-Methylpentan-2-ol		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2564	Trichloroacetic acid solution	aqueous solution	8	C3	II/III	Acetic acid
2565	Dicyclohexylamine		8	C7	III	Mixture of hydrocarbons and wetting solution
2571	Ethylsulphuric acid		8	C3	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2571	Alkylsulphuric acids		8	C3	II	Rule for collective entries
2580	Aluminium bromide solution	aqueous solution	8	C1	III	Water
2581	Aluminium chloride solution	aqueous solution	8	C1	III	Water
2582	Ferric chloride solution	aqueous solution	8	C1	III	Water
2584	Methane sulphonic acid	with more than 5% free sulphuric acid	8	C1	II	Water
2584	Alkylsulphonic acids, liquid	with more than 5% free sulphuric acid	8	C1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2584	Benzene sulphonic acid	with more than 5% free sulphuric acid	8	C1	II	Water
2584	Toluene sulphonic acids	with more than 5% free sulphuric acid	8	C1	II	Water
2584	Arylsulphonic acids, liquid	with more than 5% free sulphuric acid	8	C1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2586	Methane sulphonic acid	with not more than 5% free sulphuric acid	8	C3	III	Water
2586	Alkylsulphonic acids, liquid	with not more than 5% free sulphuric acid	8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2586	Benzene sulphonic acid	with not more than 5% free sulphuric acid	8	C3	III	Water
2586	Toluene sulphonic acids	liquid, with not more than 5% free sulphuric acid	8	C3	III	Water
2586	Arylsulphonic acids, liquid	with not more than 5% free sulphuric acid	8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2610	Triallylamine		3	FC	III	Mixture of hydrocarbons and wetting solution
2614	Methallyl alcohol		3	F1	III	Acetic acid
2617	Methylcyclohexanols	pure isomers and isomeric mixture, flashpoint between 23 °C and 60 °C	3	F1	III	Acetic acid
2619	Benzyltrimethylamine		8	CF1	II	Mixture of hydrocarbons and wetting solution
2620	Amyl butyrates	pure isomers and isomeric mixture, flashpoint between 23 °C and 60 °C	3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2622	Glycidaldehyde	flashpoint below 23 °C	3	FT1	II	Mixture of hydrocarbons
2626	Chloric acid, aqueous solution	with not more than 10% chloric acid	5.1	O1	II	Nitric acid
2656	Quinoline	flashpoint more than 60 °C	6.1	T1	III	Water

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2672	Ammonia solution	relative density between 0.880 and 0.957 at 15 °C in water, with more than 10% but not more than 35% ammonia	8	C5	III	Water
2683	Ammonium sulphide solution	aqueous solution, flash-point between 23 °C and 60 °C	8	CFT	II	Acetic acid
2684	3-Diethylaminopropylamine		3	FC	III	Mixture of hydrocarbons and wetting solution
2685	N,N-Diethylethylenediamine		8	CF1	II	Mixture of hydrocarbons and wetting solution
2693	Bisulphites, aqueous solution, n.o.s.	inorganic	8	C1	III	Water
2707	Dimethyldioxanes	pure isomers and isomeric mixture	3	F1	II/III	Mixture of hydrocarbons
2733	Amines, flammable, corrosive, n.o.s. or Polyamines, flammable, corrosive, n.o.s.		3	FC	I/II/III	Mixture of hydrocarbons and wetting solution
2734	Di-sec-butylamine		8	CF1	II	Mixture of hydrocarbons
2734	Amines, liquid, corrosive, flammable, n.o.s. or Polyamines, liquid, corrosive, flammable, n.o.s.		8	CF1	I/II	Mixture of hydrocarbons and wetting solution
2735	Amines, liquid, corrosive, n.o.s. or Polyamines, liquid, corrosive, n.o.s.		8	C7	I/II/III	Mixture of hydrocarbons and wetting solution
2739	Butyric anhydride		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2789	Acetic acid, glacial or Acetic acid solution	aqueous solution, more than 80% acid, by mass	8	CF1	II	Acetic acid
2790	Acetic acid solution	aqueous solution, more than 10% but not more than 80% acid, by mass	8	C3	II/III	Acetic acid
2796	Sulphuric acid	with not more than 51% pure acid	8	C1	II	Water

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2797	Battery fluid, alkali	Potassium/Sodium hydroxide, aqueous solution	8	C5	II	Water
2810	2-Chloro-6-fluorobenzyl chloride	stabilized	6.1	T1	III	Mixture of hydrocarbons
2810	2-Phenylethanol		6.1	T1	III	Acetic acid
2810	Ethylene glycol monohexyl ether		6.1	T1	III	Acetic acid
2810	Toxic liquid, organic, n.o.s.		6.1	T1	I/II/III	Rule for collective entries
2815	N-Aminoethylpiperazine		8	CT1	III	Mixture of hydrocarbons and wetting solution
2818	Ammonium polysulphide solution	aqueous solution	8	CT1	II/III	Acetic acid
2819	Amyl acid phosphate		8	C3	III	Wetting solution
2820	Butyric acid	n-Butyric acid	8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2821	Phenol solution	aqueous solution, toxic, non-alkaline	6.1	T1	II/III	Acetic acid
2829	Caproic acid	n-Caproic acid	8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2837	Bisulphates, aqueous solution		8	C1	II/III	Water
2838	Vinyl butyrate, stabilized		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2841	Di-n-amylamine		3	FT1	III	Mixture of hydrocarbons and wetting solution
2850	Propylene tetramer	mixture of C12-monoolefines, flashpoint between 23 °C and 60 °C	3	F1	III	Mixture of hydrocarbons
2873	Dibutylaminoethanol	N,N-Di-n-butylaminoethanol	6.1	T1	III	Acetic acid
2874	Furfuryl alcohol		6.1	T1	III	Acetic acid
2920	O,O-Diethyl-dithiophosphoric acid	flashpoint between 23 °C and 60 °C	8	CF1	II	n-Butyl acetate/n-butyl acetate-saturated wetting solution
2920	O,O-Dimethyl-dithiophosphoric acid	flashpoint between 23 °C and 60 °C	8	CF1	II	Wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2920	Hydrogen bromide	33% solution in glacial acetic acid	8	CF1	II	Wetting solution
2920	Tetramethylammonium hydroxide	aqueous solution, flash-point between 23 °C and 60 °C	8	CF1	II	Water
2920	Corrosive liquid, flammable, n.o.s.		8	CF1	I/II	Rule for collective entries
2922	Ammonium sulphide	aqueous solution, flash-point more than 60 °C	8	CT1	II	Water
2922	Cresols	aqueous alkaline solution, mixture of sodium and potassium cresolate	8	CT1	II	Acetic acid
2922	Phenol	aqueous alkaline solution, mixture of sodium and potassium phenolate	8	CT1	II	Acetic acid
2922	Sodium hydrogen difluoride	aqueous solution	8	CT1	III	Water
2922	Corrosive liquid, toxic, n.o.s.		8	CT1	I/II/III	Rule for collective entries
2924	Flammable liquid, corrosive, n.o.s.	slightly corrosive	3	FC	I/II/III	Rule for collective entries
2927	Toxic liquid, corrosive, organic, n.o.s.		6.1	TC1	I/II	Rule for collective entries
2933	Methyl 2-chloropropionate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2934	Isopropyl 2-chloropropionate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2935	Ethyl 2-chloropropionate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2936	Thiolactic acid		6.1	T1	II	Acetic acid
2941	Fluoroanilines	pure isomers and isomeric mixture	6.1	T1	III	Acetic acid
2943	Tetrahydrofurfurylamine		3	F1	III	Mixture of hydrocarbons
2945	N-Methylbutylamine		3	FC	II	Mixture of hydrocarbons and wetting solution
2946	2-Amino-5-diethylaminopentane		6.1	T1	III	Mixture of hydrocarbons and wetting solution

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
2947	Isopropyl chloroacetate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
2984	Hydrogen peroxide, aqueous solution	with not less than 8% but less than 20% hydrogen peroxide, stabilized as necessary	5.1	O1	III	Nitric acid
3056	n-Heptaldehyde		3	F1	III	Mixture of hydrocarbons
3065	Alcoholic beverages	with more than 24% alcohol by volume	3	F1	II/III	Acetic acid
3066	Paint or Paint related material	including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base or including paint thinning and reducing compound	8	C9	II/III	Rule for collective entries
3079	Methacrylonitrile, stabilized		6.1	TF1	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3082	sec-Alcohol C6-C17 poly (3-6) ethoxylate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
3082	Alcohol C12-C15 poly (1-3) ethoxylate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
3082	Alcohol C13-C15 poly (1-6) ethoxylate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
3082	Aviation turbine fuel JP-5	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Aviation turbine fuel JP-7	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Coal tar	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Coal tar naphtha	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Creosote produced of coal tar	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3082	Creosote produced of wood tar	flashpoint more than 60 °C	9	M6	III	Mixture of hydrocarbons
3082	Cresyl diphenyl phosphate		9	M6	III	Wetting solution
3082	Decyl acrylate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
3082	Diisobutyl phthalate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
3082	Di-n-butyl phthalate		9	M6	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons
3082	Hydrocarbons	liquid, flashpoint more than 60 °C, environmentally hazardous	9	M6	III	Rule for collective entries
3082	Isodecyl diphenyl phosphate		9	M6	III	Wetting solution
3082	Methylnaphthalenes	isomeric mixture, liquid	9	M6	III	Mixture of hydrocarbons
3082	Triaryl phosphates	n.o.s.	9	M6	III	Wetting solution
3082	Tricresyl phosphate	with not more than 3% ortho-isomer	9	M6	III	Wetting solution
3082	Trixylenyl phosphate		9	M6	III	Wetting solution
3082	Zinc alkyl dithiophosphate	C3-C14	9	M6	III	Wetting solution
3082	Zinc aryl dithiophosphate	C7-C16	9	M6	III	Wetting solution
3082	Environmentally hazardous substance, liquid, n.o.s.		9	M6	III	Rule for collective entries
3099	Oxidizing liquid, toxic, n.o.s.		5.1	OT1	I/II/III	Rule for collective entries
3101 3103 3105 3107 3109 3111 3113 3115 3117 3119	Organic Peroxide, Type B, C, D, E or F, liquid or Organic Peroxide, Type B, C, D, E or F, liquid, temperature controlled		5.2	P1		n-Butyl acetate/ n-butyl acetate-saturated wetting solution and mixture of hydrocarbons and nitric acid ^(**)

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
(**) For UN Nos. 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115, 3117, 3119 (tert-butyl hydroperoxide with more than 40 % peroxide content and peroxyacetic acids are excluded): All organic peroxides in a technically pure form or in solution in solvents which, as far as their compatibility is concerned, are covered by the standard liquid "mixture of hydrocarbons" in this list. Compatibility of vents and gaskets with organic peroxides may be verified, also independently of the design type test, by laboratory tests with nitric acid. Organic peroxides of UN Nos 3111, 3113, 3115, 3117 and 3119 are not accepted for carriage by rail.						
3145	Butylphenols	liquid, n.o.s.	8	C3	I/II/III	Acetic acid
3145	Alkylphenols, liquid, n.o.s.	including C2 to C12 homologues	8	C3	I/II/III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3149	Hydrogen peroxide and peroxyacetic acid mixture, stabilized	with UN 2790 acetic acid, UN 2796 sulphuric acid and/or UN 1805 phosphoric acid, water and not more than 5% peroxyacetic acid	5.1	OC1	II	Wetting solution and nitric acid
3210	Chlorates, inorganic, aqueous solution, n.o.s.		5.1	O1	II/III	Water
3211	Perchlorates, inorganic, aqueous solution, n.o.s.		5.1	O1	II/III	Water
3213	Bromates, inorganic, aqueous solution, n.o.s.		5.1	O1	II/III	Water
3214	Permanganates, inorganic, aqueous solution, n.o.s.		5.1	O1	II	Water
3216	Persulphates, inorganic, aqueous solution, n.o.s.		5.1	O1	III	Wetting solution
3218	Nitrates, inorganic, aqueous solution, n.o.s.		5.1	O1	II/III	Water
3219	Nitrites, inorganic, aqueous solution, n.o.s.		5.1	O1	II/III	Water
3264	Cupric chloride	aqueous solution, slightly corrosive	8	C1	III	Water
3264	Hydroxylamine sulphate	25% aqueous solution	8	C1	III	Water
3264	Phosphorous acid	aqueous solution	8	C1	III	Water
3264	Corrosive liquid, acidic, inorganic, n.o.s.	flashpoint more than 60 °C	8	C1	I/II/III	Rule for collective entries; not applicable to mixtures having components of UN Nos.: 1830, 1832, 1906 and 2308

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3265	Methoxyacetic acid		8	C3	I	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Allyl succinic acid anhydride		8	C3	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Dithioglycolic acid		8	C3	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Butyl phosphate	mixture of mono- and di- butyl phosphate	8	C3	III	Wetting solution
3265	Caprylic acid		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Isovaleric acid		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Pelargonic acid		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Pyruvic acid		8	C3	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3265	Valeric acid		8	C3	III	Acetic acid
3265	Corrosive liquid, acidic, organic, n.o.s.	flashpoint more than 60 °C	8	C3	I/II/III	Rule for collective entries
3266	Sodium hydrosulphide	aqueous solution	8	C5	II	Acetic acid
3266	Sodium sulphide	aqueous solution, slightly corrosive	8	C5	III	Acetic acid
3266	Corrosive liquid, basic, inorganic, n.o.s.	flashpoint more than 60 °C	8	C5	I/II/III	Rule for collective entries
3267	2,2'-(Butylimino)-bisethanol		8	C7	II	Mixture of hydrocarbons and wetting solution
3267	Corrosive liquid, basic, organic, n.o.s.	flashpoint more than 60 °C	8	C7	I/II/III	Rule for collective entries
3271	Ethylene glycol monobutyl ether	flashpoint 60 °C	3	F1	III	Acetic acid
3271	Ether, n.o.s.		3	F1	II/III	Rule for collective entries

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3272	Acrylic acid tert-butyl ester		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Isobutyl propionate	flashpoint below 23 °C	3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Methyl valerate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Trimethyl ortho-formate		3	F1	II	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Ethyl valerate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Isobutyl isovalerate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	n-Amyl propionate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	n-Butylbutyrate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Methyl lactate		3	F1	III	n-Butyl acetate/ n-butyl acetate-saturated wetting solution
3272	Ester, n.o.s.		3	F1	II/III	Rule for collective entries
3287	Sodium nitrite	40% aqueous solution	6.1	T4	III	Water
3287	Toxic liquid, inorganic, n.o.s.		6.1	T4	I/II/III	Rule for collective entries
3291	Clinical waste, unspecified, n.o.s.	liquid	6.2	I3	II	Water
3293	Hydrazine, aqueous solution	with not more than 37% hydrazine, by mass	6.1	T4	III	Water
3295	Heptenes	n.o.s.	3	F1	II	Mixture of hydrocarbons
3295	Nonanes	flashpoint below 23 °C	3	F1	II	Mixture of hydrocarbons
3295	Decanes	n.o.s.	3	F1	III	Mixture of hydrocarbons
3295	1,2,3-Trimethylbenzene		3	F1	III	Mixture of hydrocarbons
3295	Hydrocarbons, liquid, n.o.s.		3	F1	I/II/III	Rule for collective entries

UN No.	Proper shipping name or technical name	Description	Class	Classification code 2.2	Packing group	Standard liquid
	3.1.2	3.1.2	2.2		2.1.1.3	
(1)	(2a)	(2b)	(3a)	(3b)	(4)	(5)
3405	Barium chlorate, solution	aqueous solution	5.1	OT1	II/III	Water
3406	Barium perchlorate, solution	aqueous solution	5.1	OT1	II/III	Water
3408	Lead perchlorate, solution	aqueous solution	5.1	OT1	II/III	Water
3413	Potassium cyanide, solution	aqueous solution	6.1	T4	I/II/III	Water
3414	Sodium cyanide, solution	aqueous solution	6.1	T4	I/II/III	Water
3415	Sodium fluoride, solution	aqueous solution	6.1	T4	III	Water
3422	Potassium fluoride, solution	aqueous solution	6.1	T4	III	Water

4.1.1.21.7 By derogation from 4.1.1.21.1, liquid waste classified under 2.1.3.5.5 may be filled into polyethylene packaging provided that the packagings have passed the tests with all standard liquids described in 6.1.6.1. Packagings shall conform to the packing group performance level as assigned in accordance with 2.1.3.5.5.

By derogation from 4.1.1.15, on the basis of the knowledge of the composition of the liquid waste, in case of presence of substances that could weaken the polyethylene packaging (e.g. some chlorinated compounds), the period of use permitted for this packaging shall be two and a half years from the date of its manufacture.

4.1.2 ADDITIONAL GENERAL PROVISIONS FOR THE USE OF IBCS

4.1.2.1 When IBCs are used for the carriage of liquids with a flashpoint of 60 °C (closed cup) or lower, or of powders liable to dust explosion, measures shall be taken to prevent a dangerous electrostatic discharge.

4.1.2.2 Every metal, rigid plastics and composite IBC, shall be inspected and tested, as relevant, in accordance with 6.5.4.4 or 6.5.4.5:

- before it is put into service;
- thereafter at intervals not exceeding two and a half and five years, as appropriate;
- after the repair or remanufacture, before it is re-used for carriage.

An IBC shall not be filled and offered for carriage after the date of expiry of the last periodic test or inspection. However, an IBC filled prior to the date of expiry of the last periodic test or inspection may be carried for a period not to exceed three months beyond the date of expiry of the last periodic test or inspection. In addition, an IBC may be carried after the date of expiry of the last periodic test or inspection:

a) after emptying but before cleaning, for purposes of performing the required test or inspection prior to refilling; and

b) unless otherwise approved by the competent authority, for a period not to exceed six months beyond the date of expiry of the last periodic test or inspection in order to allow the return of dangerous goods or residues for proper disposal or recycling.

Note: For the particulars in the transport document, see 5.4.1.1.11.

4.1.2.3 IBCs of type 31HZ2 shall be filled to at least 80% of the volume of the outer casing.

4.1.2.4 Except for routine maintenance of metal, rigid plastics, composite and flexible IBCs performed by the owner of the IBC, whose State and name or authorized symbol is durably marked on the IBC, the party performing routine maintenance shall durably mark the IBC near the manufacturer's UN design type mark to show:

- a) The State in which the routine maintenance was carried out; and
- b) The name or authorized symbol of the party performing the routine maintenance.

4.1.3 GENERAL PROVISIONS CONCERNING PACKING INSTRUCTIONS

4.1.3.1 Packing instructions applicable to dangerous goods of Classes 1 to 9 are specified in Section 4.1.4. They are subdivided in three sub-sections depending on the type of packagings to which they apply:

Sub-section 4.1.4.1 for packagings other than IBCs and large packagings; these packing instructions are designated by an alphanumeric code starting with the letter "P" or "R" for packagings specific to Annex 2 to SMGS, or RID and ADR;

Sub-section 4.1.4. for IBCs; these are designated by an alphanumeric code starting with the letters "IBCs";

Sub-section 4.1.4.3 for large packagings; these are designated by an alphanumeric code starting with the letters "LP".

Generally, packing instructions specify that the general provisions of 4.1.1, 4.1.2 or 4.1.3, as appropriate, are applicable. They may also require compliance with the special provisions of Sections 4.1.5, 4.1.6, 4.1.7, 4.1.8 or 4.1.9 when appropriate. Special packing provisions may also be specified in the packing instruction for individual substances or articles. They are also designated by an alphanumeric code comprising the letters:

"PP" for packagings other than IBCs and large packagings, or "RR" for special provisions specific to Annex 2 to SMGS or RID/ADR;

"B" for IBCs or "BB" for special packing provisions specific to Annex 2 to SMGS or RID/ADR;

"L" for large packagings or "LL" for special packing provisions specific to Annex 2 to SMGS or RID/ADR;

Unless otherwise specified, each packaging shall conform to the applicable requirements of Part 6. Generally packing instructions do not provide guidance on compatibility and the user shall not select a packaging without checking that the substance is compatible with the packaging material selected (e.g. glass receptacles are unsuitable for most fluorides). Where

glass receptacles are permitted in the packing instructions porcelain, earthenware and stoneware packagings are also allowed.

4.1.3.2 Column (8) of Table A of Chapter 3.2 shows for each article or substance the packing instruction(s) that shall be used. Columns 9a) and 9b) indicate the special packing provisions and the mixed packing provisions (see 4.1.10) applicable to specific substances or articles.

4.1.3.3 Each packing instruction shows, where applicable, the acceptable single and combination packagings. For combination packagings, the acceptable outer packagings, inner packagings and when applicable the maximum quantity permitted in each inner or outer packaging, are shown. Maximum net mass and maximum capacities are as defined in 1.2.1. Where packagings which need not meet the requirements of 4.1.1.3 (e.g. crates, pallets) are authorized in a packing instruction or the special provisions listed in Table A in Chapter 3.2, these packagings are not subject to the mass or volume limits generally applicable to packagings conforming to the requirements of Chapter 6.1, unless otherwise indicated in the relevant packing instruction or special provision.

4.1.3.4 The following packagings shall not be used when the substances being carried are liable to become liquid during carriage:

Drums: 1D and 1G

Boxes: 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2

Bags: 5L1, 5L2, 5L3, 5H1, 5H2, 5H3, 5H4, 5M1 and 5M2

Composite packagings: 6HC, 6HD2, 6HG1, 6HG2, 6HD1, 6PC, 6PD1, 6PD2, 6PG1, 6PG2 and 6PH1

Large packagings: flexible plastics 51H (outer packaging)

IBCs

For substances of packing group I:

all types of IBC

For substances of packing groups II and III:

Wooden: 11C, 11D and 11F

Fibreboard: 11G

Flexible: 13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 and 13M2

Composite: 11HZ2, 21HZ2

For the purposes of this paragraph, substances and mixtures of substances having a melting point equal to or less than 45 °C shall be treated as solids liable to become liquid during transport.

4.1.3.5 Where the packing instructions in this Chapter authorize the use of a particular type of packaging (e.g. 4G, 1A2), packagings bearing the same packaging identification code followed by the letters "V", "U" or "W" marked in accordance with the requirements of Part 6 (e.g. 4GV, 4GU or 4GW; 1A2V, 1A2U or 1A2W) may also be used under the same conditions and limitations applicable to the use of that type of packaging according to the relevant packing instructions. For example, a combination packaging marked with the packaging code "4GV" may be used whenever a combination packaging marked "4G" is authorized, provided the requirements in the relevant packing instruction regarding types of inner packagings and quantity limitations are respected.

4.1.3.6 Pressure receptacles for liquids and solids

4.1.3.6.1 Unless otherwise indicated in Annex 2 to SMGS, pressure receptacles conforming to:

a) the applicable requirements of Chapter 6.2 or

b) the national or international standards on the design, construction, testing, manufacturing and inspection, as applied by the country in which the pressure receptacles are manufactured, provided that the provisions of 4.1.3.6 are met and that, for metallic cylinders, tubes, pressure drums, bundles of cylinders and salvage pressure receptacles, the construction is such that the minimum burst ratio (burst pressure divided by test pressure) is:

- 1.50 for refillable pressure receptacles;
- 2.00 for non-refillable pressure receptacles;

are authorized for the carriage of any liquid or solid substance other than explosives, thermally unstable substances, organic peroxides, self-reactive substances, substances where significant pressure may develop by evolution of chemical reaction and radioactive material (unless permitted in 4.1.9).

This sub-section is not applicable to the substances mentioned in 4.1.4.1 (packing instruction P200, table 3 "Substances not in class 2").

4.1.3.6.2 Every design type of pressure receptacle shall be approved by the competent authority of the country of manufacture or as indicated in Chapter 6.2.

4.1.3.6.3 Unless otherwise indicated, pressure receptacles having a minimum test pressure of 0.6 MPa shall be used.

4.1.3.6.4 Unless otherwise indicated, pressure receptacles may be provided with an emergency pressure relief device designed to avoid bursting in case of overfill or fire accidents.

Pressure receptacle valves shall meet the following requirements:

- be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents, or
- be protected from damage which could cause inadvertent release of the contents of the pressure receptacle, by one of the methods as given in 4.1.6.8 (a) to (e).

4.1.3.6.5 The level of filling shall not exceed 95% of the capacity of the pressure receptacle at 50 °C. Sufficient ullage (outage) shall be left to ensure that the pressure receptacle will not be liquid full at a temperature of 55 °C.

4.1.3.6.6 Unless otherwise indicated pressure receptacles shall be subjected to a periodic inspection and test every 5 years. The periodic inspection shall include:

- an external examination
- an internal examination or alternative method as approved by the competent authority
- a pressure test or equivalent effective non-destructive testing with the agreement of the competent authority (e.g. tightness of valves, emergency relief valves or fusible elements).

Pressure receptacles shall not be filled after they become due for periodic inspection and test but may be carried after the expiry of the time limit. Pressure receptacle repairs shall meet the requirements of 4.1.6.11.

4.1.3.6.7 Prior to filling, the packer shall perform an inspection of the pressure receptacle and ensure that the pressure receptacle is authorized for the substances to be carried and that the requirements of Annex 2 to SMGS have been met. Shutoff valves shall be closed after filling and remain closed during carriage. The consignor shall verify that the closures and equipment are not leaking.

4.1.3.6.8 Refillable pressure receptacles shall not be filled with a substance different from that previously contained unless the necessary operations for change of service have been performed (neutralization, degassing, etc.).

4.1.3.6.9 Marking of pressure receptacles for liquids and solids according to 4.1.3.6 (not conforming to the requirements of Chapter 6.2) shall be in accordance with the requirements of the competent authority of the country of manufacturing.

4.1.3.7 Packagings or IBCs not specifically authorized in the applicable packing instruction shall not be used for the carriage of a substance or article unless specifically allowed under a temporary derogation agreed between SMGS Parties in accordance with 1.5.1.

4.1.3.8 Unpackaged articles other than Class 1 articles

4.1.3.8.1 Where large and robust articles cannot be packaged in accordance with the requirements of Chapters 6.1 or 6.6 and they have to be carried empty, uncleaned and unpackaged, the competent authority of the country of origin¹ may approve such unpackaged carriage. In doing so the competent authority shall take into account that:

¹ If the country of origin is not an SMGS Contracting State, the competent authority of the first RID Contracting State reached by the consignment.

- a) Large and robust articles shall be strong enough to withstand the shocks and loadings normally encountered during carriage including transshipment between cargo transport units and between cargo transport units and warehouses, as well as any removal from a pallet for subsequent manual or mechanical handling;
- b) All closures and openings shall be sealed so that there can be no loss of contents which might be caused under normal conditions of carriage, by vibration, or by changes in temperature, humidity or pressure (resulting from altitude, for example). No dangerous residue shall adhere to the outside of the large and robust articles;
- c) Parts of large and robust articles, which are in direct contact with dangerous goods:
 - shall not be affected or significantly weakened by those dangerous goods; and
 - shall not cause a dangerous effect or dangerous reactions (see 1.2.1);
- d) Large and robust articles containing liquids shall be stowed and secured to ensure that neither leakage nor permanent distortion of the article occurs during carriage;
- e) Large and robust articles shall be fixed in cradles or crates or other handling devices or to the wagon or container in such a way that they will not become loose during normal conditions of carriage.

4.1.3.8.2

Unpackaged articles approved by the competent authority in accordance with the provisions of 4.1.3.8.1 shall be subject to the consignment procedures of Part 5. In addition, the consignor of such articles shall ensure that a copy of any such approval is attached to the transport document.

Note: *A large and robust article may include flexible fuel containment systems, military equipment, machinery or equipment containing dangerous goods above the limited quantities according to 3.4.6.*

4.1.4 LIST OF PACKING INSTRUCTIONS

4.1.4.1 Packing instructions concerning the use of packagings (except IBCs and large packagings)

P001		PACKING INSTRUCTION (LIQUIDS)		P001	
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:					
Combination packagings:			Maximum capacity/Net mass (see 4.1.3.3)		
Inner packagings with maximum capacities of		Outer packagings	Packing group I	Packing group II, III	
Glass	10 l	Drums steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) fibre (1G)			
Plastics	30 l		250 kg	400 kg	
Metal	40 l		250 kg	400 kg	
			250 kg	400 kg	
			250 kg	400 kg	
			150 kg	400 kg	
			75 kg	400 kg	
Boxes steel (4A) aluminium (4B) other metal (4N) natural wood (4C1, 4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) expanded plastics (4H1) solid plastics (4H2)					
		250 kg	400 kg		
		250 kg	400 kg		
		250 kg	400 kg		
		150 kg	400 kg		
		150 kg	400 kg		
		75 kg	400 kg		
		75 kg	400 kg		
		60 kg	60 kg		
		150 kg	400 kg		
Jerricans steel (3A1, 3A2) aluminium (3B1, 3B2) plastics (3H1, 3H2)					
		120 kg	120 kg		
		120 kg	120 kg		
		120 kg	120 kg		
Single packagings:					
Drums					
steel, non-removable head (1A1)			250 l	450 l	
steel, removable head (1A2)			250 l *	450 l	
aluminium, non-removable head (1B1)			250 l	450 l	
aluminium, removable head (1B2)			250 l *	450 l	
metal other than steel or aluminium, non-removable head (1N1)			250 l	450 l	
metal other than steel or aluminium, removable head (1N2)			250 l *	450 l	
plastics, non-removable head (1H1)			250 l	450 l	
plastics, removable head (1H2)			250 l *	450 l	
Jerricans					
steel, non-removable head (3A1)			60 l	60 l	
steel, removable head (3A2)			60 l *	60 l	
aluminium, non-removable head (3B1)			60 l	60 l	
aluminium, removable head (3B2)			60 l *	60 l	
plastics, non-removable head (3H1)			60 l	60 l	
plastics, removable head (3H2)			60 l *	60 l	

* Only substances with a viscosity of more than 2 680 mm²/s are authorized.

P001 PACKING INSTRUCTION (LIQUIDS), cont'd		P001
	Maximum capacity/Net mass (see 4.1.3.3)	
	Packing group I	Packing group II, III
Composite packagings:		
plastics receptacle with outer steel, aluminium or plastics drum (6HA1, 6HB1, 6HH1)	250 /	250 /
plastics receptacle with outer fibre or plywood drum (6HG1, 6HD1)	120 /	250 /
plastics receptacle with outer steel or aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	60 /	60 /
glass receptacle with outer steel, aluminium, fibreboard, plywood, expanded plastics or solid plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or with outer steel or aluminium crate or box or with outer wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2)	60 /	60 /
Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.		
Additional requirements: For substances of Class 3, packing group III, which give off small quantities of carbon dioxide or nitrogen, the packagings shall be vented.		
Special packing provisions:		
PP1 For UN Nos. 1133, 1210, 1263 and 1866 and for adhesives, printing inks, printing ink related materials, paints, paint related materials and resin solutions which are assigned to UN 3082, metal or plastics packagings for substances of packing groups II and III in quantities of 5 litres or less per packaging are not required to meet the performance tests in Chapter 6.1 when carried: in palletized loads, a pallet box or unit load device, e.g. individual packagings placed or stacked and secured by strapping, shrink or stretch-wrapping or other suitable means to a pallet; or as inner packagings of combination packagings with a maximum net mass of 40 kg.		
PP2 For UN No. 3065, wooden barrels with a maximum capacity of 250 litres and which do not meet the provisions of Chapter 6.1 may be used.		
PP4 For UN No. 1774, packagings shall meet the packing group II performance level.		
PP5 For UN No. 1204, packagings shall be so constructed that explosion is not possible by reason of increased internal pressure. Cylinders, tubes and pressure drums shall not be used for these substances.		
PP6 (reserved)		
PP10 For UN No. 1791, packing group II, the packaging shall be vented.		
PP31 For UN No. 1131, packagings shall be hermetically sealed.		
PP33 For UN No. 1308, packing groups I and II, only combination packagings with a maximum gross mass of 75 kg allowed.		
PP81 For UN No. 1790 with more than 60% but not more than 85% hydrogen fluoride and UN No. 2031 with more than 55% nitric acid, the permitted use of plastics drums and jerricans as single packagings shall be two years from their date of manufacture.		
PP93 For UN No. 3532, packagings shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the packagings in the event of loss of stabilization.		
Special packing provision specific to Annex 2 to SMGS, RID, and ADR		
RR2 For UN No. 1261, removable head packagings are not permitted.		

P002		PACKING INSTRUCTION (SOLIDS)		P002
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:				
Combination packagings:			Maximum net mass (see 4.1.3.3)	
Inner packagings, with maximal capacity of		Outer packagings	Packing group I	Packing group II, III
Glass	10 kg	Drums		
Plastic ^{a)}	50 kg	steel (1A1, 1A2)	400 kg	400 kg
Metal	50 kg	aluminium (1B1, 1B2)	400 kg	400 kg
Paper ^{a), b), c)}	50 kg	other metal (1N1, 1N2)	400 kg	400 kg
Fibre ^{a), b), c)}	50 kg	plastic (1H1, 1H2)	400 kg	400 kg
		plywood (1D)	400 kg	400 kg
		fibre (1G)	400 kg	400 kg
		Boxes		
		steel (4A)	400 kg	400 kg
		aluminium (4B)	400 kg	400 kg
		other metal (4N)	400 kg	400 kg
		natural wood (4C1)	250 kg	400 kg
		natural wood with sift-proof walls (4C2)	250 kg	400 kg
		plywood (4D)	250 kg	400 kg
		reconstituted wood (4F)	125 kg	400 kg
		fibreboard (4G)	125 kg	400 kg
		expanded plastics (4H1)	60 kg	60 kg
		solid plastics (4H2)	250 kg	400 kg
		Jerricans		
		steel (3A1, 3A2)	120 kg	120 kg
		aluminium (3B1, 3B2)	120 kg	120 kg
		plastic (3H1, 3H2)	120 kg	120 kg
Single packagings:				
Drums				
steel (1A1 or 1A2 ^{d)})			400 kg	400 kg
aluminium (1B1 or 1B2 ^{d)})			400 kg	400 kg
metal, other than steel or aluminium (1N1 and 1N2 ^{d)})			400 kg	400 kg
plastics (1H1 or 1H2 ^{d)})			400 kg	400 kg
fibre (1G) ^{d)}			400 kg	400 kg
plywood (1D) ^{e)}			400 kg	400 kg
Jerricans				
steel (3A1 or 3A2 ^{d)})			120 kg	120 kg
aluminium (3B1 or 3B2 ^{d)})			120 kg	120 kg
plastics (3H1 or 3H2 ^{d)})			120 kg	120 kg
Boxes				
steel (4A) ^{e)}			Not allowed	400 kg
aluminium (4B) ^{e)}			Not allowed	400 kg
other metal (4 N) ^{e)}			Not allowed	400 kg
natural wood (4C1) ^{e)}			Not allowed	400 kg
plywood (4D) ^{e)}			Not allowed	400 kg
reconstituted wood (4F) ^{e)}			Not allowed	400 kg
natural wood with sift-proof walls (4C2) ^{e)}			Not allowed	400 kg
fibreboard (4G) ^{e)}			Not allowed	400 kg
solid plastics (4H2) ^{e)}			Not allowed	400 kg
Bags				
bags (5H3, 5H4, 5L3, 5M2) ^{e)}			Not allowed	50 kg

Composite packagings		
plastics receptacle with outer steel, aluminium, plywood, fibre or plastics drum (6HA1, 6HB1, 6HG1 ^e , 6HD1 ^e or 6HH1)	400 kg	400 kg
plastics receptacle with outer steel or aluminium crate or box, wooden box, plywood box, fibreboard box or solid plastics box (6HA2, 6HB2, 6HC, 6HD2 ^e , 6HG2 ^e or 6HH2)	75 kg	75 kg
glass receptacle with outer steel, aluminium plywood or fibre drum (6PA1, 6PB1, 6PD1 ^e or 6PG1 ^e), or with outer steel or aluminium crate or box or with outer wooden, or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PD2 ^e or 6PG2 ^e), or with outer steel or expanded plastics or solid plastics packaging (6PH2 or 6PH1 ^e)	75 kg	75 kg
Pressure receptacles , provided that the general provisions of 4.1.3.6 are met.		
a) These inner packagings shall be sift-proof. b) These inner packagings shall not be used when the substances being carried may become liquid during carriage (see 4.1.3.4). c) These inner packagings shall not be used for substances of packing group I. d) These packagings shall not be used for substances of packing group I that may become liquid during carriage (see 4.1.3.4). e) These packagings shall not be used when substances being carried may become liquid during carriage (see 4.1.3.4).		
Special packing provisions: PP6 (reserved) PP7 For UN No. 2000, celluloid may also be transported unpacked on pallets, wrapped in plastic film and secured by appropriate means, such as steel bands as a full load in closed wagons or in closed containers. Each pallet shall not exceed 1 000 kg. PP8 For UN No. 2002, packagings shall be so constructed that explosion is not possible by reason of increased internal pressure. Cylinders, tubes and pressure drums shall not be used for these substances. PP9 For UN Nos. 3175, 3243 and 3244, packagings shall conform to a design type that has passed a leakproofness test at the packing group II performance level. For UN No. 3175, the leakproofness test is not required when the liquids are fully absorbed in solid material contained in sealed bags. PP11 For UN No. 1309, packing group III, and UN No. 1362, 5H1, 5L1 and 5M1 bags are allowed if they are overpacked in plastic bags and are wrapped in shrink or stretch wrap on pallets. PP12 For UN Nos. 1361, 2213 and UN No. 3077, 5H1, 5L1 and 5M1 bags are allowed when carried in closed wagons or closed containers. PP13 For articles classified under UN No. 2870, only combination packagings meeting the packing group I performance level are authorized. PP14 For UN Nos. 2211, 2698 and 3314, packagings are not required to meet the performance tests in Chapter 6.1. PP15 For UN Nos. 1324 and 2623, packagings shall meet the packing group III performance level. PP20 For UN No. 2217, any sift-proof, tearproof receptacle may be used. PP32 UN Nos. 2857 and 3358 and robust articles consigned under UN No. 3164 may be carried unpackaged, in crates or in appropriate overpacks. Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3). PP87 (Deleted) PP88 (Deleted)		
PP90 For UN No. 3506, sealed inner liners or bags of strong leakproof and puncture resistant material impervious to mercury which will prevent escape of the substance from the package irrespective of the position or the orientation of the package shall be used. PP91 For UN 1044, large fire extinguishers may also be carried unpackaged provided that the requirements of 4.1.3.8.1 a) to e) are met, the valves are protected by one of the methods in accordance with 4.1.6.8 a) to d) and other equipment mounted on the fire extinguisher is protected to prevent accidental activation. For the purpose of this special packing provision, "large fire extinguishers" means fire extinguishers as described in indents (c) to (e) of special provision 225 of Chapter 3.3.		

PP96 For UN No. 2037 waste gas cartridges carried in accordance with special provision 327 of Chapter 3.3, the packagings shall be adequately ventilated to prevent the creation of dangerous atmospheres and the build-up of pressure.

Special packing provision specific to Annex 2 to SMGS, RID, and ADR:

RR6 For UN No. 2037, in the case of carriage by full load, metal articles may also be packed as follows: The articles shall be grouped together in units on trays and held in position with an appropriate plastics cover; these units shall be stacked and suitably secured on pallets.

RR9 For UN 3509, packagings are not required to meet the requirements of 4.1.1.3.

Packagings meeting the requirements of 6.1.4, made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, shall be used. When the only residues contained are solids which are not liable to become liquid at temperatures likely to be encountered during carriage, flexible packagings may be used. When liquid residues are present, rigid packagings that provide a means of retention (e.g. absorbent material) shall be used. Before being filled and handed over for carriage, every packaging shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any packaging showing signs of reduced strength shall no longer be used (minor dents and scratches are not considered as reducing the strength of the packaging). Packagings intended for the carriage of packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be so constructed or adapted that the goods cannot come into contact with wood or any other combustible material.

P003	PACKING INSTRUCTION	P003
Dangerous goods shall be placed in suitable outer packagings. The packagings shall meet the provisions of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.8 and 4.1.3 and be so designed that they meet the construction requirements of 6.1.4. Outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, shall be used. Where this packing instruction is used for the transport of articles or inner packagings of combination packagings, the packaging shall be designed and constructed to prevent inadvertent discharge of articles during normal conditions of carriage.		
Special packing provisions: PP16 For UN No. 2800, batteries shall be protected from short circuits and shall be securely packed in strong outer packagings. Note 1. Non-spillable batteries which are an integral part of, and necessary for, the operation of mechanical or electronic equipment shall be securely fastened in the battery holder on the equipment and protected in such a manner as to prevent damage and short circuits. Note 2. For used batteries (UN No. 2800), see P801. PP17 For UN No. 2037, packages shall not exceed 55 kg net mass for fibreboard packagings or 125 kg net mass for other packagings. PP19 For UN Nos. 1364 and 1365, carriage as bales is authorized. PP20 For UN Nos. 1363, 1386, 1408 and 2793 any sift-proof, tearproof receptacle may be used. PP32 UN Nos. 2857 and 3358 and robust articles consigned under UN No. 3164 may be carried unpackaged, in crates or in appropriate overpacks. PP87 (reserved) PP88 (reserved) PP90 For UN Nos. 3506 and 3554, sealed inner liners or bags of strong leakproof and puncture resistant material impervious to mercury or gallium, as appropriate, which will prevent escape of the substance from the package irrespective of the position or the orientation of the package shall be used. PP91 For UN 1044, large fire extinguishers may also be carried unpackaged provided that the requirements of 4.1.3.8.1 (a) to (e) are met, the valves are protected by one of the methods in accordance with 4.1.6.8 (a) to (d) and other equipment mounted on the fireextinguisher is protected to prevent accidental activation. For the purpose of this specialpacking provision, "large fire extinguishers" means fire extinguishers as described inindents (c) to (e) of special provision 225 of Chapter 3.3. PP96 For UN No. 2037 waste gas cartridges carried in accordance with special provision 327 of Chapter 3.3, the packagings shall be adequately ventilated to prevent the creation of dangerous atmospheres and the build-up of pressure. Special packing provisions specific to Annex 2 to SMGS, RID, and ADR RR6 For UN No. 2037, in the case of carriage by wagon load or full load, metal articles may also bepacked as follows: the articles shall be grouped together in units on trays and held in position with an appropriate plastics cover; these units shall be stacked and suitably secured on pallets. RR9 For UN 3509, packagings are not required to meet the requirements of 4.1.1.3. Packagings meeting the requirements of 6.1.4, made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, shall be used. When the only residues contained are solids which are not liable to become liquid at temperatures likely to be encountered during carriage, flexible packagings may be used. When liquid residues are present, rigid packagings that provide a means of retention (e.g. absorbent material) shall be used. Before being filled and handed over for carriage, every packaging shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any packaging showing signs of reduced strength shall no longer be used (minor dents and scratches are not considered as reducing the strength of the packaging). Packagings intended for the carriage of packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be so constructed or adapted that the goods cannot come into contact with wood or any other combustible material.		

P004	PACKING INSTRUCTION	P004
This instruction applies to UN Nos. 3473, 3476, 3477, 3478 and 3479.		
The following packagings are authorized: (1) For fuel cell cartridges, provided that the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.3, 4.1.1.6 and 4.1.3 are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). Packagings shall conform to the packing group II performance level. (2) For fuel cell cartridges packed with equipment: strong outer packagings which meet the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.6 and 4.1.3. When fuel cell cartridges are packed with equipment, they shall be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the contents within the outer packaging. The equipment shall be secured against movement within the outer packaging. For the purpose of this packing instruction, "equipment" means apparatus requiring the fuel cell cartridges with which it is packed for its operation. (3) For fuel cell cartridges contained in equipment: strong outer packagings which meet the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.6 and 4.1.3. Large robust equipment (see 4.1.3.8) containing fuel cell cartridges may be carried unpackaged. For fuel cell cartridges contained in equipment, the entire system shall be capable of withstanding the shocks and loadings normally encountered during carriage. Note: The packagings authorized in (2) and (3) may exceed a net mass of 400 kg (see 4.1.3.3)		

P005	PACKING INSTRUCTION	P005
This instruction applies to UN Nos. 3528, 3529 and 3530.		
If the engine or machinery is constructed and designed so that the means of containment containing the dangerous goods affords adequate protection, an outer packaging is not required. Dangerous goods in engines or machinery shall otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4.1.1.1, or they shall be fixed in such a way that they will not become loose during normal conditions of carriage, e.g. in cradles or crates or other handling devices. Note: <i>The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).</i> In addition, the manner in which means of containment are contained within the engine or machinery, shall be such that under normal conditions of carriage, damage to the means of containment containing the dangerous goods is prevented; and in the event of damage to the means of containment containing liquid dangerous goods, no leakage of the dangerous goods from the engine or machinery is possible (a leakproof liner may be used to satisfy this requirement). Means of containment containing dangerous goods shall be so installed, secured or cushioned as to prevent their breakage or leakage and so as to control their movement within the engine or machinery during normal conditions of carriage. Cushioning material shall not react dangerously with the content of the means of containment. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material.		
Additional requirement Other dangerous goods (e.g. batteries, fire extinguishers, compressed gas accumulators or safety devices) required for the functioning or safe operation of the engine or machinery shall be securely mounted in the engine or machine.		

P006	PACKING INSTRUCTION	P006
This instruction applies to UN Nos. 3537 to 3548.		
1) The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). Packagings shall conform to the packing group II performance level. 2) In addition, for large-size articles the following packagings are authorized: Strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packaging capacity and its intended use. The packagings shall meet the provisions of 4.1.1.1, 4.1.1.2, 4.1.1.8 and 4.1.3 in order to achieve a level of protection that is at least equivalent to that provided by Chapter 6.1. Articles may be carried unpackaged or on pallets when the dangerous goods are afforded equivalent protection by the article in which they are contained. Note: <i>The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3)</i> 3) Additionally, the following conditions shall be met: a) Receptacles within articles containing liquids or solids shall be constructed of suitable materials and secured in the article in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the article itself or the outer packaging; b) Receptacles containing liquids with closures shall be packed with their closures correctly oriented. The receptacles shall in addition conform to the internal pressure test provisions of 6.1.5.5; c) Receptacles that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials shall be properly secured. Any leakage of the contents shall not substantially impair the protective properties of the article or of the outer packaging; d) Receptacles within articles containing gases shall meet the requirements of Section 4.1.6 and Chapter 6.2 as appropriate or be capable of providing an equivalent level of protection as packing instructions P 200 or P 208; e) Articles may be carried unpackaged or on pallets when the dangerous goods are afforded equivalent protection by the article in which they are contained. 4) Articles shall be packed to prevent movement and inadvertent operation during normal conditions of carriage. 5) Articles containing pre-production prototype lithium cells or batteries or sodium ion cells or batteries when these prototypes are carried for testing or production runs of not more than 100 lithium cells or batteries or sodium ion cells or batteries that are of a type that has not met the testing requirements of the Manual of Tests and Criteria, Part III, sub-section 38.3 shall in addition meet the following: a) Packagings shall conform to the requirements in paragraph 1) of this packing instruction; b) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the article within the package that may lead to damage and a dangerous condition during carriage. When cushioning material is used to meet this requirement it shall be non-combustible and electrically non-conductive; c) Non-combustibility of the cushioning material shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured; d) The article may be carried unpackaged under conditions specified by the competent authority of any SMGS Contracting Party, which may also recognize an approval granted		

by the competent authority of a country which is not an SMGS Contracting Party, provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions. Additional conditions that may be considered in the approval process include, but are not limited to:

- 1) The article shall be strong enough to withstand the shocks and loadings normally encountered during carriage, including trans-shipment between cargo transport units and between cargo transport units and warehouses as well as any removal from a pallet for subsequent manual or mechanical handling; and
- 2) The article shall be fixed in cradles or crates or other handling devices in such a way that it will not become loose during normal conditions of carriage.

P010 PACKING INSTRUCTION P010		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Combination packagings:		
Inner packagings, with maximum capacity of	Outer packagings	Maximum net mass (see 4.1.3.3)
Glass 1 l Steel 40 l	Drums steel (1A1, 1A2) plastics (1H1, 1H2) plywood (1D) fibre (1G)	 400 kg 400 kg 400 kg 400 kg
	Boxes steel (4A) natural wood (4C1, 4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) expanded plastics (4H1) solid plastics (4H2)	 400 kg 400 kg 400 kg 400 kg 60 kg 400 kg
Single packagings		
Drums steel, non-removable head (1A1)		450 l
Jerricans steel, non-removable head (3A1)		60 l
Composite packagings plastics receptacle in steel drums (6HA1)		250 l
Steel pressure receptacles , provided that the general provisions of 4.1.3.6 are met.		

P099	PACKING INSTRUCTION	P099
Only packagings which are approved for these goods by the competent authority may be used. A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority.		

P101	PACKING INSTRUCTION	P101
Only packagings which are approved by the competent authority of the country of origin may be		

used. If the country of origin is not an SMGS Contracting State, the packaging shall be approved by the competent authority of the first SMGS Contracting State country reached by the consignment.

Note: *For the information in the transport document, see 5.4.1.2.1 e)*

P111	PACKING INSTRUCTION		P111
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings	Intermediate packagings	Outer packagings	
Bags - paper, waterproofed - plastics - textile, rubberized Receptacles wood Sheets - plastics - textile, rubberized	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4 N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibreboard (4G) - plastics, expanded (4H1) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)	
Special packing provision: PP43 For UN No. 0159, inner packagings are not required when metal (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) or plastics (1H1 or 1H2) drums are used as outer packagings.			

P112a)	PACKING INSTRUCTION (Solid wetted, 1.1D)		P112a)
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings		Intermediate packagings	Outer packagings
Bags - paper, multiwall, water resistant - plastics - woven plastics - textile - textile, rubberized Receptacles - plastics - metal - wood		Bags - plastics - textile, plastic coated or lined Receptacles - plastics - metal - wood	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proofed (4C2) - plywood (4 D) - reconstituted wood (4F) - fibreboard (4G) - plastics, expanded (4H1) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastic (1H1, 1H2)
Additional requirement: Intermediate packagings are not required if leakproof removable head drums are used as the outer packaging.			
Special packing provisions: PP26 For UN Nos. 1310, 1320, 1321, 1322, 1344, 1347, 1348, 1349, 1517, 2907, 3317 and 3376, packagings shall be lead free. PP45 For UN Nos. 0072 and 0226, intermediate packagings are not required.			

P112 b)	PACKING INSTRUCTION (Solid dry, other than powder 1.1D)	P112 b)
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Bags - paper, kraft - paper, multiwall, water resistant - plastics - woven plastic - textile - textile, rubberized	Bags (for UN No. 0150 only) - plastics - textile, plastic coated or lined	Bags - woven plastics, sift-proof (5H2) - woven plastics, water-resistant (5H3) - plastics, film (5H4) - textile, sift-proof (5L2) - textile, water resistant (5L3) - paper, multiwall, water resistant (5M2) Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibreboard (4G) - plastics, expanded (4H1) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)
Special packing provisions:		
PP26 For UN Nos. 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings shall be lead free.		
PP46 For UN Nos. 0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state and a maximum net mass of 30 kg.		
PP47 For UN No. 0222, inner packagings are not required when the outer packaging is a bag.		

P112c)	PACKING INSTRUCTION (Solid dry powder 1.1D)	P112c)
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Bags - plastics - woven plastics - paper, multiwall, water resistant Receptacles - wood - plastics - metal - fibreboard	Bags - plastics - paper, multiwall, water resistant with inner lining Receptacles - plastics - metal - wood	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4 D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)
Additional requirements: 1. Inner packagings are not required if drums are used as the outer packaging. 2. The packaging shall be sift-proof.		
Special packing provisions: PP26 For UN Nos. 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings shall be lead free. PP46 For UN No. 0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state and a maximum net mass of 30 kg. PP48 For UN No. 0504, metal packagings shall not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6.1.4, are not considered metal packagings.		

P113	PACKING INSTRUCTION		P113
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings	Intermediate packagings	Outer packagings	
Bags - plastics - paper - textile, rubberized Receptacles - wood - plastics - metal - fibreboard	Not necessary	Boxes steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)	
Additional requirement: The packaging shall be sift-proof.			
Special packing provisions:			
PP49 For UN Nos. 0094 and 0305, no more than 50 g of substance shall be packed in an inner packaging. PP50 For UN No. 0027, inner packagings are not necessary when drums are used as outer packagings. PP51 For UN No. 0028, paper kraft or waxed paper sheets may be used as inner packagings.			

P114 a)	PACKING INSTRUCTION Solid wetted	P114 a)
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Bags	Bags	Boxes
- plastics - textile - woven plastics Receptacles - plastics - metal - wood	- plastics - textile, plastic coated or lined Receptacles - plastics - metal - Dividing partitions - wood	- steel (4A) - metal, other than steel or aluminium (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4 D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)
Additional requirement: Intermediate packagings are not required if leakproof removable head drums are used as outer packagings.		
Special packing provisions: PP26 For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings shall be lead free. PP43 For UN No. 0342, inner packagings are not required when metal (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) or plastics (1H1 or 1H2) drums are used as outer packagings.		

P114b)	PACKING INSTRUCTION Solid dry	P114b)
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Bags - paper, kraft - plastics - woven plastics, sift-proof - textile, sift-proof Receptacles - metal - plastics - woven plastics, sift-proof - paper - fibreboard - wood	Not necessary	Boxes - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - fibre (4G) - reconstituted wood (4F) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)
Special packing provisions:		
PP26 For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings shall be lead free.		
PP48 For UN Nos. 0508 and 0509, metal packagings shall not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6.1.4, are not considered metal packagings.		
PP50 For UN Nos. 0160, 0161 and 0508, inner packagings are not necessary if drums are used as outer packagings.		
PP52 For UN Nos. 0160 and 0161, when metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) are used as outer packagings, metal packagings shall be so constructed that the risk of explosion, by reason of increased internal pressure from internal or external causes is prevented.		

P115	PACKING INSTRUCTION		P115
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings	Intermediate packagings	Outer packagings	
Receptacles - plastics - metal - wood	Bags - plastics in metal receptacles Receptacles - wood Drums - metal	Boxes - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - fibre (1G) - plywood (1D) - plastics (1H1, 1H2)	
Special packing provisions: PP45 For UN No. 0144, intermediate packagings are not required. PP53 For UN Nos. 0075, 0143, 0495 and 0497, when boxes are used as outer packagings, inner packagings shall have taped screw cap closures and be not more than 5 litres capacity each. Inner packagings shall be surrounded with non-combustible absorbent cushioning materials. The amount of absorbent cushioning material shall be sufficient to absorb the liquid contents. Metal receptacles shall be cushioned from each other. Net mass of propellant is limited to 30 kg for each package when outer packagings are boxes. PP54 For UN Nos. 0075, 0143, 0495 and 0497, when drums are used as outer packagings and when intermediate packagings are drums, they shall be surrounded with non-combustible cushioning material in a quantity sufficient to absorb the liquid contents. A composite packaging consisting of a plastics receptacle in a metal drum may be used instead of the inner and intermediate packagings. The net volume of propellant in each package shall not exceed 120 litres. PP55 For UN No. 0144, absorbent cushioning material shall be inserted. PP56 For UN No. 0144, metal receptacles may be used as inner packagings. PP57 For UN Nos. 0075, 0143, 0495 and 0497, bags shall be used as intermediate packagings when boxes are used as outer packagings. PP58 For UN Nos. 0075, 0143, 0495 and 0497, drums shall be used as intermediate packagings when drums are used as outer packagings. PP59 For UN No. 0144, fibreboard boxes (4G) may be used as outer packagings. PP60 For UN No. 0144, drums 1B1, 1B2, 1N1 or 1N2 shall not be used.			

P116	PACKING INSTRUCTION	P116
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Bags - plastics - woven plastics, sift-proof - paper, water and oil resistant - textile, plastic coated or lined Receptacles - wood, sift-proof - plastics - metal - fibreboard, water resistant Sheets - plastics - paper, water resistant - paper, waxed	Not necessary	Bags - woven plastics (5H1, 5H2, 5H3) - plastics, film (5H4) - paper, multiwall, water resistant (5M2) - textile, sift-proof (5L2) - textile, water resistant (5L3) Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof walls (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2) Jerricans - steel (3A1, 3A2) - plastics (3H1, 3H2)
Special packing provisions: PP61 For UN Nos. 0082, 0241, 0331 and 0332, inner packagings are not required if leakproof removable head drums are used as outer packagings. PP62 For UN Nos. 0082, 0241, 0331 and 0332, inner packagings are not required when the explosive is contained in a material impervious to liquid. PP63 For UN No. 0081, inner packagings are not required when contained in rigid plastic which is impervious to nitric esters. PP64 For UN No. 0331, inner packagings are not required when bags (5H2), (5H3) or (5H4) are used as outer packagings. PP65 (reserved). PP66 For UN No. 0081, bags shall not be used as outer packagings.		

P130	PACKING INSTRUCTION		P130
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings	Intermediate packagings	Outer packagings	
Not necessary	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, expanded (4H1) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)	
Special packing provision:			
PP67 The following applies to UN Nos. 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0488, 0502 and 0510: Large and robust explosives articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged, if they are capable of withstanding the shocks and loadings encountered during normal conditions of carriage. Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3)			

P131	PACKING INSTRUCTION	P131
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Bags - plastics - paper, Receptacles - wood - plastics - metal - fibreboard Reels	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof walls (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)
Special packing provision: PP68 For UN Nos. 0029, 0267 and 0455, bags and reels shall not be used as inner packagings.		

P132a)	PACKING INSTRUCTION	P132a)
Articles consisting of closed metal, plastics or fibreboard casings that contain a detonating explo- sive, or consisting of plastics-bonded detonating explosives		
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Not necessary	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - wood, natural, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2)

P132b)	PACKING INSTRUCTION Articles without closed casings	P132b)
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Receptacles - fibreboard - plastics - metal - wood Sheets - plastics - paper	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2)

P133	PACKING INSTRUCTION	P133
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Receptacles - wood - plastics - metal - fibreboard Trays, fitted with dividing partitions - wood - plastics - fibreboard	Receptacles - wood - plastics - metal - fibreboard	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2)
Additional requirement: Receptacles are only required as intermediate packagings when the inner packagings are trays.		
Special packing provision: PP69 For UN Nos. 0043, 0212, 0225, 0268 and 0306, trays shall not be used as inner packagings.		

P134	PACKING INSTRUCTION		P134
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings		Intermediate packagings	Outer packagings
Bags - water resistant Receptacles - wood - plastics - metal - fibreboard Sheets - fibreboard, corrugated Трубки - fibreboard		Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, expanded (4H1) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)

P135	PACKING INSTRUCTION		P135
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings		Intermediate packagings	Outer packagings
Bags - plastics - paper Receptacles - wood - plastics - metal - fibreboard Sheets - plastics - paper		Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, expanded (4H1) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)

P136	PACKING INSTRUCTION	P136
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Bags - plastics - textile Boxes - wood - plastics - fibreboard Dividing partitions in the outer packagings	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)

P137	PACKING INSTRUCTION	P137
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Outer packagings
Bags - plastics Boxes - fibreboard - wood Трубки - plastics - metal - fibreboard Dividing partitions in the outer packagings	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)
Special packing provision: PP70 For UN Nos. 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity shall face downwards and the package shall be marked as illustrated in figures 5.2.1.10.1.1 or 5.2.1.10.1.2. When the shaped charges are packed in pairs, the conical cavities shall face inwards to minimize the jetting effect in the event of accidental initiation.		

P138	PACKING INSTRUCTION		P138
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings	Intermediate packagings	Outer packagings	
Bags - plastics	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)	
Additional requirement: If the ends of the articles are sealed, inner packagings are not necessary.			

P139	PACKING INSTRUCTION		P139
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings	Intermediate packagings	Outer packagings	
Bags - plastics Receptacles - wood - plastics - metal - fibreboard Sheets - paper - plastics Reels	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)	
Special packing provisions:			
PP71 For UN Nos. 0065, 0102, 0104, 0289 and 0290, the ends of the detonating cord shall be sealed, for example, by a plug firmly fixed so that the explosive cannot escape. The ends of flexible detonating cord shall be fastened securely.			
PP72 For UN Nos. 0065 and 0289, inner packagings are not required when they are in coils.			

P140	PACKING INSTRUCTION		P140
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings		Intermediate packagings	Outer packagings
Bags - plastics Receptacles - wood Sheets - paper, kraft - plastics Reels		Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)
Special packing provisions:			
PP73 For UN No. 0105, no inner packagings are required if the ends are sealed.			
PP74 For UN No. 0101, the packaging shall be sift-proof except when the fuse is covered by a paper tube and both ends of the tube are covered with removable caps.			
PP75 For UN No. 0101, steel, aluminium or other metal boxes or drums shall not be used.			

P141	PACKING INSTRUCTION		P141
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings		Intermediate packagings	Outer packagings
Receptacles - wood - plastics - стальные - fibreboard Trays, fitted with dividing partitions - wood - plastics Dividing partitions in the outer packagings		Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)

P142	PACKING INSTRUCTION		P142
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings		Intermediate packagings	Outer packagings
Bags - paper - plastics Receptacles - wood - fibreboard - metal - plastics Sheets - paper Trays, fitted with dividing partitions - plastics		Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - из древесно-волокнистых материалов (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)

P143	PACKING INSTRUCTION		P143
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings	Intermediate packagings	Outer packagings	
Bags - paper, kraft - plastics - textile - textile, rubberized Receptacles - plastics - metal - fibreboard - wood Trays, fitted with dividing partitions - plastics - wood	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) - natural wood, sift-proof (4C2) - plywood (4D) - reconstituted wood (4F) - fibre (4G) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plywood (1D) - fibre (1G) - plastics (1H1, 1H2)	
Additional requirement: Instead of the above inner and outer packagings, composite packagings (6HH2) (plastics receptacle with outer solid plastics box) may be used.			
Special packing provision: PP76 For UN Nos. 0271, 0272, 0415 and 0491, when metal packagings are used, metal packagings shall be so constructed that the risk of explosion, by reason of increase in internal pressure from internal or external causes is prevented.			

P144	PACKING INSTRUCTION		P144
The following packagings are authorized, provided the general packing provisions of 4.1.1, 4.1.3 and special packing provisions of 4.1.5 are met:			
Inner packagings	Intermediate packagings	Outer packagings	
Receptacles - metal - fibreboard - plastics - wood Dividing partitions in the outer packagings	Not necessary	Boxes - steel (4A) - aluminium (4B) - other metal (4N) - natural wood, ordinary (4C1) with metal liner - plywood (4D) with metal liner - reconstituted wood (4F) with metal liner - plastics, expanded (4H1) - plastics, solid (4H2) Drums - steel (1A1, 1A2) - aluminium (1B1, 1B2) - other metal (1N1, 1N2) - plastics (1H1, 1H2)	
Special packing provision:			
PP77 For UN Nos. 0248 and 0249, packagings shall be protected against the ingress of water. When water- activated contrivances are transported unpackaged, they shall be provided with at least two independent protective features which prevent the ingress of water. Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).			

P200	PACKING INSTRUCTION	P200
Type of packagings: Cylinders, tubes, pressure drums and bundles of cylinders.		
Cylinders, tubes, pressure drums and bundles of cylinders are authorised provided the special packing provisions of 4.1.6, the provisions listed below under (1) to (9) and, when referred to in the column "Special packing provisions" of Tables 1, 2 or 3, the relevant special packing provisions listed below under (10), are met.		

General

- 1) Pressure receptacles shall be so closed and leakproof as to prevent escape of the gases;
- 2) Pressure receptacles containing toxic substances with an LC50 less than or equal to 200 ml/m³ (ppm) as specified in the table shall not be equipped with any pressure relief device. Pressure relief devices shall be fitted on UN pressure receptacles used for the carriage of UN No. 1013 carbon dioxide and UN No. 1070 nitrous oxide.
- 3) The following three tables cover compressed gases (Table 1), liquefied and dissolved gases (Table 2) and substances not in Class 2 (Table 3). They provide:
 - a) the UN number, name and description, and the classification code of the substance;
 - b) the LC50 for toxic substances;
 - c) the types of pressure receptacles authorised for the substance, shown by the letter "X";
 - d) the maximum test period for periodic inspection of the pressure receptacles;

Note: For pressure receptacles which make use of composite materials, the periodic inspection frequencies shall be as determined by the competent authority or body designated by this authority which issued the type approval.

 - e) the minimum test pressure of the pressure receptacles;
 - f) the maximum working pressure of the pressure receptacles for compressed gases (where no value is given, the working pressure shall not exceed two thirds of the test pressure) or the maximum filling ratio(s) dependent on the test pressure(s) for liquefied and dissolved gases;
 - g) special packing provisions that are specific to a substance.

Test pressure, filling ratios and filling requirements

- 4) The minimum test pressure required for is 1 MPa (10 bar);
- 5) In no case shall pressure receptacles be filled in excess of the limit permitted in the following requirements:
 - a) For compressed gases, the working pressure shall be not more than two thirds of the test pressure of the pressure receptacles. Restrictions to this upper limit on working pressure are imposed by special packing provision "o" of paragraph (10). In no case shall the internal pressure at 65 °C exceed the test pressure.
 - b) For high pressure liquefied gases, the filling ratio shall be such that the settled pressure at 65 °C does not exceed the test pressure of the pressure receptacles.
The use of test pressures and filling ratios other than those in the Table is permitted, except where special packing provision "o" of paragraph (10) applies, provided that:
 - 1) the criterion of special packing provision "c" of paragraph (10) is met when applicable; or
 - 2) For high pressure liquefied gases, the filling ratio shall be such that the settled pressure at 65 °C does not exceed the test pressure of the pressure receptacles.

For high pressure liquefied gases and gas mixtures for which relevant data are not available, the maximum filling ratio (FR) shall be determined as follows:

$$FR = 8,5 \times 10^{-4} \times d_g \times P_h, \text{ kg/l;}$$

where:

d_g = gas density (at 15 °C, 1 bar) (in kg/m³)

P_h = minimum test pressure (in bar).

P200	PACKING INSTRUCTION (cont'd)	P200

P200	PACKING INSTRUCTION (cont'd)	P200
	If the density of the gas is unknown, the maximum filling ratio shall be determined as follows: $FR = \frac{P_h \cdot MM \cdot 10^{-3}}{R \cdot 338}, \text{ kg/l;}$ where: P_h = minimum test pressure (in bar); MM = molecular mass (in g/mol) R = 8.31451×10^{-2} bar.l.mol⁻¹.K⁻¹ (gas constant). For gas mixtures, the average molecular mass is to be taken, taking into account the volumetric concentrations of the various components. c) For low pressure liquefied gases, the maximum mass of contents per litre of water capacity shall equal 0.95 times the density of the liquid phase at 50 °C; in addition, the liquid phase shall not fill the pressure receptacle at any temperature up to 60 °C. The test pressure of the pressure receptacle shall be at least equal to the vapour pressure (absolute) of the liquid at 65 °C, minus 100 kPa (1 bar). For low pressure liquefied gases and gas mixtures for which relevant data are not available, the maximum filling ratio shall be determined as follows: $FR = (0,0032 \times BP - 0,24) \times d_l$ where: BP = boiling point (in Kelvin); d_l = density of the liquid at boiling point (in kg/l). d) For UN No. 1001 acetylene, dissolved, and UN No. 3374 acetylene, solvent free, see (10), special packing provision "p". Other test pressure and filling ratio may be used provided they satisfy the general requirements outlined in paragraphs (4) and (5) above. e) For liquefied gases charged with compressed gases, both components – the liquefied gas and the compressed gas – have to be taken into consideration in the calculation of the internal pressure in the pressure receptacle. The maximum mass of contents per litre of water capacity shall not exceed 0.95 times the density of the liquid phase at 50 °C; in addition, the liquid phase shall not completely fill the pressure receptacle at any temperature up to 60 °C. When filled, the internal pressure at 65 °C shall not exceed the test pressure of the pressure receptacles. The vapour pressures and volumetric expansions of all substances in the pressure receptacles shall be considered. When experimental data is not available, the following steps shall be carried out: (i) Calculation of the vapour pressure of the liquefied gas and of the partial pressure of the compressed gas at 15 °C (filling temperature); (ii) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15 °C to 65 °C and calculation of the remaining volume for the gaseous phase; (iii) Calculation of the partial pressure of the compressed gas at 65 °C considering the volumetric expansion of the liquid phase; Note: The compressibility factor of the compressed gas at 15 °C and 65 °C shall be considered. (iv) Calculation of the vapour pressure of the liquefied gas at 65 °C; (v) The total pressure is the sum of the vapour pressure of the liquefied gas and the partial pressure of the compressed gas at 65 °C; (vi) Consideration of the solubility of the compressed gas at 65 °C in the liquid phase; The test pressure of the pressure receptacle shall not be less than the calculated total pressure minus 100 kPa (1 bar). If the solubility of the compressed gas in the liquid phase is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph (vi)) into account.	

P200	PACKING INSTRUCTION (cont'd)	P200
(7)	a) The filling of pressure receptacles may only be carried out by specially-equipped centres, with qualified staff using appropriate procedures. The procedures shall include checks: a) of the conformity of receptacles and accessories with Annex 2 to SMGS; b) of their compatibility with the product to be carried; c) of the absence of damage which might affect safety; d) of compliance with the degree or pressure of filling, as appropriate; e) of marks and identification. b) LPG to be filled in cylinders shall be of high quality; this is deemed to be fulfilled if the LPG to be filled is in compliance with the limitations on corrosiveness as specified in ISO 9162:1989. Periodic inspections 8) Refillable pressure receptacles shall be subjected to periodic inspections in accordance with the requirements of 6.2.1.6 and 6.2.3.5 respectively. 9) If special provisions for certain substances do not appear in the tables below, periodic inspections shall be carried out: a) every 5 years in the case of pressure receptacles intended for the carriage of gases of classification codes 1T, 1TF, 1TO, 1TC, 1TFC, 1TOC, 2T, 2TO, 2TF, 2TC, 2TFC, 2TOC, 4A, 4F and 4TC; b) every 5 years in the case of pressure receptacles intended for the carriage of substances from other classes; c) every 10 years in the case of pressure receptacles intended for the carriage of gases of classification codes 1A, 1O, 1F, 2A, 2O and 2F. For pressure receptacles which make use of composite materials, the maximum test period shall be 5 years. The test period may be extended to that specified in Tables 1 and 2 (i.e. up to 10 years), if approved by the competent authority or body designated by this authority which issued the type approval. Special packing provisions: 10) Material compatibility - a: Aluminium alloy pressure receptacles shall not be used. - b: Copper valves shall not be used. - c: Metal parts in contact with the contents shall not contain more than 65% copper. - d: When steel pressure receptacles or composite pressure receptacles with steel liners are used, only those bearing the "H" mark in accordance with 6.2.2.7.4 (p) are permitted Requirements for toxic substances with an LC50 less than or equal to 200 ml/m³ (ppm) k: Valve outlets shall be fitted with pressure retaining gas-tight plugs or caps having threads that match those of the valve outlets and made of material not liable to attack by the contents of the pressure receptacle. Each cylinder within a bundle shall be fitted with an individual valve that shall be closed during carriage. After filling, the manifold shall be evacuated, purged and plugged. Bundles containing UN 1045 Fluorine, compressed, may be constructed with isolation valves on groups of cylinders not exceeding 150 litres total water capacity instead of isolation valves on every cylinder. Cylinders and individual cylinders within a bundle shall have a test pressure greater than or equal to 200 bar and a minimum wall thickness of 3.5 mm for aluminium alloy or 2 mm for steel. Individual cylinders not complying with this requirement shall be carried in a rigid outer packaging that will adequately protect the cylinder and its fittings and meeting the packing group I performance level. Pressure drums shall have a minimum wall thickness as specified by the competent authority. Pressure receptacles shall not be fitted with a pressure relief device. Cylinders and individual cylinders in a bundle shall be limited to a maximum water capacity of 85 litres. Each valve shall be capable of withstanding the test pressure of the pressure receptacle and be connected directly to the pressure receptacle by either a taper thread or other means which meets the requirements of ISO 10692-2:2001. Each valve shall either be of the packless type with non-perforated diaphragm, or be of a type which prevents leakage through or past the packing. Carriage in capsules is not allowed.	

P200	PACKING INSTRUCTION (cont'd)	P200

P200	PACKING INSTRUCTION (cont'd)	P200
	Each pressure receptacle shall be tested for leakage after filling. Gas specific provisions l: UN No. 1040 ethylene oxide may also be packed in hermetically sealed glass or metal inner packagings suitably cushioned in fibreboard, wooden or metal boxes meeting the packing group I performance level. The maximum quantity permitted in any glass inner packaging is 30 g, and the maximum quantity permitted in any metal inner packaging is 200 g. After filling, each inner packaging shall be determined to be leak-tight by placing the inner packaging in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55 °C is achieved. The maximum net mass in any outer packaging shall not exceed 2.5 kg. m: Pressure receptacles shall be filled to a working pressure not exceeding 5 bar. n: Cylinders and individual cylinders in a bundle shall contain not more than 5 kg of the gas. When bundles containing UN 1045 Fluorine, compressed are divided into groups of cylinders in accordance with special packing provision "k" each group shall contain not more than 5 kg of the gas. o: In no case shall the working pressure or filling ratio shown in the tables be exceeded. p: For UN No. 1001 acetylene, dissolved, and UN No. 3374 acetylene, solvent free: cylinders shall be filled with a homogeneous monolithic porous material; the working pressure and the quantity of acetylene shall not exceed the values prescribed in the approval or in ISO 3807-1:2000 or ISO 3807-2:2000 or ISO 3807:2013, as applicable. For UN No. 1001 acetylene, dissolved: cylinders shall contain a quantity of acetone or suitable solvent as specified in the approval (see ISO 3807-1:2000 or ISO 3807-2:2000 or ISO 3807:2013, as applicable); cylinders manifolded together shall be carried vertically. Alternatively, for UN No. 1001 acetylene, dissolved: cylinders which are not UN pressure receptacles may be filled with a non-monolithic porous material; the working pressure, the quantity of acetylene and the quantity of solvent shall not exceed the values prescribed in the approval. The maximum test period for periodic inspection of the cylinders shall not exceed five years. q: Valve outlets of pressure receptacles for pyrophoric gases or flammable mixtures of gases containing more than 1% of pyrophoric compounds shall be fitted with gas-tight plugs or caps which shall be made of material not liable to attack by the contents of the pressure receptacle. When these pressure receptacles are manifolded in a bundle, each of the pressure receptacles shall be fitted with an individual valve that shall be closed during carriage, and the outlet of the manifold valve shall be fitted with a pressure retaining gas-tight plug or cap. Gas-tight plugs or caps shall have threads that match those of the valve outlets. Carriage in capsules is not allowed. r: The filling ratio of this gas shall be limited such that, if complete decomposition occurs, the pressure does not exceed two thirds of the test pressure of the pressure receptacle. ra: This gas may also be packed in capsules under the following conditions: - The mass of gas shall not exceed 150 g per capsule; - The capsules shall be free from faults liable to impair the strength; - The leakproofness of the closure shall be ensured by an additional device (cap, crown, seal, binding, etc.) capable of preventing any leakage of the closure during carriage; - The capsules shall be placed in an outer packaging of sufficient strength. A package shall not weigh more than 75 kg. s: Aluminium alloy pressure receptacles shall be: - Equipped only with brass or stainless-steel valves; and - Cleaned for hydrocarbons contamination and not contaminated with oil. UN pressure receptacles shall be cleaned in accordance with ISO 11621:1997. ta: (Reserved) Periodic inspection u: The interval between periodic tests may be extended to 10 years for aluminium alloy pressure receptacles. This derogation may only be applied to UN pressure receptacles when the alloy of the pressure receptacle has been subjected to stress corrosion testing as specified in ISO 7866:2012 + Cor 1:2014.	

P200	PACKING INSTRUCTION (cont'd)	P200
	ua: The interval between periodic tests may be extended to 15 years for aluminium alloy cylinders and bundles of such cylinders if the provisions of paragraph (13) of this packing instruction are applied. This shall not apply to cylinders made from aluminium alloy AA 6351. For mixtures, this provision "ua" may be applied provided all the individual gases in the mixture have been allocated "ua" in Table 1 or Table 2. x: 1) The interval between inspections for steel cylinders, other than refillable welded steel cylinders for UN Nos. 1011, 1075, 1965, 1969 or 1978, may be extended to 15 years: a) with the agreement of the competent authority (authorities) of the country (countries) where the periodic inspection and the carriage take place; and b) in accordance with the requirements of a technical code or a standard recognised by the competent authority. 2) For refillable welded steel cylinders for UN Nos. 1011, 1075, 1965, 1969 or 1978, the interval may be extended to 15 years, if the provisions of paragraph (12) of this packing instruction are applied. va: For seamless steel cylinders which are equipped with residual pressure valves (RPVs) (see note below) that have been designed and tested in accordance with EN ISO 15996:2005 + A1:2007 or EN ISO 15996:2017 and for bundles of seamless steel cylinders equipped with main valve(s) with a residual pressure device, tested in accordance with EN ISO 15996:2005 + A1:2007 or EN ISO 15996:2017, the interval between periodic tests may be extended to 15 years if the provisions of paragraph (13) of this packing instruction are applied. For mixtures, this provision "va" may be applied provided all the individual gases in the mixture have been allocated "va" in Table 1 or Table 2. Note: "Residual Pressure Valve" (RPV) means a closure which incorporates a residual pressure device that prevents ingress of contaminants by maintaining a positive differential between the pressure within the cylinder and the valve outlet. In order to prevent back-flow of fluids into the cylinder from a higher pressure source a "Non-Return Valve" (NRV) function shall either be incorporated into the residual pressure device or be a discrete additional device in the cylinder valve, e.g. a regulator. Requirements for N.O.S. entries and for mixtures z: The construction materials of the pressure receptacles and their accessories shall be compatible with the contents and shall not react to form harmful or dangerous compounds therewith. The test pressure and filling ratio shall be calculated in accordance with the relevant requirements of 5). Toxic substances with an LC50 less than or equal to 200 ml/m³ shall not be carried in tubes, pressure drums or MEGCs and shall meet the requirements of special packing provision "k". However, UN 1975 Nitric oxide and dinitrogen tetroxide mixture may be carried in pressure drums. For pressure receptacles containing pyrophoric gases or flammable mixtures of gases containing more than 1% pyrophoric compounds, the requirements of special packing provision "q" shall be met. The necessary steps shall be taken to prevent dangerous reactions (i.e. polymerisation or decomposition) during carriage. If necessary, stabilisation or addition of an inhibitor shall be required. Mixtures containing UN No. 1911 diborane, shall be filled to a pressure such that, if complete decomposition of the diborane occurs, two thirds of the test pressure of the pressure receptacle shall not be exceeded. Mixtures containing UN 2192 germane, other than mixtures of up to 35% germane in hydrogen or nitrogen or up to 28% germane in helium or argon, shall be filled to a pressure such that, if complete decomposition of the germane occurs, two thirds of the test pressure of the pressure receptacle shall not be exceeded. Mixtures of fluorine and nitrogen with a fluorine concentration below 35% by volume may be filled in pressure receptacles up to a maximum allowable working pressure for which the partial pressure of fluorine does not exceed 3.1 MPa (31 bar) absolute. working pressure (bar) < $\frac{31}{X_f} - 1$	

P200	PACKING INSTRUCTION (cont'd)	P200
where: x_f = fluorine concentration in % by volume/100; Mixtures of fluorine and inert gases with a fluorine concentration below 35% by volume may be filled in pressure receptacles up to a maximum allowable working pressure for which the partial pressure of fluorine does not exceed 3.1 MPa (31 bar) absolute, additionally taking the coefficient of nitrogen equivalency in accordance with ISO 10156:2017 into account when calculating the partial pressure. working pressure (bar) $< \frac{31}{x_f} (x_f + K_k \times x_k) - 1$ where: x_f = fluorine concentration in % by volume/100; K_k = coefficient of equivalency of an inert gas relative to nitrogen (coefficient of nitrogen equivalency); x_k = inert gas concentration in % by volume/100. However, the working pressure for mixtures of fluorine and inert gases shall not exceed 20 MPa (200 bar). The minimum test pressure of pressure receptacles for mixtures of fluorine and inert gases equals 1.5 times the working pressure or 20 MPa (200 bar), with the greater value to be applied. Requirements for substances not in Class 2 ab: Pressure receptacles shall satisfy the following conditions: a) The pressure test shall include an inspection of the inside of the pressure receptacles and check of accessories; b) In addition, resistance to corrosion shall be checked every two years by means of suitable instruments (e.g. ultrasound) and the condition of the accessories verified; c) Wall thickness shall not be less than 3 mm. ac: Tests and inspections shall be carried out under the supervision of an expert approved by the competent authority. ad: Pressure receptacles shall satisfy the following conditions: a) Pressure receptacles shall be designed for a design pressure of not less than 2.1 MPa (21 bar) (gauge pressure); b) In addition to the marks for refillable receptacles, the pressure receptacles shall bear the following particulars in clearly legible and durable characters: 1) The UN number and the proper shipping name of the substance according to 3.1.2; 2) The maximum permitted mass when filled and the tare of the pressure receptacle, including accessories fitted during filling, or the gross mass.		
(11) The applicable requirements of this packing instruction are considered to have been complied with if the following standards, as relevant, are applied:		
Applicable requirements	Reference	Title of document
(7)	Document No.22A of the List	
(7)	ISO 24431:2016	Gas cylinders – Seamless, welded and composite cylinders for compressed and liquefied gases (excluding acetylene) – Inspection at time of filling
(7) a)	ISO 10691:2004	Gas cylinders – Refillable welded steel cylinders for liquefied petroleum gas (LPG) – Procedures for checking before, during and after filling
(7) a)	ISO 11755:2005	Gas cylinders – Cylinder bundles for compressed and liquefied gases (excluding acetylene) – Inspection at time of filling
(7) a)		Gas cylinders – Cylinders for compressed and liquefied gases (excluding acetylene) – Inspection at time of filling
(7) a) and (10) p)	ISO 11372:2011	Gas cylinders – Cylinders for compressed and liquefied gases (excluding acetylene) – Inspection at time of filling

P200	PACKING INSTRUCTION (cont'd)		P200
(7) a) and (10) p)	EN ISO 13088:2012 + A1:2020	Gas cylinders – Acetylene cylinder bundles – Filling conditions and filling inspection Note: <i>The EN version of this ISO standard fulfils the requirements and may also be used.</i>	
(7)	Document No. 22B of the List		
(7)	Document No. 23 of the List		
P200	PACKING INSTRUCTION (cont'd)		P200
(12)	An interval of 15 years for the periodic inspection of refillable welded steel cylinders may be granted in accordance with special packing provision v (2) of paragraph (10), if the following provisions are applied: 1. General provisions 1.1. For the application of this section, the competent authority shall not delegate its tasks and duties to Xb bodies (inspection bodies of type B) or IS bodies (in-house inspection services) (for the definitions of Xb and IS bodies, see 6.2.3.6.1). 1.2 The owner of the cylinders shall apply to the competent authority for granting the 15-year interval, and shall demonstrate that the requirements of sub-paragraphs 2, 3 and 4 are met. 1.3 Cylinders manufactured since 1 January 1999 shall have been manufactured in conformity with the following standards: – Document No.23B <i>of the List</i>”, or – Document No.23B <i>of the List</i>; or – Document No.21 <i>of the List</i> as applicable according to the table in 6.2.4 of Annex 2 to SMGS. Other cylinders manufactured before 1 January 2009 in conformity with Annex 2 to SMGS in accordance with a technical code accepted by the national competent authority may be accepted for a 15-year interval, if they are of equivalent safety to the provisions of Annex 2 to SMGS as applicable at the time of application. 1.4. The owner shall submit documentary evidence to the competent authority demonstrating that the cylinders comply with the provisions of sub-paragraph 1.3. The competent authority shall verify that these conditions are met. 1.5. The competent authority shall check whether the provisions of sub-paragraphs 2 and 3 are fulfilled and correctly applied. If all provisions are fulfilled, it shall authorise the 15-year interval for the cylinders. In this authorisation, the type of cylinder (as specified in the type approval) or a group of cylinders (see Note) covered shall be clearly identified. The authorisation shall be delivered to the owner; the competent authority shall keep a copy. The owner shall keep the documents for as long as the cylinders are authorised for a 15-year interval. Note: <i>A group of cylinders is defined by the production dates of identical cylinders for a period, during which the applicable provisions of Annex 2 to SMGS and of the technical code accepted by the competent authority have not changed in their technical content. Example: Cylinders of identical design and volume having been manufactured according to the provisions of Annex 2 to SMGS as applicable between 1 July 2006 and 30 June 2007 in combination with a technical code accepted by the competent authority applicable for the same period, form one group in terms of the provisions of this paragraph.</i> 1.6. The competent authority shall monitor the owner of the cylinders for compliance with the provisions of Annex 2 to SMGS and the authorisation given as appropriate, but at least every three years or when changes to the procedures are introduced. 2. Operational provisions 2.1. Cylinders having been granted a 15-year interval for periodic inspection shall only be filled in filling centres applying a documented quality system to ensure that all the provisions of paragraph (7) of this packing instruction and the requirements and responsibilities of Documents 22B (or until 31 December 2024 Document 22) and 23 of the List are fulfilled and correctly applied. 2.2. The competent authority shall verify that these requirements are fulfilled and check this as appropriate, but at least every three years or when changes to the procedures are		

P200	PACKING INSTRUCTION (cont'd)	P200
	introduced. 2.3. The owner shall provide documentary evidence to the competent authority that the filling centre complies with the provisions of sub-paragraph 2.1. 2.4. If a filling centre is situated in a different SMGS Contracting State, the owner shall provide additional documentary evidence that the filling centre is monitored accordingly by the competent authority of that SMGS Contracting State country. 2.5. To prevent internal corrosion, only gases of high quality with very low potential contamination shall be filled into the cylinders. This is deemed to be fulfilled, if the gases conform to the limitations on corrosiveness as specified in ISO 9162:1989. 3. Provisions for qualification and periodic inspection 3.1. Cylinders of a type or group already in use, for which a 15-year interval has been granted and to which the 15-year interval has been applied, shall be subject to a periodic inspection according to 6.2.3.5. Note: For the definition of a group of cylinders, see Note to sub-paragraph 1.5. 3.2. If a cylinder with a 15-year interval fails the hydraulic pressure test during a periodic inspection e.g. by bursting or leakage, the owner shall investigate and produce a report on the cause of the failure and if other cylinders (e.g. of the same type or group) are affected. In the latter case, the owner shall inform the competent authority. The competent authority shall then decide on appropriate measures and inform the competent authorities of all other SMGS member countries accordingly. 3.3. If internal corrosion as defined in the standard applied (see sub-paragraph 1.3) has been detected, the cylinder shall be withdrawn from use and shall not be granted any further period for filling and carriage. 3.4. Cylinders having been granted a 15 year interval shall only be fitted with valves designed and manufactured for a minimum 15 year period of use according to Documents 23D2 or 23E2 of the List, Standards EN ISO 14245:2010, EN ISO 14245:2019, EN ISO 14245:2021, EN ISO 15995:2010, EN ISO 15995:2019 или EN ISO 15995:2021. After a periodic inspection, a new valve shall be fitted to the cylinder, except that manually operated valves, which have been refurbished or inspected according to Document 23G1 may be re-fitted, if they are suitable for another 15 year period of use. Refurbishment or inspection shall only be carried out by the manufacturer of the valves or according to his technical instruction by an enterprise qualified for such work and operating under a documented quality system. 4. Marking Cylinders having been granted a 15-year interval for periodic inspection in accordance with this paragraph shall additionally be marked clearly and legibly with "P15Y". This mark shall be removed if the cylinder is no longer authorised for a 15-year interval. Note: This mark shall not apply to cylinders subject to the transitional provision in 1.6.2.9, 1.6.2.10 or the provisions of special packing provision v (1) of paragraph (10) of this packing instruction. (13) An interval of 15 years for the periodic inspection of seamless steel and aluminium alloy cylinders and bundles of such cylinders may be granted in accordance with special packing provisions ua or va of paragraph (10), if the following provisions are applied: 1. General provisions 1.1 For the application of this paragraph, the competent authority shall not delegate its tasks and duties to Xb bodies (inspection bodies of type B) or IS bodies (in-house inspection services) (for the definitions of Xb and IS bodies, see 6.2.3.6.1). 1.2 The owner of the cylinders or bundles of cylinders shall apply to the competent authority for granting the 15-year interval, and shall demonstrate that the requirements of sub-paragraphs 2, 3 and 4 are met. 1.3 1.3 Cylinders manufactured since 1 January 1999 shall have been manufactured in conformity with one of the following documents: - Document Nos. 233 or 23I of the List; or - Document No.23K of the List; or - EN ISO 9809-1 or EN ISO 9809-2; or	

P200	PACKING INSTRUCTION (cont'd)	P200
- EN ISO 7866; or - Document No.23L of the List and Document No.23M of the List as applicable at the time of manufacture (see also the Table in 6.2.4.1). Other cylinders manufactured before 1 January 2009 in conformity with requirements of Annex 2 to SMGS in accordance with a technical code accepted by the national competent authority may be accepted for a 15 year interval for periodic inspection, if they are of equivalent safety to the provisions of Annex 2 to SMGS as applicable at the time of application. Note: <i>This provision is considered to be fulfilled if the cylinder has been reassessed according to the procedure for the reassessment of conformity described in Document No.23H of the List or in Document No.23O of the List.</i> Cylinders and bundles of cylinders marked with the United Nations packaging symbol specified in 6.2.2.7.2 (a) shall not be granted a 15 year interval for periodic inspection. 1.4 Bundles of cylinders shall be constructed such that contact between cylinders along the longitudinal axis of the cylinders does not result in external corrosion. The supports and restraining straps shall be such as to minimise the risk of corrosion to the cylinders. Shock absorbent materials used in supports shall only be allowed if they have been treated to eliminate water absorption. Examples of suitable materials are water resistant belting and rubber. 1.5 The owner shall submit documentary evidence to the competent authority demonstrating that the cylinders comply with the provisions of sub-paragraph 1.3. The competent authority shall verify that these conditions are met. 1.6 The competent authority shall check whether the provisions of sub-paragraphs 2 and 3 are fulfilled and correctly applied. If all provisions are fulfilled, it shall authorise the 15-year interval for periodic inspection for the cylinders or bundles of cylinders. In this authorisation a group of cylinders (see Note below) covered shall be clearly identified. The authorisation shall be delivered to the owner; the competent authority shall keep a copy. The owner shall keep the documents for as long as the cylinders are authorised for a 15-year interval. Note: <i>A group of cylinders is defined by the production dates of identical cylinders for a period, during which the applicable provisions of Annex 2 to SMGS and of the technical code accepted by the competent authority have not changed in their technical content. Example: Cylinders of identical design and volume having been manufactured according to the provisions of Annex 2 to SMGS applicable between 1 July 2006 and 30 June 2007 in combination with a technical code accepted by the competent authority applicable for the same period form one group in terms of the provisions of this paragraph.</i> 1.7 The owner shall ensure compliance with the provisions of Annex 2 to SMGS and the authorisation given as appropriate and shall demonstrate this to the competent authority on request but at least every three years or when significant changes to the procedures are introduced. 2. Operational provisions 2.1 Cylinders or bundles of cylinders having been granted a 15-year interval for periodic inspection shall only be filled in filling centres applying a documented and certified quality system to ensure that all the provisions of paragraph (7) of this packing instruction and the requirements and responsibilities of in Standard EN ISO 24431:2016 or Document No.22A of the List as applicable are fulfilled and correctly applied. The quality system, according to the ISO 9000 (series) or equivalent, shall be certified by an accredited independent body recognized by the competent authority. This includes procedures for pre- and post-fill inspections and the filling process for cylinders, bundles of cylinders and valves. 2.2 Aluminium alloy cylinders and bundles of such cylinders without RPVs having been granted a 15-year interval for periodic inspection shall be checked prior to every fill in accordance with a documented procedure which shall at least include the following: - Open the cylinder valve or the main valve of the bundle of cylinders main valve to check for residual pressure; - If gas is emitted, the cylinder or bundle of cylinders may be filled; - If no gas is emitted, the internal condition of the cylinder or bundle of		

P200	PACKING INSTRUCTION (cont'd)	P200
	cylinders shall be checked for contamination; d) If no contamination is detected, the cylinder or bundle of cylinders may be filled; e) If contamination is detected, corrective action shall be carried out. 2.3 Seamless steel cylinders fitted with RPVs and bundles of seamless steel cylinders equipped with main valve(s) with a residual pressure device having been granted a 15-year interval for periodic inspection shall be checked prior to every fill in accordance with a documented procedure which shall at least include the following: a) Open the cylinder valve or bundle of cylinders main valve to check for residual pressure; b) If gas is emitted, the cylinder or bundle of cylinders may be filled; c) If no gas is emitted the functioning of the residual pressure device shall be checked; d) If the check shows that the residual pressure device has retained pressure the cylinder or bundle of cylinders may be filled; e) If the check shows that the residual pressure device has not retained pressure, the internal condition of the cylinder or bundle of cylinders shall be checked for contamination: 1) If no contamination is detected, the cylinder or bundle of cylinders may be filled following repair or replacement of the residual pressure device; 2) If contamination is detected, corrective action shall be carried out. 2.4 To prevent internal corrosion, only gases of high quality with very low potential contamination shall be filled into cylinders or bundles of cylinders. This is deemed to be fulfilled, if the compatibility of gases/material is acceptable in accordance EN ISO 11114-1:2020 + A1:2023 and EN ISO 11114-2:2021, and the gas quality meets the specifications in EN ISO 14175:2008 or, for gases not covered in the standard, a minimum purity of 99.5% by volume and a maximum moisture content of 40 ml/m³(ppm). For nitrous oxide the values shall be a minimum purity of 98% by volume and a maximum moisture content of 70 ml/m³ (ppm). 2.5 The owner shall ensure that the requirements of 2.1 to 2.4 are fulfilled and provide documentary evidence of this to the competent authority on request, but at least every three years or when significant changes to the procedures are introduced. 2.6 If a filling centre is situated in a different SMGS Member Country, the owner shall provide to the competent authority, on request, additional documentary evidence that the filling centre is monitored accordingly by the competent authority of that SMGS Member Country. See also 1.2 3. Provisions for qualification and periodic inspection 3.1 Cylinders and bundles of cylinders already in use, for which the conditions of sub-paragraph 2 have been met from the date of the last periodic inspection to the satisfaction of the competent authority, may have their inspection period extended to 15 years from the date of the last periodic inspection. Otherwise the change of test period from ten to fifteen years shall be made at the time of periodic inspection. The periodic inspection report shall indicate that this cylinder or bundle of cylinders shall be fitted with a residual pressure device as appropriate. Other documentary evidence may be accepted by the competent authority. 3.2 If a cylinder with a 15-year interval fails the pressure test by bursting or leakage or if a severe defect is detected by a non-destructive test (NDT) during a periodic inspection the owner shall investigate and produce a report on the cause of the failure and if other cylinders (e.g. of the same type or group) are affected. In the latter case, the owner shall inform the competent authority. The competent authority shall then decide on appropriate measures and inform the competent authorities of all other SMGS Member Countries accordingly. 3.3 If internal corrosion and other defects as defined in the periodic inspection	

P200	PACKING INSTRUCTION (cont'd)	P200
	standards referenced in 6.2.4 have been detected, the cylinder shall be withdrawn from use and shall not be granted any further period for filling and carriage.	
3.4	Cylinders or bundles of cylinders having been granted a 15 year interval for periodic inspection shall only be fitted with valves designed and tested according to Document No.23P of the List or Standard as applicable at the time of manufacture (see also the Table in 6.2.4.1). After a periodic inspection a new valve shall be fitted, except that valves which have been refurbished or inspected according to EN ISO 22434:2022 may be re-fitted.	
4. Marking		
	Cylinders and bundles of cylinders having been granted a 15 year interval for periodic inspection in accordance with this paragraph shall have the date (year) of the next periodic inspection as required in section 5.2.1.6 (c) and at the same time additionally be marked clearly and legibly with "P15Y". This mark shall be removed if the cylinder or bundle of cylinders is no longer authorised for a 15 year interval for periodic inspection.	

P200	PACKING INSTRUCTION (cont'd)									P200	
Table 1: COMPRESSED GASES											
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))
1002	AIR, COMPRESSED	1A		X	X	X	X	10			ua, va
1006	ARGON, COMPRESSED	1A		X	X	X	X	10			ua, va
1016	CARBON MONOXIDE, COMPRESSED	1TF	3760	X	X	X	X	5			u
1023	COAL GAS, COMPRESSED	1TF		X	X	X	X	5			
1045	FLUORINE, COMPRESSED	1TOC	185	X			X	5	200	30	a, k, n, o
1046	HELIUM, COMPRESSED	1A		X	X	X	X	10			ua, va
1049	HYDROGEN, COMPRESSED	1F		X	X	X	X	10			d, ua, va
1056	KRYPTON, COMPRESSED	1A		X	X	X	X	10			ua, va
1065	NEON, COMPRESSED	1A		X	X	X	X	10			ua, va
1066	NITROGEN, COMPRESSED	1A		X	X	X	X	10			ua, va
1071	OIL GAS, COMPRESSED	1TF		X	X	X	X	5			
1072	OXYGEN, COMPRESSED	1O		X	X	X	X	10			s, ua, va
1612	HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURE	1T		X	X	X	X	5			z
1660	NITRIC OXIDE, COMPRESSED	1TOC	115	X			X	5	225	33	k, o
1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.	1TF	≤5000	X	X	X	X	5			z
1954	COMPRESSED GAS, FLAMMABLE, N.O.S	1F		X	X	X	X	10			z, ua, va
1955	COMPRESSED GAS, TOXIC, N.O.S.	1T	≤5000	X	X	X	X	5			z
1956	COMPRESSED GAS, N.O.S.	1A		X	X	X	X	10			z, ua, va
1957	DEUTERIUM, COMPRESSED	1F		X	X	X	X	10			d, ua, va

P200		PACKING INSTRUCTION (cont'd)									P200	
Table 1: COMPRESSED GASES												
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))	
1964	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.	1F		X	X	X	X	10			z, ua, va	
1971	METHANE, COMPRESSED or NATURAL GAS, COMPRESSED with high methane content	1F		X	X	X	X	10			ua, va	
2034	HYDROGEN AND METHANE MIXTURE, COMPRESSED	1F		X	X	X	X	10			d, ua, va	
2190	OXYGEN DIFLUORIDE, COMPRESSED	1TOC	2,6	X			X	5	200	30	a, k, n, o	
3156	COMPRESSED GAS, OXIDIZING, N.O.S.	1O		X	X	X	X	10			z, ua, va	
3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.	1TO	≤5000	X	X	X	X	5			z	
3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.	1TC	≤5000	X	X	X	X	5			z	
3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	1TFC	≤5000	X	X	X	X	5			z	
3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	1TOC	≤5000	X	X	X	X	5			z	

a) Not applicable for pressure receptacles made of composite materials.

b) Where the entries are blank, the working pressure shall not exceed two thirds of the test pressure.

P200		PACKING INSTRUCTION (cont'd)									P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES												
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))	
1001	ACETYLENE, DISSOLVED	4F		X			X	10	60		c, p	
1005	AMMONIA, ANHYDROUS	2TC	4000	X	X	X	X	5	29	0,54	b, ra	
1008	BORON TRIFLUORIDE	2TC	864	X	X	X	X	5	225 300	0,715 0,86	a a	
1009	BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)	2A		X	X	X	X	10	42 120 250	1,13 1,44 1,60	Ra ra ra	
1010	BUTADIENES, STABILIZED (1,2-butadiene)	2F		X	X	X	X	10	10	0,59	ra	
1010	BUTADIENES, STABILIZED (1,3-butadiene)	2F		X	X	X	X	10	10	0,55	ra	
1010	BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED	2F		X	X	X	X	10	10	0,50	ra, v, z	
1011	BUTANE	2F		X	X	X	X	10	10	0,52	ra, v	
1012	BUTYLENE (Butylenes mixture) or	2F		X	X	X	X	10	10	0,50	ra, z	
1012	BUTYLENE (1-Butylene) or	2F		X	X	X	X	10	10	0,53	ra	
1012	BUTYLENE (cis-2-Butylene) or	2F		X	X	X	X	10	10	0,55	ra	
1012	BUTYLENE (trans-2-Butylene)	2F		X	X	X	X	10	10	0,54	ra	
1013	CARBON DIOXIDE	2A		X	X	X	X	10	190 250	0,68 0,76	ra, ua, va ra, ua, va	
1017	CHLORINE	2TOC	293	X	X	X	X	5	22	1,25	a, ra	
1018	CHLORODIFLUOROMETHANE (REFRIGERANT GAS R 22)	2A		X	X	X	X	10	27	1,03	ra	
1020	CHLOROPENTAFLUOROETHANE (REFRIGERANT GAS R 115)	2A		X	X	X	X	10	25	1,05	ra	
1021	1-CHLORO-1,2,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 124)	2A		X	X	X	X	10	11	1,20		
1022	CHLOROTRIFLUOROMETHANE (REFRIGERANT GAS R 13)	2A		X	X	X	X	10	100 120 190 250	0,83 0,90 1,04 1,11	ra ra ra ra	
1026	CYANOGEN	2TF	350	X	X	X	X	5	100	0,70	ra, u	
1027	CYCLOPROPANE	2F		X	X	X	X	10	18	0,55	ra	
1028	DICHLORODIFLUOROMETHANE (REFRIGERANT GAS R 12)	2A		X	X	X	X	10	16	1,15	ra	
1029	DICHLOROFLUOROMETHANE (REFRIGERANT GAS R 21)	2A		X	X	X	X	10	10	1,23	ra	
1030	1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)	2F		X	X	X	X	10	16	0,79	ra	
1032	DIMETHYLAMINE, ANHYDROUS	2F		X	X	X	X	10	10	0,59	b, ra	
1033	DIMETHYL ETHER	2F		X	X	X	X	10	18	0,58	ra	

P200	PACKING INSTRUCTION (cont'd)										P200
Table 2: LIQUEFIED GASES AND DISSOLVED GASES											
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))
1035	ETHANE	2F		X	X	X	X	10	95 120 300	0,250, 30 0,40	ra ra ra
1036	ETHYLAMINE	2F		X	X	X	X	10	10	0,61	b, ra
1037	ETHYL CHLORIDE	2F		X	X	X	X	10	10	0,80	a, ra
1039	ETHYL METHYL ETHER	2F		X	X	X	X	10	10	0,64	ra
1040	ETHYLENE OXIDE, or ETHYLENE OXIDE WITH NITROGEN up to a total pressure of 1MPa (10 bar) at 50 °C	2TF	2900	X	X	X	X	5	15	0,78	l, ra
1041	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 9% but not more than 87% ethylene oxide	2F		X	X	X	X	10	190 250	0,66 0,75	ra ra
1043	FERTILIZER AMMONIATING SOLUTION with free ammonia	CARRIAGE PROHIBITED									
1048	HYDROGEN BROMIDE, ANHYDROUS	2TC	2860	X	X	X	X	5	60	1,51	a, d, ra
1050	HYDROGEN CHLORIDE, ANHYDROUS	2TC	2810	X	X	X	X	5	100	0,30	a, d, ra
									120	0,56	a, d, ra
									150	0,67	a, d, ra
									200	0,74	a, d, ra
1053	HYDROGEN SULPHIDE	2TF	712	X	X	X	X	5	48	0,67	d, ra, u
1055	ISOBUTYLENE	2F		X	X	X	X	10	10	0,52	ra
1058	LIQUEFIED GASES, non- flammable, charged with nitrogen, carbon dioxide or air	2A		X	X	X	X	10			ra, z
1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED	2F		X	X	X	X	10			c, ra, z
	Propadiene with 1% to 4% methylacetylene	2F		X	X	X	X	10	22	0,52	c, ra
	Mixture P1	2F		X	X	X	X	10	30	0,49	c, ra
	Mixture P2	2F		X	X	X	X	10	24	0,47	c, ra
1061	METHYLAMINE, ANHYDROUS	2F		X	X	X	X	10	13	0,58	b, ra
1062	METHYL BROMIDE with not more than 2% chloropicrin	2T	850	X	X	X	X	5	10	1,51	a
1063	METHYL CHLORIDE (REFRIGERANT GAS R 40)	2F		X	X	X	X	10	17	0,81	a, ra
1064	METHYL MERCAPTAN	2TF	1350	X	X	X	X	5	10	0,78	d, ra, u
1067	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)	2TOC	115	X		X	X	5	10	1,30	k
1069	NITROSYL CHLORIDE	2TC	35	X			X	5	13	1,10	k, ra

P200	PACKING INSTRUCTION (cont'd)										P200
Table 2: LIQUEFIED GASES AND DISSOLVED GASES											
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))
1070	NITROUS OXIDE	2O		X	X	X	X	10	180 225 250	0,68 0,74 0,75	ua, va ua, va ua, va
1075	PETROLEUM GASES, LIQUEFIED	2F		X	X	X	X	10			v, z
1076	PHOSGENE	2TC	5	X		X	X	5	20	1,23	a, k, ra
1077	PROPYLENE	2F		X	X	X	X	10	27	0,43	ca
1078	REFRIGERANT GAS, N.O.S.	2A		X	X	X	X	10			ra, z
	Mixture F1	2A		X	X	X	X	10	12	1,23	ra, z
	Mixture F2	2A		X	X	X	X	10	18	1,15	ra, z
	Mixture F3	2A		X	X	X	X	10	29	1,03	ra, z
1079	SULPHUR DIOXIDE	2TC	2520	X	X	X	X	5	12	1,23	ca
1080	SULPHUR HEXAFLUORIDE	2A		X	X	X	X	10	70 140 160	1,06 1,34 1,38	ra, ua, va ra, ua, va ra, ua, va
1081	TETRAFLUOROETHYLENE, STABILIZED	2F		X	X	X	X	10	200		m, o, ra
1082	TETRAFLUOROETHYLENE, STABILIZED (REFRIGERANT GAS R 1113)	2TF	2000	X	X	X	X	5	19	1,13	ra, u
1083	TRIMETHYLAMINE, ANHYDROUS	2F		X	X	X	X	10	10	0,56	b, ra
1085	VINYL BROMIDE, STABILIZED	2F		X	X	X	X	10	10	1,37	a, ra
1086	VINYL CHLORIDE, STABILIZED	2F		X	X	X	X	10	12	0,81	a, ra
1087	VINYL METHYL ETHER, STABILIZED	2F		X	X	X	X	10	10	0,67	ra
1581	CHLOROPICRIN AND METHYL BROMIDE MIXTURE with more than 2% chloropicrin	2T	850	X	X	X	X	5	10	1,51	a
1582	CHLOROPICRIN AND METHYL CHLORIDE MIXTURE	2T	ᵀ)	X	X	X	X	5	17	0,81	a
1589	CYANOGEN CHLORIDE, STABILIZED	2TC	80	X			X	5	20	1,03	k
1741	BORON TRICHLORIDE	2TC	2541	X	X	X	X	5	10	1,19	a, ra
1749	CHLORINE TRIFLUORIDE	2TOC	299	X	X	X	X	5	30	1,40	a
1858	HEXAFLUOROPROPYLENE (REFRIGERANT GAS R 1216)	2A		X	X	X	X	10	22	1,11	ra
1859	SILICON TETRAFLUORIDE	2TC	92	X	X	X	X	5	200 300	0,74 1,10	a a
1860	VINYL FLUORIDE, STABILIZED	2F		X	X	X	X	10	250	0,64	a, ra
1911	DIBORANE	2TF	80	X			X	5	250	0,07	d, k, o
1912	METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	2F		X	X	X	X	10	17	0,81	a, ra

P200		PACKING INSTRUCTION (cont'd)									P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES												
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))	
1952	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with not more than 9% ethylene oxide	2A		X	X	X	X	10	190 250	0,66 0,75	ra ra	
1958	1,2-DICHLORO-1,1,2,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 114)	2A		X	X	X	X	10	10	1,30	ra	
1959	1,1-DIFLUOROETHYLENE (REFRIGERANT GAS R 1132a)	2F		X	X	X	X	10	250	0,77	ra	
1962	ETHYLENE	2F		X	X	X	X	10	225 300	0,34 0,38		
1965	HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S	2F		X	X	X	X	10		⁶⁾	ra, v, z	
	Mixture A							10	10	0,50	ra, v, z	
	Mixture A01							10	15	0,49	ra, v, z	
	Mixture A02							10	15	0,48	ra, v, z	
	Mixture A0							10	15	0,47	ra, v, z	
	Mixture A1							10	20	0,46	ra, v, z	
	Mixture B1							10	25	0,45	ra, v, z	
	Mixture B2							10	25	0,44	ra, v, z	
	Mixture B							10	25	0,43	ra, v, z	
	Mixture C							10	30	0,42	ra, v, z	
1967	INSECTICIDE GAS, TOXIC, N.O.S.	2T		X	X	X	X	5			z	
1968	INSECTICIDE GAS, N.O.S.	2A		X	X	X	X	10			ra, z	
1969	ISOBUTANE	2F		X	X	X	X	10	10	0,49	ra, v	
1973	CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2A		X	X	X	X	10	31	1,01	ra	
1974	MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2A		X	X	X	X	10	10	1,61	ra	
1975	MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2TOC	115	X		X	X	5			k, z	
1976	MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2A		X	X	X	X	10	11	1,32	ra	

P200		PACKING INSTRUCTION (cont'd)									P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES												
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))	
1978	MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2F		X	X	X	X	10	23	0,43	ra, v	
1982	MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2A		X	X	X	X	10	200 300	0,71 0,90		
1983	MIXTURE with fixed boiling point, with approximately 49% chlorodifluoromethane (REFRIGERANT GAS R 502)	2A		X	X	X	X	10	10	1,18	ra	
1984	TRIFLUOROMETHANE (REFRIGERANT GAS R 23)	2A		X	X	X	X	10	190 250	0,88 0,96	ra ra	
2035	1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a)	2F		X	X	X	X	10	35	0,73	ra	
2036	XENON	2A		X	X	X	X	10	130	1,28		
2044	2,2-DIMETHYLPROPANE	2F		X	X	X	X	10	10	0,53	ra	
2073	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water	4A										
	with more than 35% but not more than 40% ammonia	4A		X	X	X	X	5	10	0,80	b	
	with more than 40% but not more than 50% ammonia	4A		X	X	X	X	5	12	0,77	b	
2188	ARSINE	2TF	178	X			X	5	42	1,10	d, k	
2189	DICHLOROSILANE	2TFC	314	X	X	X	X	5	10 200	0,90 1,08	a a	
2191	SULPHURYL FLUORIDE	2T	3020	X	X	X	X	5	50	1,10	u	
2192	GERMANE ^{c)}	2TF	620	X	X	X	X	5	250	0,064	d, q, r, ra	
2193	HEXAFLUOROETHANE (REFRIGERANT GAS R 116)	2A		X	X	X	X	10	200	1,13		
2194	SELENIUM HEXAFLUORIDE	2TC	50	X			X	5	36	1,46	k, ra	
2195	TELLURIUM HEXAFLUORIDE	2TC	25	X			X	5	20	1,00	k, ra	
2196	TUNGSTEN HEXAFLUORIDE	2TC	218	X	X	X	X	5	10	3,08	a, ca	
2197	HYDROGEN IODIDE, ANHYDROUS	2TC	2860	X	X	X	X	5	23	2,25	a, d, ra	
2198	PHOSPHORUS PENTAFLUORIDE	2TC	261	X	X	X	X	5	200 300	0,90 1,25		
2199	PHOSPHINE ^{b)}	2TF	20	X			X	5	225 250	0,30 0,45	d, k, q d, k, q	
2200	PROPADIENE, STABILIZED	2F		X	X	X	X	10	22	0,50	ra	
2202	HYDROGEN SELENIDE, ANHYDROUS	2TF	51	X			X	5	31	1,60	k	
2203	SILANE ^{c)}	2F		X	X	X	X	10	225 250	0,32 0,36	q q	
2204	CARBONYL SULPHIDE	2TF	1700	X	X	X	X	5	30	0,87	ra, u	

P200	PACKING INSTRUCTION (cont'd)										P200
Table 2: LIQUEFIED GASES AND DISSOLVED GASES											
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))
2417	CARBONYL FLUORIDE	2TC	360	X	X	X	X	5	200 300	0,47 0,70	
2418	SULPHUR TETRAFLUORIDE	2TC	40	X			X	5	30	0,91	a, k, ra
2419	BROMOTRIFLUORO-ETHYLENE	2F		X	X	X	X	10	10	1,19	ra
2420	HEXAFLUOROACETONE	2TC	470	X	X	X	X	5	22	1,08	ra
2421	NITROGEN TRIOXIDE	2TOC	CARRIAGE PROHIBITED								
2422	OCTAFLUOROBUT-2-ENE (REFRIGERANT GAS R 1318)	2A		X	X	X	X	10	12	1,34	ra
2424	OCTAFLUOROPROPANE (REFRIGERANT GAS R 218)	2A		X	X	X	X	10	25	1,04	ra
2451	NITROGEN TRIFLUORIDE	2O		X	X	X	X	10	200	0,50	
2452	ETHYLACETYLENE, STABILIZED	2F		X	X	X	X	10	10	0,57	c, ra
2453	ETHYL FLUORIDE (REFRIGERANT GAS R 161)	2F		X	X	X	X	10	30	0,57	ra
2454	METHYL FLUORIDE (REFRIGERANT GAS R 41)	2F		X	X	X	X	10	300	0,63	ra
2455	METHYL NITRITE	2A	CARRIAGE PROHIBITED								
2517	1-CHLORO-1,1-DIFLUOROETHANE (REFRIGERANT GAS R 142b)	2F		X	X	X	X	10	10	0,99	ra
2534	METHYLCHLOROSILANE	2TFC	2810	X	X	X	X	5			ra, z
2548	CHLORINE PENTAFLUORIDE	2TOC	122	X			X	5	13	1,49	a, k
2599	CHLOROTRIFLUORO-METHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE with approximately 60% chloro-trifluoromethane (REFRIGERANT GAS R 503)	2A		X	X	X	X	10	31 42 100	0,12 0,17 0,64	ra ra ra
2601	CYCLOBUTANE	2 F		X	X	X	X	10	10	0,63	ra
2602	DICHLORODIFLUORO-METHANE AND DI-FLUOROETHANE AZEOTROPIC MIXTURE with approximately 74% dichlorodifluoro- methane (REFRIGERANT GAS R 500)	2A		X	X	X	X	10	22	1,01	ra
2676	STIBINE	2TF	178	X			X	5	200	0,49	k, c, ra
2901	BROMINE CHLORIDE	2TOC	290	X	X	X	X	5	10	1,50	a
3057	TRIFLUOROACETYL CHLORIDE	2TC	10	X		X	X	5	17	1,17	κ, ra
3070	ETHYLENE OXIDE AND DICHLORODI-FLUOROMETHANE MIXTURE with not more than 12,5% ethylene oxide	2A		X	X	X	X	10	18	1,09	ra
3083	PERCHLORYL FLUORIDE	2TO	770	X	X	X	X	5	33	1,21	

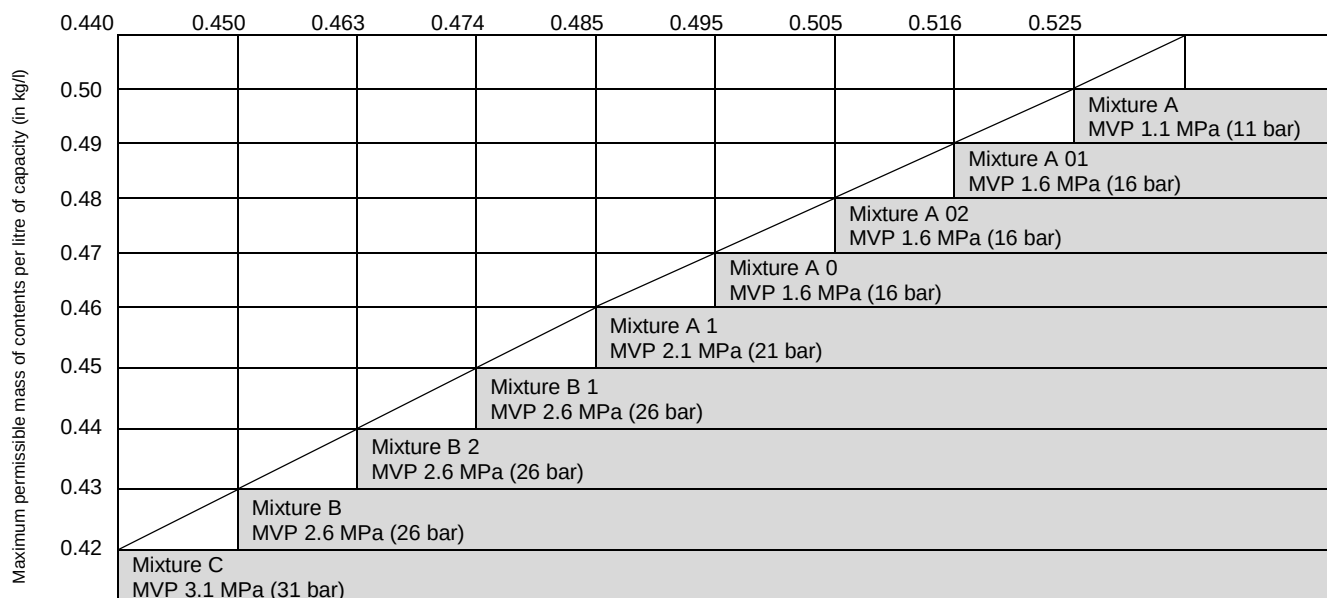
P200	PACKING INSTRUCTION (cont'd)									P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES											
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))
3153	PERFLUORO(METHYL VINYL ETHER)	2F		X	X	X	X	10	20	0,75	ra
3154	PERFLUORO(ETHYL VINYL ETHER)	2F		X	X	X	X	10	10	0,98	ra
3157	LIQUEFIED GAS, OXIDIZING, N.O.S.	2O		X	X	X	X	10			z
3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	2A		X	X	X	X	10	18	1,05	ra
3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.	2TF	≤5000	X	X	X	X	5			ra, z
3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.	2F		X	X	X	X	10			ra, z
3162	LIQUEFIED GAS, TOXIC, N.O.S.	2T	≤5000	X	X	X	X	5			z
3163	LIQUEFIED GAS, N.O.S.	2A		X	X	X	X	10			ra, z
3220	PENTAFLUOROETHANE (REFRIGERANT GAS R 125)	2A		X	X	X	X	10	49 35	0,95 0,87	ra ra
3252	DIFLUOROMETHANE (REFRIGERANT GAS R 32)	2F		X	X	X	X	10	48	0,78	ra
3296	HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	2A		X	X	X	X	10	13	1,21	ra
3297	ETHYLENE OXIDE AND CHLOROTETRA-FLUOROETHANE MIXTURE with not more than 8.8% ethylene oxide	2A		X	X	X	X	10	10	1,16	ra
3298	ETHYLENE OXIDE AND PENTAFLUORO-ETHANE MIXTURE with not more than 7.9% ethylene oxide	2A		X	X	X	X	10	26	1,02	ra
3299	ETHYLENE OXIDE AND TETRAFLUORO-ETHANE MIXTURE with not more than 5.6% ethylene oxide	2A		X	X	X	X	10	17	1,03	ra
3300	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE with more than 87% ethylene oxide	2TF	Over 2900	X	X	X	X	5	28	0,73	ra
3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.	2TO	≤5000	X	X	X	X	5			z
3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.	2TC	≤5000	X	X	X	X	5			ra, z
3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	2TFC	≤5000	X	X	X	X	5			ra, z
3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	2TOC	≤5000	X	X	X	X	5			z

P200		PACKING INSTRUCTION (cont'd)									P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES												
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section (10))	
3318	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	4TC		X	X	X	X	5			b	
3337	REFRIGERANT GAS R 404A (Pentafluoroethane, 1,1,1-trifluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 44% pentafluoroethane and 52% 1,1,1-trifluoroethane)	2A		X	X	X	X	10	36	0,82	ra	
3338	REFRIGERANT GAS R 407A (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 20% difluoromethane and 40% pentafluoroethane)	2A		X	X	X	X	10	32	0,94	ra	
3339	REFRIGERANT GAS R 407B (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 10% difluoromethane and 70% pentafluoroethane)	2A		X	X	X	X	10	33	0,93	ra	
3340	REFRIGERANT GAS R 407C (Difluoromethane, pentafluoroethane, and 1,1,1,2-tetrafluoroethane zeotropic mixture with approximately 23% difluoromethane and 25% pentafluoroethane)	2A		X	X	X	X	10	30	0,95	ra	
3354	INSECTICIDE GAS, FLAMMABLE, N.O.S	2F		X	X	X	X	10			ra, z	
3355	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.	2TF		X	X	X	X	5			ra, z	
3374	ACETYLENE, SOLVENT FREE	2F		X			X	5	60		c, p	
3553	DISILANE ^{d)}	2F		X	X	X	X	10	225	0.39	q	

a) Not applicable for pressure receptacles made of composite materials.

b) For mixtures of UN No. 1965 gases, the maximum permissible filling mass per litre of capacity is as follows:

Density at 50 °C in kg/l



MVP = Maximum vapour pressure at 70 °C.

Note: The graph above can be used to determine the correct filling ratios for the mixtures listed in 2.2.2.3.

c) Considered as pyrophoric.

d) Considered to be toxic. The LC₅₀ value still to be determined

P200		PACKING INSTRUCTION (cont'd)										P200	
Table 3: SUBSTANCES NOT IN CLASS 2													
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Cylinders	Tubes	Pressure drums	Bundles of cylinders	Test period ^{a)}	Test pressure ^{b)}	Maximum working pressure, bar ^{b)}	Special packing provisions (see section 7.1.1)	UN No.	
1051	HYDROGEN CYANIDE, STABILIZED containing less than 3% water	6.1	TF1	40	X			X	5	100	0,55	k	
1052	HYDROGEN FLUORIDE, ANHYDROUS	8	CT1	1307	X		X	X	5	10	0,84	a, ab,ac	
1745	BROMINE PENTAFLUORIDE	5.1	OTC	25	X		X	X	5	10	⁶⁾	k,ab,a d,	
1746	BROMINE TRIFLUORIDE	5.1	OTC	50	X		X	X	5	10	⁶⁾	k,ab,a d	
2495	IODINE PENTAFLUORIDE	5.1	OTC	120	X		X	X	5	10	⁶⁾	k,ab,a d	

a) Not applicable for pressure receptacles made of composite materials.

b) A minimum ullage of 8% by volume is required.

P201	PACKING INSTRUCTION	P201
This instruction applies to UN Nos. 3167, 3168 and 3169.		
The following packagings are authorized: (1) Cylinders and gas receptacles conforming to the construction, testing and filling requirements approved by the competent authority. (2) The following combination packagings provided that the general provisions of 4.1.1 and 4.1.3 are met: Outer packagings: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). Inner packagings: a) For non-toxic gases, hermetically sealed inner packagings of glass or metal with a maximum capacity of 5 litres per package; b) For toxic gases, hermetically sealed inner packagings of glass or metal with a maximum capacity of 1 litre per package. Packagings shall conform to the packing group III performance level.		

P202	PACKING INSTRUCTION	P202
(Reserved)		

P203	PACKING INSTRUCTION	P203
This instruction applies to Class 2 refrigerated liquefied gases.		
Requirements for closed cryogenic receptacles: 1) The special packing provisions of 4.1.6 shall be met. 2) The requirements of Chapter 6.2 shall be met. 3) The closed cryogenic receptacles shall be so insulated that they do not become coated with frost. 4) Test pressure Refrigerated liquids shall be filled in closed cryogenic receptacles with the following minimum test pressures: a) For closed cryogenic receptacles with vacuum insulation, the test pressure shall not be less than 1.3 times the sum of the maximum internal pressure of the filled receptacle, including during filling and discharge, plus 100 kPa (1 bar); b) For other closed cryogenic receptacles, the test pressure shall be not less than 1.3 times the maximum internal pressure of the filled receptacle, taking into account the pressure developed during filling and discharge. 5) Filling For non-flammable, non-toxic refrigerated liquefied gases (classification codes 3 A and 3 O) the volume of liquid phase at the filling temperature and at a pressure of 100 kPa (1 bar) shall not exceed 98% of the water capacity of the pressure receptacle. For flammable refrigerated liquefied gases (classification code 3 F) the gas filled into the receptacle shall remain below the level at which, if the contents were raised to the temperature at which the vapour pressure equalled the opening pressure of the relief valve, the volume of the liquid phase would reach 98% of the water capacity at that temperature. 6) Pressure-relief devices Closed cryogenic receptacles shall be fitted with at least one pressure-relief device. 7) Compatibility Materials used to ensure the leakproofness of the joints or for the maintenance of the closures shall be compatible with the contents. In the case of receptacles intended for the carriage of oxidizing gases (classification code 3 O), these materials shall not react with these gases in a dangerous manner. 8) a) The periodic inspection and test frequencies of pressure relief valves in accordance with 6.2.1.6.3 shall not exceed five years. b) The periodic inspection and test frequencies of non-UN closed cryogenic receptacles in accordance with 6.2.3.5.2 shall not exceed 10 years.		

P203	PACKING INSTRUCTION (cont'd)	P203
Requirements for open cryogenic receptacles:		
Only the following non-oxidizing refrigerated liquefied gases of classification code 3 A may be carried in open cryogenic receptacles: UN Nos. 1913, 1951, 1963, 1970, 1977, 2591, 3136 and 3158. For these gases, when used as a coolant, the requirements of 5.5.3 shall apply.		
Open cryogenic receptacles shall be constructed to meet the following requirements:		
1)	The receptacles shall be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during their normal use and during normal conditions of carriage.	
2)	The capacity shall be not more than 450 litres.	
3)	The receptacle shall have a double wall construction with the space between the inner and outer wall being evacuated (vacuum insulation). The insulation shall prevent the formation of hoar frost on the exterior of the receptacle.	
4)	The materials of construction shall have suitable mechanical properties at the service temperature.	
5)	Materials which are in direct contact with the dangerous goods shall not be affected or weakened by the dangerous goods intended to be carried and shall not cause a dangerous effect, e.g. catalysing a reaction or reacting with the dangerous goods.	
6)	Receptacles of glass double wall construction shall have an outer packaging with suitable cushioning or absorbent materials which withstand the pressures and impacts liable to occur under normal conditions of carriage.	
7)	The receptacle shall be designed to remain in an upright position during carriage, e.g. have a base whose smaller horizontal dimension is greater than the height of the centre of gravity when filled to capacity or be mounted on gimbals.	
8)	The openings of the receptacles shall be fitted with devices allowing gases to escape, preventing any splashing out of liquid, and so configured that they remain in place during carriage.	
9)	Open cryogenic receptacles shall bear the following marks permanently affixed e.g. by stamping, engraving or etching:	
	– The manufacturer's name and address; – The model number or name; – The serial or batch number; – The UN number and proper shipping name of gases for which the receptacle is intended; – The capacity of the receptacle in litres.	

P204	PACKING INSTRUCTION	P204
(Deleted)		

P205	PACKING INSTRUCTION	P205
This instruction applies to UN No. 3468.		
1) For metal hydride storage systems, the special packing provisions of 4.1.6 shall be met. 2) Only pressure receptacles not exceeding 150 litres in water capacity and having a maximum developed pressure not exceeding 25 MPa are covered by this packing instruction. 3) Metal hydride storage systems meeting the applicable requirements for the construction and testing of pressure receptacles containing gas of Chapter 6.2 are authorised for the carriage of hydrogen only. 4) When steel pressure receptacles or composite pressure receptacles with steel liners are used, only those bearing the "H" mark, in accordance with 6.2.2.9.2 (j) shall be used. 5) Metal hydride storage systems shall meet the service conditions, design criteria, rated capacity, type tests, batch tests, routine tests, test pressure, rated charging pressure and provisions for pressure relief devices for transportable metal hydride storage systems specified in ISO 16111:2008 or ISO 16111:2018 Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride. Their conformity and approval shall be assessed in accordance with 6.2.2.5. 6) Metal hydride storage systems shall be filled with hydrogen at a pressure not exceeding the rated charging pressure shown in the permanent mark on the system as specified by ISO 16111:2008 or ISO 16111:2018. 7) The periodic test requirements for a metal hydride storage system shall be in accordance with ISO 16111:2008 or ISO 16111:2018 and carried out in accordance with 6.2.2.6, and the interval between periodic inspections shall not exceed five years. See 6.2.2.4 to determine which standard is applicable at the time of periodic inspection and test.		

P206	PACKING INSTRUCTION	P206
This instruction applies to UN Nos. 3500, 3501, 3502, 3503, 3504 and 3505.		
Unless otherwise indicated in Annex 2 to SMGS, cylinders and pressure drums conforming to the applicable requirements of Chapter 6.2 are authorized. (1) The special packing provisions of 4.1.6 shall be met. (2) The maximum test period for periodic inspection shall be 5 years. (3) Cylinders and pressure drums shall be so filled that at 50 °C the non-gaseous phase does not exceed 95% of their water capacity and they are not completely filled at 60 °C. When filled, the internal pressure at 65 °C shall not exceed the test pressure of the cylinders and pressure drums. The vapour pressures and volumetric expansion of all substances in the cylinders and pressure drums shall be taken into account. For liquids charged with a compressed gas both components – the liquid and the compressed gas – have to be taken into consideration in the calculation of the internal pressure in the pressure receptacle. When experimental data is not available, the following steps shall be carried out: a) Calculation of the vapour pressure of the liquid and of the partial pressure of the compressed gas at 15 °C (filling temperature); b) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15 °C to 65 °C and calculation of the remaining volume for the gaseous phase; c) Calculation of the partial pressure of the compressed gas at 65 °C considering the volumetric expansion of the liquid phase; Note: The compressibility factor of the compressed gas at 15 °C and 65 °C shall be considered. d) Calculation of the vapour pressure of the liquid at 65 °C; e) The total pressure is the sum of the vapour pressure of the liquid and the partial pressure of the compressed gas at 65 °C; f) Consideration of the solubility of the compressed gas at 65 °C in the liquid phase. The test pressure of the cylinders or pressure drums shall not be less than the calculated total pressure minus 100 kPa (1 bar). If the solubility of the compressed gas in the liquid phase is not known for the calculation, the test		

pressure can be calculated without taking the gas solubility (sub-paragraph (f)) into account.
(4) The minimum test pressure shall be in accordance with packing instruction P 200 for the propellant but shall not be less than 20 bar.
Additional requirement: Cylinders and pressure drums shall not be offered for carriage when connected with spray application equipment such as a hose and wand assembly.
Special packing provisions: PP89 For UN Nos. 3501, 3502, 3503, 3504 and 3505, notwithstanding 4.1.6.9 (b), non-refillable cylinders used may have a water capacity not exceeding 1 000 litres divided by the test pressure expressed in bars provided capacity and pressure restrictions of the construction standard comply with clause 1 of ISO 11118:2015 + Amd 1:2019, which limits the maximum capacity to 50 litres. PP97 For fire extinguishing agents assigned to UN No. 3500 the maximum test period for periodic inspection shall be 10 years. They may be carried in tubes of a maximum water capacity of 450 litres conforming to the applicable requirements of Chapter 6.2

P207	PACKING INSTRUCTION	P207
This instruction applies to UN No. 1950.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: a) Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2). Packagings shall conform to the packing group II performance level. b) Rigid outer packagings with a maximum net mass as follows: Fibreboard 55 kg Other than fibreboard 125 kg The provisions of 4.1.1.3 need not be met.		
The packagings shall be designed and constructed to prevent excessive movement of the aerosols and inadvertent discharge during normal conditions of carriage.		
Special packing provision: PP87 For UN 1950 waste aerosols carried in accordance with special provision 327, the packagings shall have a means of retaining any free liquid that might escape during carriage, e.g. absorbent material. The packagings shall be adequately ventilated to prevent the dangerous atmospheres and the build-up of pressure.		
Special packing provision specific to Annex 2 to SMGS, RID and ADR: RR6 For UN 1950, in the case of carriage by wagon load or full load, metal articles may also be packed as follows: The articles shall be grouped together in units on trays and held in position with an appropriate plastics cover; these units shall be stacked and suitably secured on pallets		

P208	PACKING INSTRUCTION	P208
This instruction applies to Class 2 adsorbed gases.		
(1) The following packagings are authorized provided the general packing requirements of 4.1.6.1 are met: Cylinders specified in Chapter 6.2 and in accordance with ISO 11513:2011, ISO 11513:2019, ISO 9809-1:2010 or ISO 9809-1:2019.		
(2) The pressure of each filled cylinder shall be less than 101.3 kPa at 20 °C and less than 300 kPa at 50 °C.		
(3) The minimum test pressure of the cylinder shall be 21 bar.		
(4) The minimum burst pressure of the cylinder shall be 94.5 bar.		

P208	PACKING INSTRUCTION	P208
(5)	The internal pressure at 65 °C of the filled cylinder shall not exceed the test pressure of the cylinder.	
(6)	The adsorbent material shall be compatible with the cylinder and shall not form harmful or dangerous compounds with the gas to be adsorbed. The gas in combination with the adsorbent material shall not affect or weaken the cylinder or cause a dangerous reaction (e.g. a catalyzing reaction).	
(7)	The quality of the adsorbent material shall be verified at the time of each fill to ensure that the pressure and chemical stability requirements of this packing instruction are met each time an adsorbed gas package is offered for carriage.	
(8)	The adsorbent material shall not meet the criteria of any of the classes in Annex 2 to SMGS.	
(9)	Requirements for cylinders and closures containing toxic gases with an LC ₅₀ less than or equal to 200 ml/m ³ (ppm) (see Table 1) shall be as follows:	
a)	Valve outlets shall be fitted with pressure retaining gas-tight plugs or caps having threads matching those of the valve outlets.	
b)	Each valve shall either be of the packless type with non-perforated diaphragm, or be of a type which prevents leakage through or past the packing.	
c)	Each cylinder and closure shall be tested for leakage after filling.	
d)	Each valve shall be capable of withstanding the test pressure of the cylinder and be directly connected to the cylinder by either a taper-thread or other means which meets the requirements of ISO 10692-2:2001.	
e)	Cylinders and valves shall not be fitted with a pressure relief device.	
(10)	Valve outlets for cylinders containing pyrophoric gases shall be fitted with gas-tight plugs or caps having threads matching those of the valve outlets.	
(11)	The filling procedure shall be in accordance with Annex A of ISO 11513:2011 (applicable until 31 December 2024) or Annex A of ISO 11513:2019.	
(12)	The maximum period for periodic inspections shall be 5 years.	
(13)	Special packing provisions that are specific to a substance (see Table 1).	
	<i>Material compatibility</i>	
a:	Aluminium alloy cylinders shall not be used.	
d:	When steel cylinders are used, only those bearing the "H" mark in accordance with 6.2.2.7.4 (p) are permitted.	
	<i>Gas specific provisions</i>	
r:	The filling of this gas shall be limited such that, if complete decomposition occurs, the pressure does not exceed two thirds of the test pressure of the cylinder.	
	<i>Material compatibility for n.o.s. adsorbed gas entries</i>	
z:	The construction materials of the cylinders and their accessories shall be compatible with the contents and shall not react to form harmful or dangerous compounds therewith.	

P208	PACKING INSTRUCTION	P208
Table 1: ADSORBED GASES		

P208 PACKING INSTRUCTION P208				
UN No.	Name and description	Classification code	LC ₅₀ ml/m ³	Special packing provisions
3510	ADSORBED GAS, FLAMMABLE, N.O.S.	9F		z
3511	ADSORBED GAS, N.O.S.	9A		z
3512	ADSORBED GAS, TOXIC, N.O.S.	9T	≤ 5 000	z
3513	ADSORBED GAS, OXIDIZING, N.O.S.	9O		z
3514	ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.	9TF	≤ 5 000	z
3515	ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.	9TO	≤ 5 000	z
3516	ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.	9TC	≤ 5 000	z
3517	ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.	9TFC	≤ 5 000	z
3518	ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.	9TOC	≤ 5 000	z
3519	BORON TRIFLUORIDE, ADSORBED	9TC	387	a
3520	CHLORINE, ADSORBED	9TOC	293	a
3521	SILICON TETRAFLUORIDE, ADSORBED	9TC	450	a
3522	ARSINE, ADSORBED	9TF	20	d
3523	GERMANE, ADSORBED	9TF	620	d, r
3524	PHOSPHORUS PENTAFLUORIDE, ADSORBED	9TC	190	
3525	PHOSPHINE, ADSORBED	9TF	20	d
3526	HYDROGEN SELENIDE, ADSORBED	9TF	2	

P209	PACKING INSTRUCTION	P209
This packing instruction applies to UN No. 3150 devices, small, hydrocarbon gas powered or hydrocarbon gas refills for small devices.		
1)The special packing provisions of 4.1.6 when applicable shall be met. 2)The articles shall comply with the provisions of the country in which they were filled. 3)The devices and refills shall be packed in outer packagings conforming to 6.1.4 tested and approved in accordance with Chapter 6.1 for packing group II.		

P300	PACKING INSTRUCTION	P300
This instruction applies to UN No. 3064.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Combination packagings consisting of inner metal cans of not more than 1 litre capacity each and outer wooden boxes (4C1, 4C2, 4D or 4F) containing not more than 5 litres of solution.		
Additional requirements: 1. Metal cans shall be completely surrounded with absorbent cushioning material. 2. Wooden boxes shall be completely lined with suitable material impervious to water and nitroglycerin.		

P301	PACKING INSTRUCTION	P301
This instruction applies to UN No. 3165.		
The following packagings are authorized, provided that the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.5, 4.1.1.6 and 4.1.3 are met: (1) Aluminium pressure receptacle made from tubing and having welded heads. Primary containment of the fuel within this receptacle shall consist of a welded aluminium bladder having a maximum internal volume of 46 litres. The outer receptacle shall have a minimum design gauge pressure of 1 275 kPa and a minimum burst gauge pressure of 2 755 kPa. Each receptacle shall be leak checked during manufacture and before dispatch and shall be found leakproof. The complete inner unit shall be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per unit and package is 42 litres. (2) Aluminium pressure receptacle. Primary containment of the fuel within this receptacle shall consist of a welded vapour tight fuel compartment with an elastomeric bladder having a maximum internal volume of 46 litres. The pressure receptacle shall have a minimum design gauge pressure of 2 860 kPa and a minimum burst gauge pressure of 5 170 kPa. Each receptacle shall be leak-checked during manufacture and before dispatch and shall be securely packed in non-combustible cushioning material such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per unit and package is 42 litres.		

P302	PACKING INSTRUCTION	P302
This instruction applies to UN No. 3269.		
The following combination packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Outer packagings: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). Inner packagings: The activator (organic peroxide) shall have a maximum quantity of 125 ml per inner packaging if liquid, and 500 g per inner packaging if solid. The base material and the activator shall each be separately packed in inner packagings. The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of a leakage. Packagings shall conform to the packing group II or III performance level according to the criteria for Class 3 applied to the base material.		

P 303	PACKING INSTRUCTION	P 303
This instruction applies to UN No. 3555.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 as well as 4.1.5.12 are met: Plastics drum non-removable head (1H1) of maximum capacity 250 l.		

Special packing provision	
PP 26	For UN No. 3555, packagings shall be lead free.

P400	PACKING INSTRUCTION	P400
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: (1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. Inner packagings shall have threaded closures or closures physically held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during carriage. They shall be made of steel and shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar, gauge pressure). During carriage, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar) (2) Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F or 4G), drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1D or 1G) or jerricans (3A1, 3A2, 3B1 or 3B2) enclosing hermetically sealed metal cans with inner packagings of glass or metal, with a capacity of not more than 1 litre each, having closures with gaskets. Inner packagings shall be cushioned on all sides with dry, absorbent, non-combustible material in a quantity sufficient to absorb the entire contents. Inner packagings shall not be filled to more than 90% of their capacity. Outer packagings shall have a maximum net mass of 125 kg. (3) Steel, aluminium or metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2), jerricans (3A1, 3A2, 3B1 or 3B2) or boxes (4A, 4B or 4N) with a maximum net mass of 150 kg each with hermetically sealed inner metal cans not more than 4 litre capacity each, with closures fitted with gaskets. Inner packagings shall be cushioned on all sides with dry, absorbent, non-combustible material in a quantity sufficient to absorb the entire contents. Each layer of inner packagings shall be separated by a dividing partition in addition to cushioning material. Inner packagings shall not be filled to more than 90% of their capacity. Special packing provisions: PP86 For UN Nos. 3392 and 3394, air shall be eliminated from the vapour space by nitrogen or other means.		

P401	PACKING INSTRUCTION	P401
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: (1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be made of steel and subjected to an initial test and periodic tests every 10 years at a pressure of not less than 0.6 MPa (6 bar, gauge pressure). During carriage, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar). (2) Combination packagings: Outer packagings: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). Inner packagings: Glass, metal or plastics which have threaded closures with a maximum capacity of 1 litre. Each inner packaging shall be surrounded by inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents. The maximum net mass per outer packaging shall not exceed 30 kg. Special packing provision specific to Annex 2 to SMGS, RID and ADR: RR7 For UN Nos. 1183, 1242, 1295 and 2988, the pressure receptacles shall however be subjected to the tests every five years.		

P402	PACKING INSTRUCTION	P402				
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: (1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be made of steel and subjected to an initial test and periodic tests every 10 years at a pressure of not less than 0.6 MPa (6 bar, gauge pressure). During carriage, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar).						
(2) Combination packagings: Outer packagings: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). Inner packagings with a maximum net mass as follows: <table><tr><td>Glass</td><td>10 kg</td></tr><tr><td>Metal or plastics</td><td>15 kg</td></tr></table> Each inner packaging shall be fitted with threaded closures and be surrounded by inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents. The maximum net mass per outer packaging shall not exceed 125 kg.			Glass	10 kg	Metal or plastics	15 kg
Glass	10 kg					
Metal or plastics	15 kg					
(3) Steel drums (1A1) with a maximum capacity of 250 litres.						
(4) Combination packagings consisting of a plastic receptacle in an outer steel or aluminium drum, with a capacity of not more than 250 litres.						
Special packing provision specific to Annex 2 to SMGS, RID and ADR: RR4 For UN No. 3130, the openings of receptacles shall be tightly closed by means of two devices in series, one of which shall be screwed or secured in an equivalent manner. RR7 For UN No. 3129, the pressure receptacles shall however be subjected to the tests every five years. RR8 For UN Nos. 1389, 1391, 1411, 1421, 1928, 3129, 3130, 3148 and 3482, the pressure receptacles shall however be subjected to an initial test and to periodic tests at a pressure of not less than 1 MPa (10 bar).						

P403	PACKING INSTRUCTION	P403
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Combination packagings:		
Inner packagings	Outer packagings	Maximum net mass
Glass 2 kg Plastics 15 kg Metal 20 kg Inner packagings shall be hermetically sealed (e.g. by taping or by threaded closures).	Drums	
	steel (1A1, 1A2)	400 kg
	aluminium (1B1, 1B2)	400 kg
	other metal (1N1, 1N2)	400 kg
	plastics (1H1, 1H2)	400 kg
	plywood (1D)	400 kg
	fibre (1G)	400 kg
	Boxes	
	steel (4A)	400 kg
	aluminium (4B)	400 kg
	other metal (4N)	400 kg
	natural wood (4C1)	400 kg
	natural wood with sift proof walls (4C2)	400 kg
	plywood (4D)	250 kg
	reconstituted wood (4F)	125 kg
	fibreboard (4G)	125 kg
	expanded plastics (4H1)	60 kg
	solid plastics (4H2)	250 kg
	Jerricans	
	steel (3A1, 3A2)	120 kg
	aluminium (3B1, 3B2)	120 kg
	plastics (3H1, 3H2)	120 kg
Single packagings:		Maximum net mass
Drums		
steel (1A1, 1A2)		250 kg
aluminium (1B1, 1B2)		250 kg
metal other than steel or aluminium (1N1, 1N2)		250 kg
plastics (1H1, 1H2)		250 kg
Jerricans		
steel (3A1, 3A2)		120 kg
aluminium (3B1, 3B2)		120 kg
plastics (3H1, 3H2)		120 kg
Composite packagings		
plastics receptacle with outer steel or aluminium drums (6HA1 or 6HB1)		250 kg
plastics receptacle with outer fibre, plastics or plywood drums (6HG1, 6HH1 or 6HD1)		75 kg
plastics receptacle with outer steel or aluminium crate or box or with outer wooden, plywood, fibreboard or solid plastics boxes (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)		75 kg
Pressure receptacles, provided that the general provisions of 4.1.3.6 are met		
Additional requirement: Packagings shall be hermetically sealed.		
Special packing provision: PP83 Reserved		

P404	PACKING INSTRUCTION	P404
This instruction applies to pyrophoric solids: UN Nos.: 1383, 1854, 1855, 2008, 2441, 2545, 2546, 2846, 2881, 3200, 3391 and 3393.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
(1) Combination packagings Outer packagings: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2) Inner packagings: Metal receptacles with a maximum net mass of 15 kg each. Inner packagings shall be hermetically sealed. Glass receptacles, with a maximum net mass of 1 kg each, having closures with gaskets, cushioned on all sides and contained in hermetically sealed metal cans. Inner packagings shall have threaded closures or closures physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage. Outer packagings shall have a maximum net mass of 125 kg. Inner packagings shall have threaded closures or closures physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage. (2) Metal packagings: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2); Jerricans (3A1, 3A2, 3B1 and 3B2) Maximum gross mass: 150 kg. (3) Composite packagings: Plastics receptacle with outer steel or aluminium drum (6HA1 or 6HB1) Maximum gross mass: 150 kg. (4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.		
Special packing provision:		
PP86 For UN Nos. 3391 and 3393, air shall be eliminated from the vapour space by nitrogen or other means.		

P405	PACKING INSTRUCTION	P405
This instruction applies to UN No. 1381.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
1) For UN No. 1381, phosphorus (white or yellow), wet: a) Combination packagings Outer packagings: Boxes (4A, 4B, 4N, 4C1, 4C2, 4D or 4F) Maximum net mass: 75 kg Inner packagings: – hermetically sealed metal cans, with a maximum net mass of 15 kg; or – glass inner packagings cushioned on all sides with dry, absorbent, non-combustible material in a quantity sufficient to absorb the entire contents with a maximum net mass of 2 kg; or b) Drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2); maximum net mass: 400 kg Jerricans (3A1 or 3B1); maximum net mass: 120 kg.. These packagings shall be capable of passing the leakproofness test specified in 6.1.5.4 at the packing group II performance level. 2) For UN No. 1381, dry phosphorus (white or yellow): a) When fused, drums (1A2, 1B2 or 1N2) with a maximum net mass of 400 kg; or b) In projectiles or hard cased articles when carried without Class 1 components: as specified by the competent authority.		

P406	PACKING INSTRUCTION	P406
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Combination packagings: outer packagings: (4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2, 1G, 1D, 1H1, 1H2, 3H1 or 3H2); inner packagings: water-resistant packagings. 2)Plastics, plywood or fibreboard drums (1H2, 1D or 1G) or boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G and 4H2) with a water resistant inner bag, plastics film lining or water resistant coating. 3)Metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2), plastics drums (1H1 or 1H2), metal jerricans (3A1, 3A2, 3B1 or 3B2), plastics jerricans (3H1 or 3H2), plastics receptacle with outer steel or aluminium drums (6HA1 or 6HB1), plastics receptacle with outer fibre, plastics or plywood drums (6HG1, 6HH1 or 6HD1),), plastics receptacle with outer steel or aluminium crate or box or with outer wooden, plywood, fibreboard or solid plastics boxes (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2).		
Additional requirements: 1.Packagings shall be designed and constructed to prevent the loss of water or alcohol content or the content of the phlegmatizer. 2.Packagings shall be so constructed and closed so as to avoid an explosive overpressure or pressure build-up of more than 300 kPa (3 bar).		
Special packing provisions: PP24 UN Nos. 2852, 3364, 3365, 3366, 3367, 3368 and 3369 shall not be carried in quantities of more than 500 g per package. PP25 For UN No. 1347, the quantity carried shall not exceed 15 kg per package. PP26 For UN Nos. 1310, 1320, 1321, 1322, 1344, 1347, 1348, 1349, 1517, 2907, 3317 and 3376 packagings shall be lead free. PP48 For UN No. 3474, metal packagings shall not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6.1.4, are not considered metal packagings. PP78 UN No. 3370 shall not be carried in quantities of more than 11.5 kg per package. PP80 For UN No. 2907 packagings shall meet the packing group II performance level. Packagings meeting the test criteria of packing group I shall not be used.		

P407	PACKING INSTRUCTION	P407
This instruction applies to UN Nos. 1331, 1944, 1945 and 2254.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Outer packagings: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). Inner packagings: Matches shall be tightly packed in securely closed inner packagings to prevent accidental ignition under normal conditions of carriage. The maximum gross mass of the package shall not exceed 45 kg except for fibreboard boxes which shall not exceed 30 kg. Packagings shall conform to the packing group III performance level.		
Special packing provision: PP27 UN No. 1331, Strike-anywhere matches shall not be packed in the same outer packaging with any other dangerous goods other than safety matches or wax Vesta matches, which shall be packed in separate inner packagings. Inner packagings shall not contain more than 700 strike-anywhere matches.		

P408	PACKING INSTRUCTION	P408
This instruction applies to UN No. 3292.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: (1) For cells: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). There shall be sufficient cushioning material to prevent contact between cells and between cells and the internal surfaces of the outer packaging and to ensure that no dangerous movement of the cells within the outer packaging occurs in carriage. Packagings shall conform to the packing group II performance level. (2) Batteries may be carried unpacked or in protective enclosures (e.g. fully enclosed or wooden slatted crates). The terminals shall not support the weight of other batteries or materials packed with the batteries. Packagings need not meet the requirements of 4.1.1.3. Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).		
Additional requirement: Cells and batteries shall be protected against short circuit and shall be isolated in such a manner as to prevent short circuits.		

P409	PACKING INSTRUCTION	P409
This instruction applies to UN Nos. 2956, 3242 and 3251.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: (1) Fibre drum (1G) which may be fitted with a liner or coating; maximum net mass: 50 kg. (2) Combination packagings: Fibreboard box (4G) with a single inner plastic bag; maximum net mass: 50 kg. (3) Combination packagings: Fibreboard box (4G) or fibre drum (1G) with plastics inner packagings each containing a maximum of 5 kg; maximum net mass: 25 kg.		

P410	PACKING INSTRUCTION	P410
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Combination packagings:		
Inner packagings	Outer packagings	Maximum net mass
		Packing groups II, III
Glass 10 kg Plastics ^{a)} 30 kg Metal 40 kg Paper ^{a), b)} 10 kg Fibre ^{a), b)} 10 kg	Drums	
	steel (1A1, 1A2)	400 kg
	aluminium (1B1, 1B2)	400 kg
	other metal(1N1, 1N2)	400 kg
	plastics (1H1, 1H2)	400 kg
	plywood (1D)	400 kg
	fibre (1G) ^{a)}	400 kg
	Boxes	
	steel (4A)	400 kg
	aluminium (4B)	400 kg
	other metal (4N)	400 kg
	natural wood (4C1)	400 kg
	natural wood with sift-proof walls (4C2)	400 kg
	plywood (4D)	400 kg
	reconstituted wood (4F)	400 kg
	fibreboard (4G) ^{a)}	400 kg
	expanded plastics (4H1)	60 kg

	solid plastics (4H2)	400 kg
	Jerricans	
	steel (3A1, 3A2)	120 kg
	aluminium (3B1, 3B2)	120 kg
	Plastics (3H1, 3H2)	120 kg
Single packagings:		
Drums		
	steel (1A1 или 1A2)	400 kg
	aluminium (1B1 или 1B2)	400 kg
	metal other than steel or aluminium (1N1 or 1N2)	400 kg
	plastics (1H1 или 1H2)	400 kg
Jerricans		
	steel (3A1 или 3A2)	120 kg
	aluminium (3B1 или 3B2)	120 kg
	plastics (3H1 или 3H2)	120 kg
Boxes		
	steel (4A) ^{c)}	400 kg
	aluminium (4B) ^{c)}	400 kg
	other metal (4N) ^{c)}	400 kg
	natural wood (4C1) ^{c)}	400 kg
	plywood (4D) ^{c)}	400 kg
	reconstituted wood (4F) ^{c)}	400 kg
	natural wood with sift-proof walls (4C2) ^{c)}	400 kg
	fibreboard (4G) ^{c)}	400 kg
	solid plastics (4H2) ^{c)}	400 kg
Bags		
	Bags (5H3, 5H4, 5L3, 5M2) ^{c), d)}	50 kg

P410	PACKING INSTRUCTION (cont'd)	P410
Composite packagings		
	plastics receptacle with outer steel, aluminium, plywood, fibre or plastics drum (6HA1, 6HB1, 6HG1, 6HD1 or 6HH1)	400 kg
	plastics receptacle with outer steel or aluminium crate or box, or outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	75 kg
	glass receptacle with outer steel, aluminium, plywood or fibre drum (6PA1, 6PB1, 6PD1 or 6PG1) or outer steel or aluminium crate or box or with outer wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) or with outer expanded or solid plastics packaging (6PH1 or 6PH2)	75 kg
Pressure receptacles, provided that the general provisions of 4.1.3.6 are met		
^{a)} These packagings shall be sift-proof. ^{b)} These inner packagings shall not be used when the substances being carried may become liquid during carriage. ^{c)} These packagings shall not be used when the substances being carried may become liquid during carriage. ^{d)} For packing group II substances, these packagings may only be used when carried in a closed wagon or container.		
Special packing provisions:		
PP39	For UN No. 1378, for metal packagings a venting device is required.	
PP40	For UN Nos. 1326, 1352, 1358, 1395, 1396, 1436, 1437, 1871, 2805 and 3182, packing group II, bags are not allowed.	
PP83	Reserved	

P411	PACKING INSTRUCTION	P411
This instruction applies to UN No. 3270.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2) provided that explosion is not possible by reason of increased internal pressure . The maximum net mass shall not exceed 30 kg.		

P412	PACKING INSTRUCTION	P412
This instruction applies to UN No. 3527.		
The following combination packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: (1) Outer packagings: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). (2) Inner packagings: a) The activator (organic peroxide) shall have a maximum quantity of 125 ml per inner packaging if liquid, and 500 g per inner packaging if solid. b) The base material and the activator shall each be separately packed in inner packagings. The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of a leakage. Packagings shall conform to the packing group II or III performance level according to the criteria for Class 4.1 applied to the base material.		

P500	PACKING INSTRUCTION	P500
This instruction applies to UN No. 3356.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). Packagings shall conform to the packing group II performance level. The generator(s) shall be carried in a package which meets the following requirements when one generator in the package is actuated: a) Other generators in the package will not be actuated; b) Packaging material will not ignite; and c) The outside surface temperature of the completed package shall not exceed 100 °C.		

P501	PACKING INSTRUCTION	P501
This instruction applies to UN No. 2015.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Combination packagings:	Inner packaging maximum capacity	Outer packaging maximum net mass
(1) Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4H2) or drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D) or jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2) with glass, plastics or metal inner packagings	5 l	125 kg
(2) Fibreboard box (4G) or fibre drum (1G) with plastics or metal inner packagings each in a plastics bag	2 l	50 kg
Single packagings:	Maximum capacity	
Drums		
steel (1A1)	250 l	
aluminium (1B1)	250 l	
metal other than steel or aluminium (1N1)	250 l	
plastics (1H1)	250 l	
Jerricans		
steel (3A1)	60 l	
aluminium (3B1)	60 l	
plastics (3H1)	60 l	
Composite packagings		
plastics receptacle with outer steel or aluminium drum (6HA1, 6HB1)	250 l	
plastics receptacle with outer fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)	250 l	
plastics receptacle with outer steel or aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)	60 l	
glass receptacle with outer steel, aluminium, fibre or plywood drum (6PA1, 6PB1, 6PD1 or 6PG1) or with outer steel, aluminium, wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) or with outer expanded or solid plastics (6PH1 or 6PH2)	60 l	

Additional requirements:

1. Packagings shall have a maximum filling degree of 90%.
2. Packagings shall be vented.

P502	PACKING INSTRUCTION	P502
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Combination packagings:		
Inner packagings	Outer packagings	Maximum net mass
Glass 5 l Metal 5 l Plastics 5 l	Drums steel (1A1, 1A2) aluminium (1B1, 1B2) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) fibre (1G)	125 kg 125 kg 125 kg 125 kg 125 kg 125 kg
	Boxes steel (4A) aluminium (4B) other metal (4N) natural wood (4C1) natural wood with sift-proof walls (4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) expanded plastics (4H1) solid plastics (4H2)	125 kg 125 kg 125 kg 125 kg 125 kg 125 kg 125 kg 125 kg 60 kg 125 kg
Single packagings:		Maximum capacity
Drums steel (1A1) aluminium (1B1) plastics (1H1)		250 l
Jerricans steel (3A1) aluminium (3B1) plastics (3H1)		60 l
Composite packagings:		
plastics receptacle with outer steel or aluminium drum (6HA1 or 6HB1)		250 l
plastics receptacle with outer fibre, plastics or plywood drum (6HG1, 6HH1 or 6HD1)		250 l
plastics receptacle with outer steel or aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)		60 l
glass receptacle with outer steel, aluminium, fibre or plywood drum (6PA1, 6PB1, 6PD1 or 6PG1) or with outer steel, aluminium, wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) or with outer expanded or solid plastics packaging (6PH1 or 6PH2)		60 l
Special packing provision:		
PP28 For UN No. 1873, parts of packagings which are in direct contact with perchloric acid shall be constructed of glass or plastics.		

P503	PACKING INSTRUCTION		P503
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 are met:			
Combination packagings:			
Inner packagings	Outer packagings	Maximum net mass	
Glass 5 kg Metal 5 kg Plastics 5 kg	Drums		
	steel (1A1, 1A2)	125 kg	
	aluminium (1B1, 1B2)	125 kg	
	other metal (1N1, 1N2)	125 kg	
	plastics (1H1, 1H2)	125 kg	
	plywood (1D)	125 kg	
	fibre (1G)	125 kg	
	Boxes		
	steel (4A)	125 kg	
	aluminium (4B)	125 kg	
	other metal (4N)	125 kg	
	natural wood (4C1)	125 kg	
	natural wood with sift-proof walls (4C2)	125 kg	
	plywood (4D)	125 kg	
reconstituted wood (4F)	125 kg		
fibreboard (4G)	40 kg		
expanded plastics (4H1)	60 kg		
solid plastics (4H2)	125 kg		
Single packagings:			
Metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2)) with a maximum net mass of 250 kg.			
Fibreboard (1G) or plywood drums (1D) fitted with inner liners with a maximum net mass of 200 kg.			

P504	PACKING INSTRUCTION	P504
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Combination packagings:		Maximum net mass
(1) Glass receptacles with a maximum capacity of 5 litres in 1A1, 1A2, 1B1, 75 kg 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2 outer packagings		75 kg
(2) Plastics receptacles with a maximum capacity of 30 litres in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2 outer packagings		75 kg
(3) Metal receptacles with a maximum capacity of 40 litres in 1G, 4F or 4G outer packagings		125 kg
(4) Metal receptacles with a maximum capacity of 40 litres in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 4A, 4B, 4N, 4C1, 4C2, 4D, 4H2 outer packagings		225 kg
Single packagings:		Maximum capacity
Drums		
steel, non-removable head (1A1)		250 l
steel, removable head (1A2)		250 l
aluminium, non-removable head (1B1)		250 l
aluminium, removable head (1B2)		250 l
metal other than steel or aluminium, non-removable head (1N1)		250 l
metal other than steel or aluminium, removable head (1N2)		250 l
plastics, non-removable head (1H1)		250 l
plastics, removable head (1H2)		250 l
Jerricans		
steel, non-removable head (3A1)		60 l
steel, removable head (3A2)		60 l
aluminium, non-removable head (3B1)		60 l
aluminium, removable head (3B2)		60 l
plastics, non-removable head (3H1)		60 l
plastics, removable head (3H2)		60 l
Composite packagings:		
plastics receptacle with outer steel or aluminium drum (6HA1 or 6HB1)		250 l
plastics receptacle with outer fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)		120 l
plastics receptacle with outer steel or aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)		60 l
glass receptacle with outer steel, aluminium, fibre or plywood drum (6PA1, 6PB1, 6PD1 or 6PG1) or with outer steel, aluminium, wooden or fibreboard box or with outer wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2) or with outer expanded or solid plastics packaging (6PH1 or 6PH2)		60 l
Special packing provisions:		
PP10 For UN Nos. 2014, 2984 and 3149, the packaging shall be vented.		

P505		PACKING INSTRUCTION	
This instruction applies to UN No. 3375.			
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:			
			Maximum capacity/maximum net mass
Combination packagings			
Inner packagings		Outer packagings	
glass 5 l		Boxes	
plastics 5 l		aluminium (4B)	125 kg
metal 5 l		natural wood, ordinary (4C1)	125kg
		natural wood, sift proof walls (4C2)	125 kg
		plywood (4D)	125 kg
		fibreboard (4G)	125 kg
		plastics, solid (4H2)	125 kg
		Drums	
		aluminium, removable head (1B2)	125 kg
		fibre (1G)	125 kg
		other metal, removable head (1N2)	125 kg
		plastics, removable head (1H2)	125 kg
		plywood (1D)	125 kg
		Jerricans	
		aluminium, removable head (3B2)	125 kg
		plastics, removable head (3H2)	125 kg
Single packagings:			
Drums			
aluminium (1B1, 1B2)		250 l	
plastics (1H1, 1H2)		250 l	
Jerricans			
aluminium (3B1, 3B2)		60 l	
plastics (3H1, 3H2)		60 l	
Composite packagings			
plastics receptacle with outer aluminium drum (6HB1)		250 l	
plastics receptacle with outer fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)		250 l	
plastics receptacle with outer aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HB2, 6HC, 6HD2, 6HG2 or 6HH2)		60 l	
glass receptacle with outer aluminium, fibre or plywood drum (6PB1, 6PG1, 6PD1) or with outer expanded or solid plastics			
plastics receptacles (6PH1 or 6PH2) or with outer aluminium crate or box or with outer wooden or fibreboard box or with outer wickerwork hamper (6PB2, 6PC, 6PG2 or 6PD2)		60 l	

P520	PACKING INSTRUCTION							P520
This instruction applies to organic peroxides of Class 5.2 and self-reactive substances of Class 4.1.								
The packagings listed below in (1), (2), and (3) are authorized provided the general provisions of 4.1.1 and 4.1.3 and special provisions of 4.1.7.1 are met.								
The packing methods are designated OP1 to OP8. The packing methods appropriate for the individual currently assigned organic peroxides and self-reactive substances are listed in 2.2.41.4 and 2.2.52.4.								
The quantities specified for each packing method are the maximum quantities authorized per package.								
(1) Combination packagings with outer packagings comprising boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2), drums (1A1, 1A2, 1B1, 1B2, 1G, 1H1, 1H2 and 1D), jerricans (3A1, 3A2, 3B1, 3B2, 3H1 and 3H2);								
(2) Single packagings consisting of drums (1A1, 1A2, 1B1, 1B2, 1G, 1H1, 1H2 and 1D) and jerricans (3A1, 3A2, 3B1, 3B2, 3H1 and 3H2);								
(3) Composite packagings with plastics inner receptacles (6HA1, 6HA2, 6HB1, 6HB2, 6HC, 6HD1, 6HD2, 6HG1, 6HG2, 6HH1 and 6HH2).								
The maximum quantities per packaging/package for packing methods OP1 to OP8 are:								
	OP1	OP2 ^{a)}	OP3	OP4 ^{a)}	OP5	OP6	OP7	OP8
Maximum net mass (kg) for solids and for combination packagings (liquid and solid)	0,5	0,5/10	5	5/25	25	50	50	400 ^{b)}
Maximum contents in litres for liquids ^{c)}	0,5	-	5	-	30	60	60	225 ^{d)}
^{a)} If two values are given, the first applies to the maximum net mass per inner packaging and the second to the maximum net mass of the complete package.								
^{b)} 60 kg for jerricans / 200 kg for boxes and, for solids, 400 kg in combination packagings with outer packagings comprising boxes (4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2) and with inner packagings of plastics or fibre with a maximum net mass of 25 kg.								
^{c)} Viscous substances shall be treated as solids when they do not meet the criteria provided in the definition for "liquids" presented in 1.2.1.								
^{d)} 60 litres for jerricans.								
Additional requirements:								
1.Metal packagings, including inner packagings of combination packagings and outer packagings of combination or composite packagings may only be used for packing methods OP7 and OP8.								
2.In combination packagings, glass receptacles may only be used as inner packagings with maximum contents of 0.5 kg for solids or 0.5 litre for liquids.								
3.In combination packagings, cushioning materials shall not be readily combustible.								
4.The packaging of an organic peroxide or self-reactive substance required to bear an "EXPLOSIVE" subsidiary risk label (model No.1, see 5.2.2.2.2) shall also comply with the provisions given in 4.1.5.10 and 4.1.5.11.								

Special packing provisions:

PP21 For certain self-reactive substances of types B or C, UN Nos. 3221, 3222, 3223 and 3224, a smaller packaging than that allowed by packing methods OP5 or OP6 respectively shall be used (see 4.1.7 and 2.2.41.4).

PP22 UN No. 3241, 2-Bromo-2-nitropropane-1, 3-diol, shall be packed in accordance with packing method OP6.

PP94 Very small amounts of energetic samples of 2.1.4.3 may be carried under UN No. 3223 or UN No. 3224, as appropriate, provided that:

- a) Only combination packagings with outer packagings comprising boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2) are used;
- b) The samples are carried in microtiter plates or multi-titer plates made of plastics, glass, porcelain or stoneware as inner packaging;
- c) The maximum amount per individual inner cavity does not exceed 0.01 g for solids or 0.01 ml for liquids;
- d) The maximum net quantity per outer packaging is 20 g for solids or 20 ml for liquids, or in the case of mixed packing the sum of grams and millilitres does not exceed 20; and
- e) When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, the requirements of 5.5.3 are complied with. Interior supports shall be provided to secure the inner packagings in their original position. The inner and outer packagings shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

PP95 Small amounts of energetic samples of 2.1.4.3 may be carried under UN No. 3223 or UN No. 3224, as appropriate, provided that:

- a) The outer packaging consists only of corrugated fibreboard of type 4G having minimum dimensions of 60 cm (length) by 40.5 cm (width) by 30 cm (height) and minimum wall thickness of 1.3 cm;
- b) The individual substance is contained in an inner packaging of glass or plastics of maximum capacity 30 ml placed in an expandable polyethylene foam matrix of at least 130 mm thickness having a density of 18 ± 1 g/l;
- c) Within the foam carrier, inner packagings are segregated from each other by a minimum distance of 40 mm and from the wall of the outer packaging by a minimum distance of 70 mm. The package may contain up to two layers of such foam matrices, each carrying up to 28 inner packagings;
- d) The maximum content of each inner packaging does not exceed 1 g for solids or 1 ml for liquids;
- e) The maximum net quantity per outer packaging is 56 g for solids or 56 ml for liquids, or in the case of mixed packing the sum of grams and millilitres does not exceed 56; and
- f) When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, the requirements of 5.5.3 are complied with. Interior supports shall be provided to secure the inner packagings in their original position. The inner and outer packagings shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

P600	PACKING INSTRUCTION	P600
This instruction applies to UN Nos. 1700, 2016 и 2017.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G) Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2)		
Outer packagings shall meet the packing group II performance level.		
Articles shall be individually packaged and separated from each other using partitions, dividers, inner packagings or cushioning material to prevent inadvertent discharge during normal conditions of carriage.		
Maximum net mass: 75 kg		

P601	PACKING INSTRUCTION	P601
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met and the packagings are hermetically sealed:		
(1) Combination packagings with a maximum gross mass of 15 kg, consisting of		
a) one or more glass inner packaging(s) with a maximum quantity of 1 litre each and filled to not more than 90% of their capacity; the closure(s) of which shall be physically held in place by any means capable of preventing		

back-off or loosening by impact or vibration during carriage, individually placed in

- b) metal receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in
- c) 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings;

(2) Combination packagings consisting of metal or plastics inner packagings not exceeding 5 litres in capacity individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 75 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage;

(3) Packagings consisting of:

Outer packagings: steel or plastics drums (1A1, 1A2, 1H1 or 1H2), tested in accordance with the test requirements in 6.1.5 at a mass corresponding to the mass of the assembled package either as a packaging intended to contain inner packagings, or as a single packaging intended to contain solids or liquids, and marked accordingly;

Inner packagings:

Drums and composite packagings (1A1, 1B1, 1N1, 1H1 or 6HA1) meeting the requirements of Chapter 6.1 for single packagings, subject to the following conditions:

- a) The hydraulic pressure test shall be conducted at a pressure of at least 0.3 MPa (gauge pressure);
- b) The design and production leakproofness tests shall be conducted at a test pressure of 30 kPa;
- c) They shall be isolated from the outer drum by the use of inert shock-mitigating cushioning material which surrounds the inner packaging on all sides;
- d) Their capacity shall not exceed 125 litres;
- e) Closures shall be of a screw cap type that are:
 - physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage; and;
 - provided with a cap seal;
- f) The outer and inner packagings shall be subjected periodically to a leakproofness test according to a) and b) at intervals of not more than two and a half years;
- g) The complete packaging shall be visually inspected to the satisfaction of the competent authority at least every 3 years;
- h) The outer and inner packaging shall bear in clearly legible and durable characters:
 - the date (month, year) of the initial test and the latest periodic test and inspection;
 - The stamp of the expert who carried out the test and inspection.

(4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar) (gauge pressure). Pressure receptacles may not be equipped with any pressure relief device. Each pressure receptacle containing a toxic by inhalation liquid with an LC50 less than or equal to 200 ml/m³ (ppm) shall be closed with a plug or valve conforming to the following:

- a) Each plug or valve shall have a taper-threaded connection directly to the pressure receptacle and be capable of withstanding the test pressure of the pressure receptacle without damage or leakage;
- b) Each valve shall be of the packless type with non-perforated diaphragm, except that, for corrosive substances, a valve may be of the packed type with an assembly made gas-tight by means of a seal cap with gasket joint attached to the valve body or the pressure receptacle to prevent loss of substance through or past the packing;
- c) Each valve outlet shall be sealed by a threaded cap or threaded solid plug and inert gasket material;
- d) The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting and gaskets shall be compatible with each other and with the contents.

Each pressure receptacle with a wall thickness at any point of less than 2.0 mm and each pressure receptacle which does not have fitted valve protection shall be carried in an outer packaging. Pressure receptacles shall not be manifolded or interconnected

Special packing provision:

PP82 (reserved)

Special packing provisions specific to Annex 2 to SMGS, RID and ADR:

RR3 (reserved)

RR7 For UN No. 1251, the pressure receptacles shall however be subjected to the tests every five years.

RR10 UN No. 1614, when completely absorbed by an inert porous material, shall be packed in metal receptacles of a capacity of not more than 7.5 litres, placed in wooden cases in such a manner that they cannot come into contact with one another. The receptacles shall be entirely filled with the porous material which shall not shake down or form dangerous spaces even after prolonged use or under impact, even at temperatures of up to 50 °C.

P602	PACKING INSTRUCTION	P602
The following packagings are authorised provided the general provisions of 4.1.1 and 4.1.3 are met and the packagings are hermetically sealed: (1) Combination packagings with a maximum gross mass of 15 kg, consisting of - one or more glass inner packaging(s) with a maximum quantity of 1 litre each and filled to not more than 90% of their capacity; the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during carriage, individually placed in - metal receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings; (2) Combination packagings consisting of metal or plastics inner packagings individually packed with absorbent material sufficient to absorb the entire contents and inert cushioning material in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 75 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage. Inner packagings shall not exceed 5 litres in capacity. (3) Drums and composite packagings (1A1, 1B1, 1N1, 1H1, 6HA1 or 6HH1), subject to the following conditions: - The hydraulic pressure test shall be conducted at a pressure of at least 0.3 MPa (gauge pressure); - The design and production leakproofness tests shall be conducted at a test pressure of 30 kPa; and - Closures shall be of a screw cap type that are: - physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage; and - provided with a cap seal. (4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar) (gauge pressure). Pressure receptacles may not be equipped with any pressure relief device. Each pressure receptacle containing a toxic by inhalation liquid with an LC50 less than or equal to 200 ml/m3 (ppm) shall be closed with a plug or valve conforming to the following: - Each plug or valve shall have a taper-threaded connection directly to the pressure receptacle and be capable of withstanding the test pressure of the pressure receptacle without damage or leakage; - Each valve shall be of the packless type with non-perforated diaphragm, except that, for corrosive substances, a valve may be of the packed type with an assembly made gas-tight by means of a seal cap with gasket joint attached to the valve body or the pressure receptacle to prevent loss of substance through or past the packing; - Each valve outlet shall be sealed by a threaded cap or threaded solid plug and inert gasket material; - The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting and gaskets shall be compatible with each other and with the contents. Each pressure receptacle with a wall thickness at any point of less than 2.0 mm and each pressure receptacle which does not have fitted valve protection shall be carried in an outer packaging. Pressure receptacles shall not be manifolded or interconnected.		

P603	PACKING INSTRUCTION
This instruction applies to UN No. 3507.	
The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 and the special packing provisions of 4.1.9.1.2, 4.1.9.1.4 and 4.1.9.1.7 are met: Packagings consisting of: a) Metal or plastics primary receptacle(s); in b) Leakproof rigid secondary packaging(s); in c) A rigid outer packaging: - Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); - Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); - Jerricans (3A2, 3B2, 3H2).	
Additional requirements: 1. Primary inner receptacles shall be packed in secondary packagings in a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings shall be secured in outer packagings with suitable cushioning material to prevent movement. If multiple primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them. 2. The contents shall comply with the provisions of 2.2.7.2.4.5.2. 3. The provisions of 6.4.4 shall be met. 4. In the case of fissile-excepted material, the limits specified in 2.2.7.2.3.5 shall be met.	

P620	PACKING INSTRUCTION	P620
This instruction applies to UN Nos. 2814 и 2900.		
The following packagings are authorized provided the special packing provisions of 4.1.8 are met: Packagings meeting the requirements of Chapter 6.3 and approved accordingly consisting of: a) Inner packagings comprising: – leakproof primary receptacle(s); – a leakproof secondary packaging; – other than for solid infectious substances, an absorbent material in sufficient quantity to absorb the entire contents placed between the primary receptacle(s) and the secondary packaging; if multiple primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them; b) A rigid outer packaging: - Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); - Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); - Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). The smallest external dimension shall be not less than 100 mm.		

P620	PACKING INSTRUCTION (продолжение)	P620
Additional requirements: 1. Inner packagings containing infectious substances shall not be consolidated with inner packagings containing unrelated types of goods. Complete packages may be overpacked in accordance with the provisions of 1.2.1 and 5.1.2; such an overpack may contain dry ice. When dry ice or other refrigerants presenting a risk of asphyxiation are used as a coolant, the requirements of 5.5.3 shall apply. 2. Other than for exceptional consignments, e.g. whole organs which require special packaging, the following additional requirements shall apply: a) Substances consigned at ambient temperatures or at a higher temperature: Primary receptacles shall be of glass, metal or plastics. Positive means of ensuring a leakproof seal shall be provided, e.g. a heat seal, a skirted stopper or a metal crimp seal. If screw caps are used, they shall be secured by positive means, e.g., tape, paraffin sealing tape or manufactured locking closure. b) Substances consigned refrigerated or frozen: Ice, dry ice or other refrigerant shall be placed around the secondary packaging(s) or alternatively in an overpack with one or more complete packages marked in accordance with 6.3.3. Interior supports shall be provided to secure secondary packaging(s) or packages in position after the ice or dry ice has dissipated. When dry ice or other refrigerants presenting a risk of asphyxiation are used as a coolant, the requirements of 5.5.3 shall apply. If ice is used, the outer packaging or overpack shall be leakproof. If dry ice is used, the outer packaging or overpack shall permit the release of carbon dioxide gas. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used. c) Substances consigned in liquid nitrogen: When liquid nitrogen is used as a coolant, the requirements of 5.5.3 shall apply. Plastics primary receptacles capable of withstanding very low temperature shall be used. The secondary packaging shall also be capable of withstanding very low temperatures, and in most cases will need to be fitted over the primary receptacle individually. Provisions for the consignment of liquid nitrogen shall also be fulfilled. The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the liquid nitrogen. d) Lyophilised substances may also be carried in primary receptacles that are flame-sealed glass ampoules or rubber-stoppered glass vials fitted with metal seals. 3. Whatever the intended temperature of the consignment, the primary receptacle or the secondary packaging shall be capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95 kPa. This primary receptacle or secondary packaging shall also be capable of withstanding temperatures in the range -40 °C to +55 °C. 4. Other dangerous goods shall not be packed in the same packaging as Class 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Classes 3, 8 or 9 may be packed in each primary receptacle containing infectious substances. These small quantities of dangerous goods of Classes 3, 8 or 9 are not subject to any additional requirements of Annex 2 to SMGS when packed in accordance with this packing instruction. 5. Alternative packagings for the carriage of animal material may be authorized by the competent authority of the country of origin² in accordance with the provisions of 4.1.8.7.		

² If the country of origin is not an SMGS Contracting State, the competent authority of the first SMGS Contracting State reached by the consignment.

P621	PACKING INSTRUCTION	P621
This instruction applies to UN No. 3291.		
The following packagings are authorized provided that the general provisions of 4.1.1 except 4.1.1.15 and 4.1.3 are met: (1) Provided that there is sufficient absorbent material to absorb the entire amount of liquid present and the packaging is capable of retaining liquids: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G) Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). Packagings shall conform to the packing group II performance level for liquids. (2) For packages containing larger quantities of liquid: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2); Composites (6HA1, 6HB1, 6HG1, 6HH1, 6HD1, 6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2, 6PA1, 6PB1, 6PG1, 6PD1, 6PH1, 6PH2, 6PA2, 6PB2, 6PC, 6PG2 or PD2). Packagings shall conform to the packing group II performance level for liquids.		
Additional requirement: Packagings intended to contain sharp objects such as broken glass and needles shall be resistant to puncture and retain liquids under the performance test conditions in Chapter 6.1.		

P622 PACKING INSTRUCTION P622		
This instruction applies to waste of UN No. 3549 carried for disposal.		
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:		
Inner packagings	Intermediate packagings	Outer packagings
metal plastics	metal plastics	Boxes steel (4A) aluminium (4B) other metal (4N) plywood (4D) fibreboard (4G) plastics, solid (4H2) Drums steel (1A2) aluminium (1B2) other metal (1N2) plywood (1D) fibreboard (1G) plastics (1H2) Jerricans steel (3A2) aluminium (3B2) plastics (3H2)
The outer packaging shall conform to the packing group I performance level for solids.		
Additional requirements:		
1. Fragile articles shall be contained in either a rigid inner packaging or a rigid intermediate packaging. 2. Inner packagings containing sharp objects such as broken glass and needles shall be rigid and resistant to puncture. 3. The inner packaging, the intermediate packaging, and the outer packaging shall be capable of retaining liquids. Outer packagings that are not capable of retaining liquids by design shall be fitted with a liner or suitable measure of retaining liquids. 4. The inner packaging and/or the intermediate packaging may be flexible. When flexible packagings are used, they shall be capable of passing the impact resistance test of at least 165 g according to ISO 7765-1:1988 "Plastics film and sheeting – Determination of impact resistance by the free-falling dart method – Part 1: Staircase methods" and the tear resistance test of at least 480 g in both parallel and perpendicular planes with respect to the length of the bag in accordance with ISO 6383-2:1983 "Plastics – Film and sheeting – Determination of tear resistance – Part 2: Elmendorf method". The maximum net mass of each flexible inner packaging shall be 30 kg. 5. Each flexible intermediate packaging shall contain only one inner packaging. 6. Inner packagings containing a small amount of free liquid may be included in intermediate packaging provided that there is sufficient absorbent or solidifying material in the inner or intermediate packaging to absorb or solidify all the liquid content present. Suitable absorbent material which withstands the temperatures and vibrations liable to occur under normal conditions of carriage shall be used. 7. Intermediate packagings shall be secured in outer packagings with suitable cushioning and/or absorbent material.		

P650	PACKING INSTRUCTION	P650
This instruction applies to UN No. 3373.		
(1) The packaging shall be of good quality, strong enough to withstand the shocks and loadings normally encountered during carriage, including transshipment between cargo transport units and between cargo		

transport units and warehouses as well as any removal from a pallet or overpack for subsequent manual or mechanical handling. Packagings shall be constructed and closed to prevent any loss of contents that might be caused under normal conditions of carriage by vibration or by changes in temperature, humidity or pressure.

- (2) The packaging shall consist of at least three components:

- a) a primary receptacle;
- b) a secondary packaging; and
- c) an outer packaging.

of which either the secondary or the outer packaging shall be rigid.

- (3) Primary receptacles shall be packed in secondary packagings in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings shall be secured in outer packagings with suitable cushioning material. Any leakage of the contents shall not compromise the integrity of the cushioning material or of the outer packaging.

- (4) For carriage, the mark illustrated below shall be displayed on the external surface of the outer packaging on a background of a contrasting colour and shall be clearly visible and legible. The mark shall be in the form of a square set at an angle of 45° (diamond-shaped) with minimum dimensions of 50 mm by 50 mm; the width of the line shall be at least 2 mm and the letters and numbers shall be at least 6 mm high. The proper shipping name "BIOLOGICAL SUBSTANCE, CATEGORY B" in letters at least 6 mm high shall be marked on the outer packaging adjacent to the diamond-shaped mark.



- (5) At least one surface of the outer packaging shall have a minimum dimension of 100 mm x 100 mm.

- (6) The completed package shall be capable of withstanding a 1.2 m drop in any orientation without leakage from the primary receptacle(s), which shall remain protected by absorbent material, when required, in the secondary packaging.

Note: *The capability to withstand such a drop may be demonstrated by testing, assessment or experience.*

- (7) For liquid substances:

- a) The primary receptacle(s) shall be leakproof;
- b) The secondary packaging shall be leakproof;
- c) If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them;
- d) Absorbent material shall be placed between the primary receptacle(s) and the secondary packaging. The absorbent material shall be in quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging; and

- e) The primary receptacle or the secondary packaging shall be capable of withstanding, without leakage, an internal pressure of 95 kPa (0.95 bar).

Note: The capability to withstand such a drop may be demonstrated by testing, assessment or experience.

- (8) For solid substances:
 - a) The primary receptacle(s) shall be siftproof;
 - b) The secondary packaging shall be siftproof;
 - c) If multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated to prevent contact between them; and
 - d) If there is any doubt as to whether or not residual liquid may be present in the primary receptacle during carriage then a packaging suitable for liquids, including absorbent materials, shall be used.
- (9) Refrigerated or frozen specimens: ice, dry ice and liquid nitrogen:
 - a) When dry ice or liquid nitrogen is used as a coolant, the requirements of 5.5.3 shall apply. When used, ice shall be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports shall be provided to secure the secondary packagings in the original position. If ice is used, the outside packaging or overpack shall be leakproof; and
 - b) The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.
- (10) When packages are placed in an overpack, the package marks required by this packing instruction shall either be clearly visible or be reproduced on the outside of the overpack.
- (11) Infectious substances assigned to UN No. 3373 which are packed, and packages which are marked in accordance with this packing instruction are not subject to any other requirement in Annex 2 to SMGS.
- (12) Clear instructions on filling and closing such packages shall be provided by packaging manufacturers and subsequent distributors to the consignor or to the person who prepares the package (e.g. patient) to enable the package to be correctly prepared for carriage.
- (13) Other dangerous goods shall not be packed in the same packaging as Class 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Classes 3, 8 or 9 may be packed in each primary receptacle containing infectious substances. When these small quantities of dangerous goods are packed with infectious substances in accordance with this packing instruction no other requirements of Annex 2 to SMGS need be met.
- (14) If any substance has leaked and has been spilled in a cargo transport unit, it may not be reused until after it has been thoroughly cleaned and, if necessary, disinfected or decontaminated. Any other goods and articles carried in the same cargo transport unit shall be examined for possible contamination.

Additional requirement:

Alternative packagings for the carriage of animal material may be authorized by the competent authority of the country of origin³ in accordance with the provisions of 4.1.8.7.

³ If the country of origin is not an SMGS Contracting State, the competent authority of the first SMGS Contracting State reached by the consignment.

P800	PACKING INSTRUCTION	P800
This instruction applies to UN Nos. 2803 и 2809.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: (1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met; or; (2) Steel flasks or bottles with threaded closures with a capacity not exceeding 3 litres, or; (3) Combination packagings which conform to the following requirements: a) Inner packagings shall comprise glass, metal or rigid plastics intended to contain liquids with a maximum net mass of 15 kg each; b) The inner packagings shall be packed with sufficient cushioning material to prevent breakage; c) Either the inner packagings or the outer packagings shall have inner liners or bags of strong leakproof and puncture-resistant material impervious to the contents and completely surrounding the contents to prevent it from escaping from the package irrespective of its position or orientation; d) The following outer packagings and maximum net masses are authorized:		
Outer packagings:		Maximum net mass
Drums		
steel (1A1, 1A2)		400 kg
other metal (1N1, 1N2)		400 kg
plastics (1H1, 1H2)		400 kg
plywood (1D)		400 kg
fibre (1G)		400 kg
Boxes		
steel (4A)		400 kg
other metal (4N)		400 kg
natural wood (4C1)		250 kg
natural wood with sift-proof walls (4C2)		250 kg
plywood (4D)		250 kg
reconstituted wood (4F)		125 kg
fibreboard (4G)		125 kg
expanded plastics (4H1)		60 kg
solid plastics (4H2)		125 kg
Special packing provision: PP41 For UN No. 2803, when it is necessary to carry gallium at low temperatures in order to maintain it in a completely solid state, the above packagings may be overpacked in a strong, water-resistant outer packaging which contains dry ice or other means of refrigeration. When dry ice or other means of refrigeration presenting a risk of asphyxiation are used as a coolant, the requirements of 5.5.3 shall apply. If a refrigerant is used, all of the above materials used in the packaging of gallium shall be chemically and physically resistant to the refrigerant and shall have impact resistance at the low temperatures of the refrigerant employed. If dry ice is used, the outer packaging shall permit the release of carbon dioxide gas. Interior supports shall be provided to prevent movement after the dissipation of the refrigerant.		

P801	PACKING INSTRUCTION	P801
This instruction applies to UN Nos. 2794, 2795 and 3028 and used batteries of UN No. 2800.		
The following packagings are authorized, provided that the provisions of 4.1.1.1, 4.1.1.2, 4.1.1.6 and 4.1.3 are met: (1) Rigid outer packagings, wooden slatted crates or pallets. Additionally, the following conditions shall be met: a) Battery stacks shall be in tiers separated by a layer of electrically non-conductive material; b) Battery terminals shall not support the weight of other superimposed elements; c) Batteries shall be packaged or secured to prevent inadvertent movement; d) Batteries shall not leak under normal conditions of carriage or appropriate measures shall be taken to prevent the release of electrolyte from the package (e.g. individually packaging batteries or other equally effective methods); and e) Batteries shall be protected against short circuits. (2) Stainless steel or plastics bins may also be used to carry used batteries. Additionally, the following conditions shall be met: a) The bins shall be resistant to the electrolyte that was contained in the batteries; b) The bins shall not be filled to a height greater than the height of their sides; c) The outside of the bins shall be free of residues of electrolyte contained in the batteries; d) Under normal conditions of carriage, no electrolyte shall leak from the bins; e) Measures shall be taken to ensure that filled bins cannot lose their content; f) Measures shall be taken to prevent short circuits (e.g. batteries are discharged, individual protection of the battery terminals, etc.); and (g) The bins shall be either: 1) covered; or 2) carried in closed or sheeted wagons or containers. Note: The packagings authorized in (1) and (2) may exceed a net mass of 400 kg (see 4.1.3.3).		

P802	PACKING INSTRUCTION	P802
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: (1) Combination packagings: Outer packagings: 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2. Maximum net mass: 75 kg. Inner packagings: glass or plastics; maximum capacity: 10 litres. (2) Combination packagings: Outer packagings: 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2. Maximum net mass 125 kg. Inner packagings: metal; maximum capacity: 40 litres. (3) Composite packagings: Glass receptacle with outer steel, aluminium or plywood drum (6PA1, 6PB1 or 6PD1) or with outer steel, aluminium or wooden box or with outer wickerwork hamper (6PA2, 6PB2, 6PC or 6PD2) or with outer solid plastics packaging (6PH2); maximum capacity: 60 litres (4) Steel drums (1A1) with a maximum capacity of 250 litres. (5) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.		

P803	PACKING INSTRUCTION	P803
This instruction applies to UN No. 2028.		
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2). Packagings shall conform to the packing group II performance level. Articles shall be individually packaged and separated from each other using partitions, dividers, inner packagings or cushioning material to prevent inadvertent discharge during normal conditions of carriage. Maximum net mass: 75 kg.		

P804	PACKING INSTRUCTION	P804
This instruction applies to UN No. 1744.		
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met and the packagings are hermetically sealed: (1) Combination packagings with a maximum gross mass of 25 kg, consisting of: a) one or more glass inner packaging(s) with a maximum capacity of 1.3 litres each and filled to not more than 90% of their capacity; the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during carriage, individually placed in b) metal or rigid plastics receptacles together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in c) 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings; (2) Combination packagings consisting of metal or polyvinylidene fluoride (PVDF) inner packagings, not exceeding 5 litres in capacity individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G, 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 75 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage. 3) Packagings consisting of: Outer packagings: Steel or plastics drums (1A1, 1A2, 1H1 or 1H2) tested in accordance with the test requirements in 6.1.5 at a mass corresponding to the mass of the assembled package either as a packaging intended to contain inner packagings, or as a single packaging intended to contain solids or liquids, and marked accordingly; Inner packagings: Drums and composite packagings (1A1, 1B1, 1N1, 1H1 or 6HA1) meeting the requirements of Chapter 6.1 for single packagings, subject to the following conditions: a) The hydraulic pressure test shall be conducted at a pressure of at least 300 kPa (3 bar) (gauge pressure); b) The design and production leakproofness tests shall be conducted at a test pressure of 30 kPa (0.3 bar); c) They shall be isolated from the outer drum by the use of inert shock-mitigating cushioning material which surrounds the inner packaging on all sides; d) Their capacity shall not exceed 125 litres; e) Closures shall be of a screw type that are: - Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage; - Provided with a cap seal;		

P804	PACKING INSTRUCTION	P804
f) The outer and inner packagings shall be subjected periodically to an internal inspection and leakproofness test according to (b) at intervals of not more than two and a half years; and g) The outer and inner packagings shall bear in clearly legible and durable characters: - the date (month, year) of the initial test and the latest periodic test and inspection of the inner packaging; and - the name or authorized symbol of the expert who carried out the tests and inspections. 4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. a) Receptacles shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar) (gauge pressure). b) Receptacles shall be subjected periodically to an internal inspection and leakproofness test at intervals of not more than two and a half years; c) Receptacles may not be equipped with any pressure relief device; d) Each pressure receptacle shall be closed with a plug or valve(s) fitted with a secondary closure device; and e) The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting and gaskets shall be compatible with each other and with the contents.		

P900	PACKING INSTRUCTION	P900
(Reserved)		

P901	PACKING INSTRUCTION	P901
This instruction applies to UN No. 3316.		
The following combination packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met: Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2). Packagings shall conform to the performance level consistent with the packing group assigned to the kit as a whole (see special provision 251 of Chapter 3.3). Where the kit contains only dangerous goods to which no packing group is assigned, packagings shall meet the packing group II performance level. Maximum quantity of dangerous goods per outer packaging: 10 kg excluding the mass of any carbon dioxide, solid (dry ice) used as a refrigerant. If dry ice is used as a coolant, the requirements of 5.5.3 shall apply. Additional requirement: Dangerous goods in kits shall be packed in inner packagings which shall be protected from other materials in the kit.		

P902	PACKING INSTRUCTION	P902
This instruction applies to UN Nos. 3268 and 3559.		

(1) Packaged articles: The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). Packagings shall conform to the packing group III performance level. The packagings shall be designed and constructed so as to prevent movement of the articles and inadvertent operation during normal conditions of carriage.
(2) Unpackaged articles: Except for UN No. 3559, the articles may also be carried unpackaged in dedicated handling devices or cargo transport units when moved to, from, or between where they are manufactured and an assembly plant including intermediate handling locations.
Additional requirement: Any pressure receptacle shall be in accordance with the requirements of the competent authority for the substance(s) contained therein.

P903	PACKING INSTRUCTION	P903
This instruction applies to UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552.		
For the purpose of this packing instruction, "equipment" means apparatus for which cells or batteries will provide electrical power for its operation. The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met:		
(1) For cells and batteries: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). Cells or batteries shall be packed in packagings so that the cells or batteries are protected against damage that may be caused by the movement or placement of the cells or batteries within the packaging. Packagings shall conform to the packing group II performance level.		
(2) In addition for a cell or a battery with a gross mass of 12 kg or more employing a strong, impact resistant outer casing: a) Strong outer packagings; b) Protective enclosures (e.g., fully enclosed or wooden slatted crates); or c) Pallets or other handling devices. Cells or batteries shall be secured to prevent inadvertent movement, and the terminals shall not support the weight of other superimposed elements. Packagings need not meet the requirements of 4.1.1.3.		
(3) For cells or batteries packed with equipment: Packagings conforming to the requirements in paragraph (1) of this packing instruction, then placed with the equipment in an outer packaging; or Packagings that completely enclose the cells or batteries, then placed with equipment in a packaging conforming to the requirements in paragraph (1) of this packing instruction. The equipment shall be secured against movement within the outer packaging.		

(4)	For cells or batteries contained in equipment: Strong outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use. They shall be constructed in such a manner as to prevent accidental operation during carriage. Packagings need not meet the requirements of 4.1.1.3. Large equipment can be offered for carriage unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained. Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be carried when intentionally active in strong outer packagings. Note: For carriage in a transport chain including air carriage, these devices, when active, shall meet defined standards for electromagnetic radiation to ensure that the operation of the devices does not interfere with aircraft systems.
(5)	For packagings containing both cells or batteries packed with equipment and contained in equipment: (a) For cells and batteries, packagings that completely enclose the cells or batteries, then placed with equipment in a packaging conforming to the requirements in paragraph (1) of this packing instruction; or (b) Packagings conforming to the requirements in paragraph (1) of this packing instruction, then placed with the equipment in a strong outer packaging constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use. The outer packaging shall be constructed in such a manner as to prevent accidental operation during carriage and need not meet the requirements of 4.1.1.3. The equipment shall be secured against movement within the outer packaging. Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be carried when intentionally active in strong outer packagings. Note: For carriage in a transport chain including air carriage, these devices, when active, shall meet defined standards for electromagnetic radiation to ensure that the operation of the devices does not interfere with aircraft systems. Note: The packagings authorized in (2) and (4) and (5) may exceed a net mass of 400 kg (see 4.1.3.3). Additional requirement: Cells or batteries shall be protected against short circuit.

P903a	PACKING INSTRUCTION	P903a
	(reserved)	

P903b	PACKING INSTRUCTION	P903b
	(reserved)	

P904	PACKING INSTRUCTION	P904
	This instruction applies to UN No. 3245.	
	The following packagings are authorized:	
1)	Packagings meeting the provisions of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.8 and 4.1.3 and so designed that they meet the construction requirements of 6.1.4. Outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, shall be used. Where this packing instruction is used for the carriage of inner packagings of combination packagings the packaging shall be designed and constructed to prevent inadvertent discharge during normal conditions of carriage.	
2)	Packagings, which need not conform to the packaging test requirements of Part 6, but conforming to the following:	

- a) An inner packaging comprising:
- 1) primary receptacle(s) and a secondary packaging, the primary receptacle(s) or the secondary packaging shall be leakproof for liquids or siftproof for solids;
 - 2) for liquids, absorbent material placed between the primary receptacle(s) and the secondary packaging. The absorbent material shall be in a quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;
 - 3) if multiple fragile primary receptacles are placed in a single secondary packaging they shall be individually wrapped or separated to prevent contact between them;
- b) An outer packaging shall be strong enough for its capacity, mass and intended use, and with a smallest external dimension of at least 100 mm.

For carriage, the mark illustrated below shall be displayed on the external surface of the outer packaging on a background of a contrasting colour and shall be clearly visible and legible. The mark shall be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm; the width of the line shall be at least 2 mm and the letters and numbers shall be at least 6 mm high.



Additional requirement:

When dry ice or liquid nitrogen is used as a coolant, the requirements of 5.5.3 shall apply. When used, ice shall be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports shall be provided to secure the secondary packaging in the original position. If ice is used, the outside packaging or overpack shall be leakproof.

P905	PACKING INSTRUCTION	P905
This instruction applies to UN Nos. 2990 and 3072.		
Any suitable packaging is authorized, provided the general provisions of 4.1.1 and 4.1.3 are met, except that packagings need not conform to the requirements of Part 6. Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).		
When the life-saving appliances are constructed to incorporate or are contained in rigid outer weatherproof casings (such as for lifeboats), they may be carried unpackaged.		
Additional requirements: 1. All dangerous substances and articles contained as equipment within the appliances shall be secured to prevent inadvertent movement and in addition: a) Signal devices of Class 1 shall be packed in plastics or fibreboard inner packagings; b) Non-flammable, non-toxic gases shall be contained in cylinders as specified by the competent authority, which may be connected to the appliance; c) Electric storage batteries (Class 8) and lithium batteries and sodium ion batteries (Class 9) shall be disconnected or electrically isolated and secured to prevent any spillage of liquid; and d) Small quantities of other dangerous substances (for example in Classes 3, 4.1 and 5.2) shall be packed in strong inner packagings. 2. Preparation for transport and packaging shall include provisions to prevent any accidental inflation of the appliance.		

P906	PACKING INSTRUCTION	P906
This instruction applies to UN Nos. 2315, 3151, 3152 and 3432.		
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 are met: (1) For liquids and solids containing or contaminated with PCBs, polyhalogenated biphenyls, polyhalogenated terphenyls or halogenated monomethyldiphenylmethanes: Packagings in accordance with packing instructions P 001 or P 002, as appropriate. (2) For transformers and condensers and other articles: a) Packagings in accordance with packing instructions P 001 or P 002. The articles shall be secured with suitable cushioning material to prevent inadvertent movement during normal conditions of carriage; or b) Leakproof packagings which are capable of containing, in addition to the articles, at least 1.25 times the volume of the liquid PCBs, polyhalogenated biphenyls, polyhalogenated terphenyls or halogenated monomethyldiphenylmethanes present in them. There shall be sufficient absorbent material in the packagings to absorb at least 1.1 times the volume of liquid which is contained in the articles. In general, transformers and condensers shall be carried in leakproof metal packagings which are capable of holding, in addition to the transformers and condensers, at least 1.25 times the volume of the liquid present in them. Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3). Notwithstanding the above, liquids and solids not packaged in accordance with packing instructions P 001 and P 002 and unpackaged transformers and condensers may be carried in cargo transport units fitted with a leakproof metal tray to a height of at least 800 mm, containing sufficient inert absorbent material to absorb at least 1.1 times the volume of any free liquid. Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).		
Additional requirement: Adequate provisions shall be taken to seal the transformers and condensers to prevent leakage during normal conditions of carriage.		

P907	PACKING INSTRUCTION	P907
This instruction applies to articles, such as machinery, apparatus or devices of UN No. 3363.		
If the articles are constructed and designed so that the receptacles containing the dangerous goods are afforded adequate protection, an outer packaging is not required. Dangerous goods in articles shall otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4.1.1.1. Receptacles containing dangerous goods shall conform to the general provisions in 4.1.1, except that 4.1.1.3, 4.1.1.4, 4.1.1.12 and 4.1.1.14 do not apply. For non-flammable, non-toxic gases, the		

inner cylinder or receptacle, its contents and filling ratio shall be to the satisfaction of the competent authority of the country in which the cylinder or receptacle is filled.

In addition, the manner in which receptacles are contained within the articles, shall be such that under normal conditions of carriage, damage to receptacles containing the dangerous goods is unlikely; and in the event of damage to receptacles containing solid or liquid dangerous goods, no leakage of the dangerous goods from the machinery or apparatus is possible (a leakproof liner may be used to satisfy this requirement). Receptacles containing dangerous goods shall be so installed, secured or cushioned as to prevent their breakage or leakage and so as to control their movement within the articles during normal conditions of carriage. Cushioning material shall not react dangerously with the content of the receptacles. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material.

Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).

P908	PACKING INSTRUCTION	P908
This instruction applies to damaged or defective cells and batteries, including those contained in equipment, of UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552.		
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met: For cells and batteries and equipment containing cells and batteries: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). Packagings shall conform to the packing group II performance level. Packagings shall also meet the following requirements: a) Each damaged or defective cell or battery or equipment containing such cells or batteries shall be individually packed in inner packaging and placed inside an outer packaging. The inner packaging or outer packaging shall be leak-proof to prevent the potential release of electrolyte. b) Each inner packaging shall be surrounded by sufficient non-combustible and non-conductive thermal insulation material to protect against a dangerous evolution of heat. c) Sealed packagings shall be fitted with a venting device when appropriate. d) Appropriate measures shall be taken to minimize the effects of vibrations and shocks, prevent movement of the cells or batteries within the package that may lead to further damage and a dangerous condition during carriage. Cushioning material that is non-combustible and non-conductive may also be used to meet this requirement. e) The non-combustibility of the thermal insulation material and the cushioning material shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured. For leaking cells or batteries, sufficient inert absorbent material shall be added to the inner or outer packaging to absorb any release of electrolyte. A cell or battery with a net mass of more than 30 kg shall be limited to one cell or battery per outer packaging.		
Additional requirement: Cells or batteries shall be protected against short circuit.		

P909	PACKING INSTRUCTION	P909
This instruction applies to UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552 carried for disposal or recycling, either packed together with or packed without non-lithium batteries.		
(1) Cells and batteries shall be packed in accordance with the following: a) The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2); и Jerricans (3A2, 3B2, 3H2). b) Packagings shall conform to the packing group II performance level. c) Metal packagings shall be fitted with a non-conductive lining material (e.g. plastics) of adequate strength for the intended use. (2) However, lithium ion or sodium ion cells with a Watt-hour rating of not more than 20 Wh, lithium ion or sodium ion batteries with a Watt-hour rating of not more than 100 Wh, lithium metal cells with a lithium content of not more than 1 g and lithium metal batteries with an aggregate lithium content of not more than 2 g may be packed in accordance with the following: a) In strong outer packaging up to 30 kg gross mass meeting the general provisions of 4.1.1, except 4.1.1.3, and 4.1.3; b) Metal packagings shall be fitted with a non-conductive lining material (e.g. plastics) of adequate strength for the intended use. (3) For cells or batteries contained in equipment, strong outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, may be used. Packagings need not meet the requirements of 4.1.1.3. Equipment may also be offered for carriage unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained. (4) In addition, for cells or batteries with a gross mass of 12 kg or more employing a strong, impact resistant outer casing, strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packaging's capacity and its intended use, may be used. Packagings need not meet the requirements of 4.1.1.3.		
Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).		
Additional requirements: - Cells and batteries shall be designed or packed to prevent short circuits and the dangerous evolution of heat. - Protection against short circuits and the dangerous evolution of heat includes, but is not limited to: - individual protection of the battery terminals; - inner packaging to prevent contact between cells and batteries; - batteries with recessed terminals designed to protect against short circuits, or - the use of a non-conductive and non-combustible cushioning material to fill empty space between the cells or batteries in the packaging. - Cells and batteries shall be secured within the outer packaging to prevent excessive movement during carriage (e.g. by using a non-combustible and non-conductive cushioning material or through the use of a tightly closed plastics bag).		

P910	PACKING INSTRUCTION	P910
This instruction applies to UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552 production runs consisting of not more than 100 cells or batteries and to pre-production prototypes of cells or batteries when these prototypes are carried for testing.		
The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met:		
(1) For cells and batteries, including when packed with equipment:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2).		
Packagings shall conform to the packing group II performance level and shall meet the following requirements:		
a) Batteries and cells, including equipment, of different sizes, shapes or masses shall be packaged in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested; b) Each cell or battery shall be individually packed in an inner packaging and placed inside an outer packaging; c) Each inner packaging shall be completely surrounded by sufficient non-combustible and electrically non-conductive thermal insulation material to protect against a dangerous evolution of heat; d) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the cells or batteries within the package that may lead to damage and a dangerous condition during carriage. Cushioning material that is non-combustible and electrically non-conductive may be used to meet this requirement; e) The non-combustibility of the thermal insulation material and the cushioning material shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured; f) A cell or battery with a net mass of more than 30 kg shall be limited to one cell or battery per outer packaging.		
(2) For cells and batteries contained in equipment:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2).		
Packagings shall conform to the packing group II performance level and shall meet the following requirements:		
a) Equipment of different sizes, shapes or masses shall be packaged in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested; b) The equipment shall be constructed or packaged in such a manner as to prevent accidental operation during carriage; c) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the equipment within the package that may lead to damage and a dangerous condition during carriage. When cushioning material is used to meet this requirement it shall be non-combustible and electrically non-conductive; and d) The non-combustibility of the cushioning material shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured.		
(3) The equipment or the batteries may be carried unpackaged under conditions specified by the competent authority of any SMGS Contracting State, which may also recognize an approval granted by the competent authority of a country which is not an SMGS3333 Contracting State,		

P910	PACKING INSTRUCTION	P910
provided that this approval has been granted in accordance with the procedures applicable according to Annex 2 to SMGS, RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions. Additional conditions that may be considered in the approval process include, but are not limited to: a) The equipment or the battery shall be strong enough to withstand the shocks and loadings normally encountered during carriage, including transshipment between cargo transport units and between cargo transport units and warehouses as well as any removal from a pallet for subsequent manual or mechanical handling; and b) The equipment or the battery shall be fixed in cradles or crates or other handling devices in such a way that it will not become loose during normal conditions of carriage. Note: The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).		
Additional requirements The cells and batteries shall be protected against short circuit. Protection against short circuits includes, but is not limited to: a) individual protection of the battery terminals, b) inner packaging to prevent contact between cells and batteries, c) batteries with recessed terminals designed to protect against short circuits, or d) the use of an electrically non-conductive and non-combustible cushioning material to fill empty space between the cells or batteries in the packaging.		

P911	PACKING INSTRUCTION	P911
This instruction applies to damaged or defective cells and batteries of UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: For cells and batteries and equipment containing cells and batteries: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). The packagings shall conform to the packing group I performance level. (1) The packaging shall be capable of meeting the following additional performance requirements in case of rapid disassembly, dangerous reaction, production of a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours of the cells or batteries: a) The outside surface temperature of the completed package shall not have a temperature of more than 100 °C. A momentary spike in temperature up to 200 °C is acceptable; b) No flame shall occur outside the package; c) No projectiles shall exit the package; d) The structural integrity of the package shall be maintained; and e) The packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging etc.), as appropriate. (1) The additional packaging performance requirements shall be verified by a test as specified by the competent authority of any SMGS Contracting State who may also recognize a test specified by the competent authority of a country which is not an SMGS Contracting State provided that this test has been specified in accordance with the procedures applicable		

according to Annex 2 to SMGS, ADR, ADN, the IMDG Code or the ICAO Technical Instructions^a.

A verification report shall be available on request. As a minimum requirement, the cell or battery name, the cell or battery number, the mass, type, energy content of the cells or batteries, the packaging identification and the test data according to the verification method as specified by the competent authority shall be listed in the verification report.

- (3) When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

Additional requirement:

Cells or batteries shall be protected against short circuit.

^a The following criteria, as relevant, may be considered to assess the performance of the packaging:

- a) The assessment shall be done under a quality management system (as described e.g. in section 2.2.9.1.7.1 (e)) allowing for the traceability of tests results, reference data and characterization models used;
- b) The list of hazards expected in case of thermal runaway for the cell or battery type, in the condition it is carried (e.g. usage of an inner packaging, state of charge (SOC), use of sufficient non-combustible, electrically non-conductive and absorbent cushioning material etc.), shall be clearly identified and quantified; the reference list of possible hazards for cells or batteries (e.g. rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours) can be used for this purpose. The quantification of these hazards shall rely on available scientific literature;
- c) The mitigating effects of the packaging shall be identified and characterized, based on the nature of the protections provided and the construction material properties. A list of technical characteristics and drawings shall be used to support this assessment (Density ($\text{kg} \cdot \text{m}^{-3}$), specific heat capacity ($\text{J} \cdot \text{kg}^{-1} \cdot \text{K}^{-1}$), heating value ($\text{kJ} \cdot \text{kg}^{-1}$), thermal conductivity ($\text{W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$), melting temperature and flammability temperature (K), heat transfer coefficient of the outer packaging ($\text{W} \cdot \text{m}^{-2} \cdot \text{K}^{-1}$), ...);
- d) The test and any supporting calculations shall assess the result of a thermal runaway of the cell or battery inside the packaging in the normal conditions of carriage;
- e) In case the SOC of the cell or battery is not known, the assessment used, shall be done with the highest possible SOC corresponding to the cell or battery use conditions;
- f) The surrounding conditions in which the packaging may be used and carried shall be described (including for possible consequences of gas or smoke emissions on the environment, such as ventilation or other methods) according to the gas management system of the packaging;
- g) The tests or the model calculation shall consider the worst case scenario for the thermal runaway triggering and propagation inside the cell or battery; this scenario includes the worst possible failure in the normal carriage condition, the maximum heat and flame emissions for the possible propagation of the reaction;
- h) These scenarios shall be assessed over a period of time long enough to allow all the possible consequences to occur (e.g. 24 hours).
- (i) In the case of multiple batteries and multiple items of equipment containing batteries, additional requirements such as the maximum number of batteries and items of equipment, the total maximum energy content of the batteries, and the configuration inside the package, including separations and protections of the parts, shall be considered.

P 912

PACKING INSTRUCTION

P 912

This instruction applies to UN Nos. 3556, 3557 and 3558.

The vehicle shall be secured in a strong, rigid outer packaging constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use. It shall be constructed in such a manner as to prevent accidental operation during carriage. Packagings need not meet the requirements of 4.1.1.3. The vehicle shall be secured by means capable of restraining the vehicle in the outer packaging to prevent any movement during carriage which would change the orientation or cause the battery in the vehicle to be damaged.

Vehicles carried in a packaging may have some parts of the vehicle, other than the battery, detached from its frame to fit into the packaging.

NOTE: The packagings may exceed a net mass of 400 kg (see 4.1.3.3).

Vehicles with an individual net mass of 30 kg or more:

- (a) may be loaded into crates or secured to pallets;
- (b) may be carried unpackaged providing that the vehicle is capable of remaining upright during carriage without additional support and the vehicle provides adequate protection to the battery so that no damage to the battery can occur; or
- (c) where they have the potential to topple over during carriage (e.g. motor cycles), may be carried unpackaged in a cargo transport unit fitted out with the means to prevent toppling in carriage, such as by the use of bracing, frames or racking.

R001	PACKING INSTRUCTION		R001
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:			
Light gauge metal packagings		Maximum capacity/Maximum net mass (see 4.1.3.3)	
		Packing group I	Packing group II, III
steel, non-removable head (OA1)		Not allowed	40 l/50 kg
steel, removable head (OA2) ^{a)}		Not allowed	40 l /50 kg
^{a)} Not allowed for UN No. 1261 NITROMETHANE			
Note 1: This instruction applies to solids and liquids (provided the design type is tested and marked appropriately).			
Note 2: For Class 3, packing group II, these packagings may be used only for substances with no subsidiary risk and a vapour pressure of not more than 110 kPa at 50 °C and for slightly toxic pesticides.			

4.1.4.2 Packing instructions concerning the use of IBCs

IBC01	PACKING INSTRUCTION	IBC01
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: Metal (31A, 31B and 31N).		
Special packing provision specific to Annex 2 to SMGS, RID and ADR: BB1 For UN No. 3130, the openings of receptacles for this substance shall be tightly closed by means of two devices in series, one of which shall be screwed or secured in an equivalent manner.		

IBC02	PACKING INSTRUCTION	IBC02
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1).		
Special packing provisions: B5 For UN Nos. 1791, 2014, 2984 and 3149, IBCs shall be provided with a device to allow venting during carriage. The inlet to the venting device shall be sited in the vapour space of the IBC under maximum filling conditions during carriage. B7 For UN Nos. 1222 and 1865, IBCs with a capacity greater than 450 litres are not permitted due to the substance's potential for explosion when carried in large volumes. B8 The pure form of this substance shall not be transported in IBCs since it is known to have a vapour pressure of more than 110 kPa at 50 °C or 130 kPa at 55 °C. B15 For UN No. 2031 with more than 55% nitric acid, the permitted use of rigid plastics IBCs and of rigid plastics inner receptacles of composite IBCs with a rigid plastics inner receptacle shall be two years from their date of manufacture. B16 For UN No. 3375, IBCs of type 31A and 31N are not allowed without competent authority approval.		
Special packing provisions specific to Annex 2 to SMGS, RID and ADR: BB2 For UN No. 1203, notwithstanding special provision 534 (see 3.3.1), IBCs shall only be used when the actual vapour pressure is not more than 110 kPa at 50 °C, or 130 kPa at 55 °C. BB4 For UN Nos. 1133, 1139, 1197, 1210, 1263, 1266, 1286, 1287, 1306, 1866, 1993 and 1999, assigned to packing group III in accordance with 2.2.3.1.4, IBCs with a capacity greater than 450 litres are not permitted.		

IBC03	PACKING INSTRUCTION	IBC03
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1, 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2).		
Special packing provision: B8 The pure form of this substance shall not be carried in IBCs since it is known to have a vapour pressure of more than 110 kPa at 50 °C or 130 kPa at 55 °C. B19 For UN No. 3532, IBCs shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the IBCs in the event of loss of stabilization.		

IBC04	PACKING INSTRUCTION	IBC04
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B и 31N).		

IBC05	PACKING INSTRUCTION	IBC05
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B и 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, , 31H1 и 31H2); Composite (11HZ1, 21HZ1, и 31HZ1).		
IBC06	PACKING INSTRUCTION	IBC06
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, , 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2 and 31HZ1).		
Additional requirement: Where the solid may become liquid during carriage see 4.1.3.4.		
Special packing provision: B12 For UN No. 2907, IBCs shall meet the packing group II performance level. IBCs meeting the test criteria of packing group I shall not be used		
IBC07	PACKING INSTRUCTION	IBC07
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1 , 21H2, , 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2 and 31HZ1); Wood (11C, 11D and 11F).		
Additional requirements: 1. Where the solid may become liquid during carriage see 4.1.3.4. 2. Liners of wooden IBCs shall be siftproof.		
Special packing provision: B18 For UN No. 3531, IBCs shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the IBCs in the event of loss of stabilization.		
B20 UN No. 3550 may be carried in flexible IBCs (13H3 or 13H4) with siftproof liners to prevent any egress of dust during carriage.		
Special packing provision specific to Annex 2 to SMGS only: B100 For UN Nos. 1680 and 1689: for carriage to or through the territories of the Republic of Belarus, Republic of Kazakhstan, Russian Federation, and Ukraine, the IBCs specified in this Packing Instruction are not used.		

IBC08	PACKING INSTRUCTION	IBC08
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, , 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1 21HZ1, and 31HZ1); Fibreboard (11G); Wood (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).		
Additional requirement: Where the solid may become liquid during carriage see 4.1.3.4.		
Special packing provisions: B3 Flexible IBCs shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner. B4 Flexible, fibreboard or wooden IBCs shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner. B6 For UN Nos. 1363, 1364, 1365, 1386, 1408, 1841, 2211, 2217, 2793 and 3314, IBCs are not required to meet the IBC testing requirements of Chapter 6.5. B13 Note: For UN Nos. 1748, 2208, 2880, 3485, 3486 and 3487, carriage by sea in IBCs is prohibited according to the IMDG Code.		
Special packing provision specific to Annex 2 to SMGS, RID, and ADR		
BB3 For UN 3509, IBCs are not required to meet the requirements of 4.1.1.3. IBCs meeting the requirements of 6.5.5, made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, shall be used. When the only residues are solids which are not liable to become liquid at temperatures likely to be encountered during carriage, flexible IBCs may be used. When liquid residues are present, rigid IBCs that provide a means of retention (e.g. absorbent material) shall be used. Before being filled and handed over for carriage, every IBC shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any IBC showing signs of reduced strength shall no longer be used (minor dents and scratches are not considered as reducing the strength of the IBC). IBCs intended for the carriage of packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be so constructed or adapted that the goods cannot come into contact with wood or any other combustible material.		

IBC99	PACKING INSTRUCTION	IBC99
Only IBCs which are approved for these goods by the competent authority may be used. A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority.		

IBC100	PACKING INSTRUCTION	IBC100
This instruction applies to UN Nos. 0082, 0222, 0241, 0331 and 0332.		
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 and special provisions of 4.1.5 are met: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Flexible (13H2, 13H3, 13H4, 13L2, 13L3, 13L4 and 13M2); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2).		
Additional requirements: 1. IBCs shall only be used for free flowing substances. 2. Flexible IBCs shall only be used for solids.		
Special packing provisions: B3 For UN No. 0222, flexible IBCs shall be sift-proof and water resistant or shall be fitted with a sift-proof and water-resistant liner. B9 For UN No. 0082, this packing instruction may only be used when the substances are mixtures of ammonium nitrate or other inorganic nitrates with other combustible substances which are not explosive ingredients. Such explosives shall not contain nitroglycerin, similar liquid organic nitrates, or chlorates. Metal IBCs are not authorized. B10 For UN No. 0241, this packing instruction may only be used for substances which consist of water as an essential ingredient and high proportions of ammonium nitrate or other oxidizing substances some or all of which are in solution. The other constituents may include hydrocarbons or aluminium powder, but shall not include nitro-derivatives such as trinitrotoluene. Metal IBCs are not authorized. B17 For UN No. 0222, metal IBCs are not authorized.		

IBC520		PACKING INSTRUCTION		IBC520
This instruction applies to organic peroxides and self-reactive substances of type F.				
The IBCs listed below are authorized for the formulations listed, provided the general provisions of 4.1.1 , 4.1.2 and 4.1.3 and special provisions of 4.1.7.2 are met. The formulations not listed in 2.2.41.4 or in 2.2.52.4 but listed below may also be carried packed in accordance with packing method OP8 of packing instruction P 520 of 4.1.4.1. For formulations not listed below, only IBCs which are approved by the competent authority may be used (see 4.1.7.2.2).				
UN No.	Organic peroxide	Type of IBC	Maximum quantity (litres/kg)	
3109	ORGANIC PEROXIDE, TYPE F, LIQUID			
	tert-BUTYL CUMYL PEROXIDE	31HA1	1000	
	tert-BUTYL HYDROPEROXIDE, not more than 72% with water	31A 31HA1	1250 1000	
	tert-BUTYL PEROXYACETATE, not more than 32% in diluent type A	31A 31HA1	1250 1000	
	tert-BUTYL PEROXYBENZOATE, not more than 32% in diluent type A	31A	1250	
	tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE, not more than 37% in diluent type A	31A 31HA1	1250 1000	
	CUMYL HYDROPEROXIDE, not more than 90% in diluent type A	31HA1	1250	
	DIBENZOYL PEROXIDE, not more than 42% as a stable dispersion in water	31H1	1000	
	DI-tert-BUTYL PEROXIDE, not more than 52% in diluent type A	31A 31HA1	1250 1000	
	1,1-DI-(tert-BUTYLPEROXY)CYCLOHEXANE, not more than 37% in diluent type A	31A	1250	
	1,1-DI-(tert-BUTYLPEROXY)CYCLOHEXANE, not more than 42% in diluent type A	31H1	1000	
	2,5-DIMETHYL-2,5-DI(tert-BUTYLPEROXY)HEXANE, not more than 52% in diluent type A	31HA1	1000	
	DILAULOYL PEROXIDE, not more than 42%, stable dispersion, in water	31HA1	1000	
	ISOPROPYL CUMYL HYDROPEROXIDE, not more than 72% in diluent type A	31HA1	1250	
	p-MENTHYL HYDROPEROXIDE, not more than 72% in diluent type A	31HA1	1250	
	PEROXYACETIC ACID, STABILIZED, not more than 17%	31H1 31H2 31HA1 31A	1500 1500 1500 1500	
	3,6,9-TRIETHYL-3,6,9-TRIMETHYL-1,4,7-RIPEROXONANE, not more than 27% in diluent type A	31HA1	1000	
3110	ORGANIC PEROXIDE, TYPE F, SOLID			
	DICUMYL PEROXIDE	31A 31H1 31HA1	2000 2000 2000	
Additional requirements:				
1. IBCs shall be provided with a device to allow venting during carriage. The inlet to the pressure-relief device shall be sited in the vapour space of the IBC.				
2. To prevent explosive rupture of metal IBCs or composite IBCs with complete metal casing, the emergency-relief devices shall be designed to vent all the decomposition products and vapours evolved during self-accelerating decomposition or during a period of not less than one hour of fire-engulfment as calculated by the formula in 4.2.1.13.8 or in special provision TE 12 of 6.8.4.				

IBC620	PACKING INSTRUCTION	IBC620
This instruction applies to UN No. 3291. The following IBCs are authorized, provided the general provisions of 4.1.1, except 4.1.1.15, 4.1.2 and 4.1.3 are met: Rigid, leakproof IBCs conforming to the packing group II performance level.		
Additional requirements: 1. There shall be sufficient absorbent material to absorb the entire amount of liquid present in the IBC. 2. IBCs shall be capable of retaining liquids. 3. IBCs intended to contain sharp objects such as broken glass and needles shall be resistant to puncture.		

4.1.4.3 Packing instructions concerning the use of large packagings

LP01	PACKING INSTRUCTION (LIQUIDS)				LP01	
The following large packagings are authorized provided the general provision of 4.1.1 and 4.1.3 are met:						
Inner packagings		Large outer packagings		Packing group I	Packing group II	Packing group III
Glass 10 I Plastics 30 I Metal 40 I		Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Solid plastics (50H) Natural wood (50C) Fibreboard (50D) Reconstituted wood (50F) Rigid fibreboard (50G)		Not allowed	Not allowed	Maximum capacity: 3 m ³

LP02	PACKING INSTRUCTION ТВЕРДЫХ ВЕЩЕСТВ				LP02
The following large packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:					
Inner packagings	Large outer packagings	Packing group I	Packing group II	Packing group III	
Glass 10 kg Plastics ^{b)} 50 kg Metal 50 kg Paper ^{a), b)} 50 kg Fibre ^{a), b)} 50 kg	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Solid plastics (50H) Natural wood (50C) Fibreboard (50D) Reconstituted wood (50F) Rigid fibreboard (50G) Flexible plastics (51H) ^{c)}	Not allowed	Not allowed	Maximum capacity: 3 m ³	

LP03	PACKING INSTRUCTION	LP03
This instruction applies to UN Nos. 3537 to 3548.		
(1) The following large packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: Rigid large packagings conforming to the packing group II performance level made of: steel (50A); aluminium (50B); metal other than steel or aluminium (50N); rigid plastics (50H); natural wood (50C); plywood (50D); reconstituted wood (50F);		

rigid fibreboard (50G).

(2) Additionally, the following conditions shall be met:

- a) Receptacles within articles containing liquids or solids shall be constructed of suitable materials and secured in the article in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the article itself or the outer packaging;
- b) Receptacles containing liquids with closures shall be packed with their closures correctly oriented. The receptacles shall in addition conform to the internal pressure test provisions of 6.1.5.5;
- c) Receptacles that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials shall be properly secured. Any leakage of the contents shall not substantially impair the protective properties of the article or of the outer packaging;
- d) Receptacles within articles containing gases shall meet the requirements of Section 4.1.6 and Chapter 6.2 as appropriate or be capable of providing an equivalent level of protection as packing instructions P 200 or P 208; and
- e) Where there is no receptacle within the article, the article shall fully enclose the dangerous substances and prevent their release under normal conditions of carriage.

(3) Articles shall be packed to prevent movement and inadvertent operation during normal conditions of carriage.

(4) Articles containing pre-production prototype lithium cells or batteries or sodium ion cells or batteries when these prototypes are carried for testing or production runs of not more than 100 lithium cells or batteries or sodium ion cells or batteries that are of a type that has not met the testing requirements of the Manual of Tests and Criteria, Part III, sub-section 38.3 shall in addition meet the following:

- a) Packagings shall conform to the requirements in paragraph (1) of this packing instruction;
- b) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the article within the package that may lead to damage and a dangerous condition during carriage. When cushioning material is used to meet this requirement it shall be non-combustible and electrically non-conductive;
- c) Non-combustibility of the cushioning material shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured.

LP99	PACKING INSTRUCTION	LP99
Only large packagings which are approved for these goods by the competent authority may be used. A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority.		

LP101	PACKING INSTRUCTION	LP101
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 and special provisions of 4.1.5 are met:		
Inner packagings	Intermediate packagings	Large outer packagings
Not necessary	Not necessary	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Solid plastics (50H) Natural wood (50C)

		Fibreboard (50D) Reconstituted wood (50F) Rigid fibreboard (50G)
Special packing provision: L1 For UN Nos. 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0488, 0502 and 0510: Large and robust explosives articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged if they are capable of withstanding the shocks and loadings normally encountered during carriage. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for carriage unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling devices.		

LP102	PACKING INSTRUCTION		LP102
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 and special provisions of 4.1.5 are met:			
Inner packagings		Intermediate packagings	Large outer packagings
Bags: water resistant Receptacles: fibreboard metal plastics wood Sheets: fibreboard, corrugated Tubes: fibreboard		Not necessary	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Solid plastics (50H) Natural wood (50C) Fibreboard (50D) Reconstituted wood (50F) Rigid fibreboard (50G)

LP200	PACKING INSTRUCTION	LP200
This instruction applies to UN Nos.1950 and 2037.		
The following large packagings are authorized for aerosols and gas cartridges, provided that the general provisions of 4.1.1 and 4.1.3 are met: Rigid large packagings conforming to the packing group II performance level, made of: steel (50A); aluminium (50B); metal other than steel or aluminium (50N); rigid plastics (50H); natural wood (50C); plywood (50D); reconstituted wood (50F); rigid fibreboard (50G).		

LP200	PACKING INSTRUCTION	LP200
Special packing provision: L2 The large packagings shall be designed and constructed to prevent dangerous movement and inadvertent discharge during normal conditions of carriage. For waste aerosols carried in accordance with special provision 327, the large packagings shall have a means of retaining any free liquid that might escape during carriage, e.g. absorbent material. For waste aerosols and waste gas cartridges carried in accordance with special provision 327, the large packagings shall be adequately ventilated to prevent the creation of dangerous atmospheres and the build-up of pressure.		

LP621	PACKING INSTRUCTION	LP621
This instruction applies to UN No. 3291.		
The following large packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 are met: (1) For clinical waste placed in inner packagings: Rigid, leakproof large packagings conforming to the requirements of Chapter 6.6 for solids, at the packing group II performance level, provided there is sufficient absorbent material to absorb the entire amount of liquid present and the large packaging is capable of retaining liquids. (2) For packages containing larger quantities of liquid: Large rigid packagings conforming to the requirements of Chapter 6.6, at the packing group II performance level, for liquids.		
Additional requirement: Large packagings intended to contain sharp objects such as broken glass and needles shall be resistant to puncture and retain liquids under the performance test conditions in Chapter 6.6.		

LP622 PAXKING INSTRUCTION LP622		
This instruction applies to waste of UN No. 3549 carried for disposal.		
The following large packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:		
Inner packagings	Intermediate packagings	Outer packagings
metal plastics	metal plastics	steel (50A) aluminium (50B) metal other than steel or aluminium (50N) plywood (50D) rigid fibreboard (50G) rigid plastics (50H);
The outer packaging shall conform to the packing group I performance level for solids.		
Additional requirements: 1. Fragile articles shall be contained in either a rigid inner packaging or a rigid intermediate packaging. 2. Inner packagings containing sharp objects such as broken glass and needles shall be rigid and resistant to puncture. 3. The inner packaging, the intermediate packaging and the outer packaging shall be capable of retaining liquids. Outer packagings that are not capable of retaining liquids by design shall be fitted with a liner or suitable measure of retaining liquids. 4. The inner packaging and/or the intermediate packaging may be flexible. When flexible packagings are used, they shall be capable of passing the impact resistance test of at least 165 g according to ISO 7765-1:1988 "Plastics film and sheeting – Determination of impact resistance by the free-falling dart method – Part 1: Staircase methods" and the tear resistance test of at least 480 g in both parallel and perpendicular planes with respect to the length of the bag in accordance with ISO 6383-2:1983 "Plastics – Film and sheeting – Determination of tear resistance – Part 2: Elmendorf method". The maximum net mass of each flexible inner packaging shall be 30 kg. 5. Each flexible intermediate packaging shall contain only one inner packaging. 6. Inner packagings containing a small amount of free liquid may be included in intermediate packaging provided that there is sufficient absorbent or solidifying material in the inner or intermediate packaging to absorb or solidify all the liquid content present. Suitable absorbent material which withstands the temperatures and vibrations liable to occur under normal conditions of carriage shall be used. 7. Intermediate packagings shall be secured in outer packagings with suitable cushioning and/or absorbent material		

LP902 PACKING INSTRUCTION LP902		
This instruction applies to UN No. 3268.		
(1) Packaged articles: The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 are met: Rigid large packagings conforming to the packing group III performance level, made of: - steel (50A); - aluminium (50B); - metal other than steel or aluminium (50N); - rigid plastics (50H); - natural wood (50C); - plywood (50D); - reconstituted wood (50F); - rigid fibreboard (50G). The packagings shall be designed and constructed to prevent movement of the articles and inadvertent operation during normal conditions of carriage. (2) Unpackaged articles: The articles may also be carried unpackaged in dedicated handling devices or cargo transport units when moved to, from, or between where they are manufactured and an assembly plant including intermediate handling locations.		

Additional requirement: Any pressure receptacle shall be in accordance with the requirements of the competent authority for the substance(s) contained in the pressure receptacle(s).

LP903	PACKING INSTRUCTION	LP903
This instruction applies to large cells with a gross mass of more than 500 g, large batteries with a gross mass of more than 12 kg, and equipment containing large cells or large batteries of UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552.		
The following large packagings are authorized for cells, batteries and equipment containing cells or batteries, provided that the general provisions of 4.1.1 and 4.1.3 are met: Rigid large packagings conforming to the packing group II performance level, made of: - steel (50A); - aluminium (50B); - metal other than steel or aluminium (50N); - rigid plastics (50H); - natural wood (50C); - plywood (50D); - reconstituted wood (50F); - rigid fibreboard (50G). Cells, batteries or equipment shall be placed in inner packagings or separated by other suitable means, such as placement in trays or by dividers, to ensure protection against damage that may be caused under normal conditions of carriage by: a) its movement or placement within the large packaging; b) contact with other cells, batteries or equipment within the large packaging; and c) any loads arising from the superimposed weight of cells, batteries, equipment and packaging components above the cell, battery or equipment within the large packaging. When multiple cells, batteries or items of equipment are packed in the large packaging, bags (e.g. plastics) alone shall not be used to satisfy these requirements.		
Additional requirement:		
Batteries shall be protected against short circuit.		

LP904	PACKING INSTRUCTION	LP904
This instruction applies to single damaged or defective batteries and to single items of equipment containing damaged or defective cells and batteries of UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552.		
The following large packagings are authorized for a single damaged or defective battery and for a single item of equipment containing damaged or defective cells and batteries, provided the general provisions of 4.1.1 and 4.1.3 are met: For batteries and equipment containing cells and batteries: Rigid large packagings conforming to the packing group II performance level, made of: - steel (50A); - aluminium (50B); - metal other than steel or aluminium (50N); - rigid plastics (50H); - plywood (50D). Large packagings shall also meet the following requirements: a) The damaged or defective battery or equipment containing such cells or batteries shall be individually packed in an inner packaging and placed inside an outer packaging. The inner packaging or outer packaging shall be leak-proof to prevent the potential release of electrolyte. b) The inner packaging shall be surrounded by sufficient non-combustible and electrically non-conductive thermal insulation material to protect against a dangerous evolution of heat. c) Sealed packagings shall be fitted with a venting device when appropriate. d) Appropriate measures shall be taken to minimize the effects of vibrations and shocks, prevent movement of the battery or the equipment within the package that may lead to further damage and a dangerous condition during carriage. Cushioning material that is non-combustible and electrically non-conductive may also be used to meet this requirement. e) The non-combustibility of the thermal insulation material and the cushioning material shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured. For leaking cells and batteries, sufficient inert absorbent material shall be added to the inner or outer packaging to absorb any release of electrolyte.		
Additional requirement: Cells and batteries shall be protected against short circuit.		

LP905	PACKING INSTRUCTION	LP905
This instruction applies to UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552 production runs consisting of not more than 100 cells or batteries and to pre-production prototypes of cells or batteries when these prototypes are carried for testing.		
The following large packagings are authorized for a single battery and for a single item of equipment containing cells or batteries, provided that the general provisions of 4.1.1 and 4.1.3 are met: (1) For a single battery: Rigid large packagings conforming to the packing group II performance level, made of: - steel (50A); - aluminium (50B); - metal other than steel or aluminium (50N); - rigid plastics (50H);		

natural wood (50C);
plywood (50D);
reconstituted wood (50F);
rigid fibreboard (50G).

Large packagings shall also meet the following requirements:

- a) A battery of different size, shape or mass may be packed in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;
- b) The battery shall be packed in an inner packaging and placed inside the outer packaging;
- c) The inner packaging shall be completely surrounded by sufficient non-combustible and electrically non-conductive thermal insulation material to protect against a dangerous evolution of heat;
- d) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the battery within the package that may lead to damage and a dangerous condition during carriage. When cushioning material is used to meet this requirement it shall be non-combustible and electrically non-conductive; and
- e) The non-combustibility of the thermal insulation material and the cushioning material shall be assessed according to a standard recognized in the country where the large packaging is designed or manufactured.

- (2) For a single item of equipment containing cells or batteries:

Rigid large packagings conforming to the packing group II performance level, made of:

steel (50A);
aluminium (50B);
metal other than steel or aluminium (50N);
rigid plastics (50H);
natural wood (50C);
plywood (50D);
reconstituted wood (50F);
rigid fibreboard (50G).

Large packagings shall also meet the following requirements:

- a) A single item of equipment of different size, shape or mass may be packed in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;
- b) The equipment shall be constructed or packed in such a manner as to prevent accidental operation during carriage;
- c) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the equipment within the package that may lead to damage and a dangerous condition during carriage. When cushioning material is used to meet this requirement, it shall be non-combustible and electrically non-conductive; and
- d) The non-combustibility of the cushioning material shall be assessed according to a standard recognized in the country where the large packaging is designed or manufactured.

Additional requirement:

Cells and batteries shall be protected against short circuit.

This instruction applies to damaged or defective batteries of UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage.

The following large packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

For batteries and items of equipment containing batteries:

Rigid large packagings conforming to the packing group I performance level, made of:

- steel (50A);
- aluminium (50B);
- metal other than steel or aluminium (50N);
- rigid plastics (50H);
- plywood (50D);
- rigid fibreboard (50G).

(1) The large packaging shall be capable of meeting the following additional performance requirements in case of rapid disassembly, dangerous reaction, production of a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours of the battery:

- a) The outside surface temperature of the completed package shall not have a temperature of more than 100 °C. A momentary spike in temperature up to 200 °C is acceptable;
- b) No flame shall occur outside the package;
- c) No projectiles shall exit the package;
- d) The structural integrity of the package shall be maintained; and
- e) The large packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging etc.), as appropriate.

(2) The additional large packaging performance requirements shall be verified by a test as specified by the competent authority of any SMGS Contracting State who may also recognize a test specified by the competent authority of a country which is not an SMGS Contracting State provided that this test has been specified in accordance with the procedures applicable according to Annex 2 to SMGS, RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions^a.

A verification report shall be made available on request. As a minimum requirement, the name of the batteries, their type as defined in Section 38.3.2.3 of the Manual of Tests and Criteria, the maximum number of batteries, the total mass of batteries, the total energy content of the batteries, the large packaging identification and the test data according to the verification method as specified by the competent authority shall be listed in the verification report. A set of specific instructions describing the way to use the package shall also be part of the verification report.

(3) When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

(4) The specific instructions for use of the package shall be made available by the packaging manufacturers and subsequent distributors to the consignor. They shall include at least the identification of the batteries and items of equipment that may be contained inside the packaging, the maximum number of batteries contained in the package and the maximum total of the batteries' energy content, as well as the configuration inside the package, including the separations and protections used during the performance verification test

Additional requirement:

Batteries shall be protected against short circuit.

^a The following criteria, as relevant, may be considered to assess the performance of the large packaging:

- a) The assessment shall be done under a quality management system (as described e.g. in section 2.2.9.1.7.1 e)) allowing for the traceability of tests results, reference data and characterization models used;
- b) The list of hazards expected in case of thermal runaway for the battery type, in the condition it is carried (e.g. usage of an inner packaging, state of charge (SOC), use of sufficient non-combustible, electrically non-conductive and absorbent cushioning material etc.), shall be clearly identified and quantified; the reference list of possible hazards for cells or batteries (e.g. rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours) can be used for this purpose. The quantification of these hazards shall rely on available scientific literature;
- c) The mitigating effects of the large packaging shall be identified and characterized, based on the nature of the protections provided and the construction material properties. A list of technical characteristics and drawings shall be used to support this assessment (Density ($\text{kg}\cdot\text{m}^{-3}$), specific heat capacity ($\text{J}\cdot\text{kg}^{-1}\cdot\text{K}^{-1}$), heating value ($\text{kJ}\cdot\text{kg}^{-1}$), thermal conductivity ($\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), melting temperature and flammability temperature (K), heat transfer coefficient of the outer packaging ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$), ...);
- d) The test and any supporting calculations shall assess the result of a thermal runaway of the battery inside the large packaging in the normal conditions of carriage;
- e) In case the SOC of the battery is not known, the assessment used, shall be done with the highest possible SOC corresponding to the battery use conditions;
- f) The surrounding conditions in which the large packaging may be used and carried shall be described (including for possible consequences of gas or smoke emissions on the environment, such as ventilation or other methods) according to the gas management system of the large packaging;
- g) The tests or the model calculation shall consider the worst case scenario for the thermal runaway triggering and propagation inside the battery; this scenario includes the worst possible failure in the normal carriage condition, the maximum heat and flame emissions for the possible propagation of the reaction;
- h) These scenarios shall be assessed over a period of time long enough to allow all the possible consequences to occur (e.g. 24 hours).
- (i) In the case of multiple batteries and multiple items of equipment containing batteries, additional requirements such as the maximum number of batteries and items of equipment, the total maximum energy content of the batteries, and the configuration inside the package, including separations and protections of the parts, shall be considered.

4.1.4.4 (reserved)

4.1.5 SPECIAL PACKING PROVISIONS FOR GOODS OF CLASS A

4.1.5.1 The general provisions of Section 4.1.1 shall be met.

4.1.5.2 All packagings for Class 1 goods shall be so designed and constructed that:

- a) They will protect the explosives, prevent them escaping and cause no increase in the risk of unintended ignition or initiation when subjected to normal conditions of carriage including foreseeable changes in temperature, humidity and pressure;
- b) The complete package can be handled safely in normal conditions of carriage; and
- c) The packages will withstand any loading imposed on them by foreseeable stacking to which they will be subject during carriage so that they do not add to the risk presented by the explosives, the containment function of the packagings is not harmed, and they are not distorted in a way or to an extent which will reduce their strength or cause instability of a stack.

4.1.5.3 All explosive substances and articles, as prepared for carriage, shall have been classified in accordance with the procedures detailed in 2.2.1.

4.1.5.4 Class 1 goods shall be packed in accordance with the appropriate packing instruction shown in Column (8) of Table A of Chapter 3.2, as detailed in 4.1.4.

4.1.5.5 Unless otherwise specified in Annex 2 to SMGS, packagings, including IBCs and large packagings, shall conform to the requirements of chapters 6.1, 6.5 or 6.6, as appropriate, and shall meet their test requirements for packing group II.

4.1.5.6 The closure device of packagings containing liquid explosives shall ensure a double protection against leakage.

4.1.5.7 The closure device of metal drums shall include a suitable gasket; if a closure device includes a screw-thread, the ingress of explosive substances into the screw-thread shall be prevented.

4.1.5.8 Packagings for water soluble substances shall be water resistant. Packagings for desensitized or phlegmatized substances shall be closed to prevent changes in concentration during carriage.

4.1.5.9 (reserved).

4.1.5.10 Nails, staples and other closure devices made of metal without protective covering shall not penetrate to the inside of the outer packaging unless the inner packaging adequately protects the explosives against contact with the metal.

4.1.5.11 Inner packagings, fittings and cushioning materials and the placing of explosive substances or articles in packages shall be accomplished in a manner which prevents the explosive substances or articles from becoming loose in the outer packaging under normal conditions of carriage. Metallic components of articles shall be prevented from making contact with metal packagings. Articles containing explosive substances not enclosed in an outer casing shall be separated from each other in order to prevent friction and impact. Padding, trays, partitioning in the inner or outer packaging, mouldings or receptacles may be used for this purpose.

4.1.5.12 Packagings shall be made of materials compatible with, and impermeable to, the explosives contained in the package, so that neither interaction between the explosives and the packaging materials, nor leakage, causes the explosive to become unsafe to carriage, or the hazard division or compatibility group to change.

4.1.5.13 The ingress of explosive substances into the recesses of seamed metal packagings shall be prevented.

4.1.5.14 Plastics packagings shall not be liable to generate or accumulate sufficient static electricity so that a discharge could cause the packaged explosive substances or articles to initiate, ignite or function.

4.1.5.15 Large and robust explosives articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged, if they are capable of withstanding the shocks and loadings normally encountered during carriage. When such articles have propelling charges or are self-propelled, their ignition systems shall be protected against stimuli encountered during normal conditions of carriage. A negative result in Test Series 4 on an unpackaged article indicates that

the article can be considered for carriage unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling, storage or launching devices in such a way that they will not become loose during normal conditions of carriage. Where such large explosive articles are as part of their operational safety and suitability tests subjected to test regimes that meet the intentions of Annex 2 to SMGS and such tests have been successfully undertaken, the competent authority may approve such articles to be carried in accordance with Annex 2 to SMGS.

- 4.1.5.16** Explosive substances shall not be packed in inner or outer packagings where the differences in internal and external pressures, due to thermal or other effects, could cause an explosion or rupture of the package.
- 4.1.5.17** Whenever loose explosive substances or the explosive substance of an uncased or partly cased article may come into contact with the inner surface of metal packagings (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 4A, 4B, 4N and metal receptacles), the metal packaging shall be provided with an inner liner or coating (see 4.1.1.2).
- 4.1.5.18** Packing instruction P101 may be used for any explosive provided the packaging has been approved by a competent authority regardless of whether the packaging complies with the packing instruction assignment in Column (8) of Table A of Chapter 3.2.

4.1.6 SPECIAL PACKING PROVISIONS FOR GOODS OF CLASS 2 AND GOODS OF OTHER CLASSES ASSIGNED TO PACKING INSTRUCTION P200

4.1.6.1 This section provides general requirements applicable to the use of pressure receptacles and open cryo-genic receptacles for the carriage of Class 2 substances and goods of other classes assigned to packing instruction P200 (e.g. UN 1051 hydrogen cyanide, stabilized). Pressure receptacles shall be constructed and closed so as to prevent any loss of contents which might be caused under normal conditions of carriage, including by vibration, or by changes in temperature, humidity or pressure (resulting from change in altitude, for example).

4.1.6.2 Parts of pressure receptacles and open cryogenic receptacles which are in direct contact with dangerous goods shall not be affected or weakened by those dangerous goods and shall not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods).

4.1.6.3 Pressure receptacles, including their closures and open cryogenic receptacles, shall be selected to contain a gas or a mixture of gases according to the requirements of 6.2.1.2 and the requirements of the relevant packing instructions of 4.1.4.1. This sub-section also applies to pressure receptacles which are elements of MEGCs and battery-wagons.

4.1.6.4 A change of use of a refillable pressure receptacle shall include emptying, purging and evacuation operations to the extent necessary for safe operation (see also table of standards at the end of this section). In addition, a pressure receptacle that previously contained a Class 8 corrosive substance or a substance of another class with a corrosive subsidiary risk shall not be authorized for the carriage of a Class 2 substance unless the necessary inspection and testing as specified in 6.2.1.6 and 6.2.3.5 respectively have been performed.

4.1.6.5 Prior to filling, the packer shall perform an inspection of the pressure receptacle or open cryogenic receptacle and ensure that the pressure receptacle or open cryogenic receptacle is authorized for the substance and, in case of a chemical under pressure, for the propellant to be carried and that the requirements have been met. Shut-off valves shall be closed after filling and remain closed during carriage. The consignor shall verify that the closures and equipment are not leaking.

Note: *Shut-off valves fitted to individual cylinders in bundles may be open during carriage, unless the substance carried is subject to special packing provision "k" or "q" in packing instruction P200.*

4.1.6.6 Pressure receptacles and open cryogenic receptacles shall be filled according to the working pressures, filling ratios and provisions specified in the appropriate packing instruction for the specific substance being filled and taking into account the lowest pressure rating of any component. Service equipment having a pressure rating lower than other components shall nevertheless comply with 6.2.1.3.1. Reactive gases and gas mixtures shall be filled to a pressure such that if complete decomposition of the gas occurs, the working pressure of the pressure receptacle shall not be exceeded.

4.1.6.7 Pressure receptacles, including their closures, shall conform to the design, construction, inspection and testing requirements detailed in Chapter 6.2. When outer packagings are prescribed, the pressure receptacles and open cryogenic receptacles shall be firmly secured therein. Unless otherwise specified in the detailed packing instructions, one or more inner packagings may be enclosed in one outer packaging.

4.1.6.8 Valves and other components which are to remain connected to the valve during carriage (e.g. handling devices or adaptors) shall be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or shall be protected from damage which could cause inadvertent release of the contents of the pressure receptacle, by one of the following methods (see also table of standards in 4.1.6.15):

- a) Valves are placed inside the neck of the pressure receptacle and protected by a threaded plug or cap;
- b) Valves are protected by caps or guards. Caps shall possess vent-holes of sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;
- c) Valves are protected by shrouds or permanent protective attachments;
- d) Pressure receptacles are carried in protective frames, (e.g. cylinders in bundles); or
- e) Pressure receptacles are carried in protective boxes. For UN pressure receptacles the packaging as prepared for carriage shall be capable of meeting the drop test specified in 6.1.5.3 at the packing group I performance level.

4.1.6.9 Non-refillable pressure receptacles shall:

- a) be carried in an outer packaging, such as a box or crate, or in shrink-wrapped or stretch-wrapped trays;
- b) be of a water capacity less than or equal to 1.25 litres when filled with flammable or toxic gas;
- c) not be used for toxic gases with an LC₅₀ less than or equal to 200 ml/m³; and
- d) not be repaired after being put into service.

4.1.6.10 Refillable pressure receptacles, other than closed cryogenic receptacles, shall be periodically inspected according to the provisions of 6.2.1.6, or 6.2.3.5.1 for non-UN receptacles, and packing instruction P200, P205, P206 or P208 as applicable. Pressure relief valves for closed cryogenic receptacles shall be subject to periodic inspections and tests according to the provisions of 6.2.1.6.3 and packing instruction P203. Pressure receptacles shall not be filled after they become due for periodic inspection but may be carried after the expiry of the time-limit for purposes of performing inspection or disposal, including the intermediate carriage operations.

4.1.6.11 Repairs shall be consistent with the fabrication and testing requirements of the applicable design and construction standards and are only permitted as indicated in the relevant periodic inspection standards specified in Chapter 6.2. Pressure receptacles, other than the jacket of closed cryogenic receptacles, shall not be subjected to repairs of any of the following:

- a) weld cracks or other weld defects;
- b) cracks in walls;
- c) leaks or defects in the material of the wall, head or bottom.

4.1.6.12 Pressure receptacles shall not be offered for filling:

- a) when damaged to such an extent that the integrity of the pressure receptacle or its service equipment may be affected;
- b) unless the pressure receptacle and its service equipment has been examined and found to be in good working order; and
- c) unless the required certification, retest, and filling marks are legible.

4.1.6.13 Filled pressure receptacles shall not be offered for carriage:

- a) when leaking;
- b) when damaged to such an extent that the integrity of the pressure receptacle or its service equipment may be affected;
- c) unless the pressure receptacle and its service equipment has been examined and found to be in good working order; and
- d) unless the required certification, retest, and filling marks are legible.

4.1.6.14 Owners shall, on the basis of a reasoned request from the competent authority, provide it with all the information necessary to demonstrate the conformity of the pressure receptacle in a language easily understood by the competent authority. They shall cooperate with that authority, at its request, on any action taken to eliminate non-conformity of the pressure receptacles which they own to these Provisions.

4.1.6.15 For UN pressure receptacles, the ISO standards and EN ISO standards listed in Table 4.1.6.15.1, except EN ISO 14245 and EN ISO 15995, shall be applied. For information on which standard shall be used at the time of manufacturing the equipment, see 6.2.2.3. For other pressure receptacles, the requirements of section 4.1.6 are considered to have been complied with if the standards in Table 4.1.6.15.1, as relevant, are applied. For information on which standards shall be used for the manufacture of valves with inherent protection, see 6.2.4.1. For information on the applicability of standards for manufacturing valve protection caps and valve guards, see Table 4.1.6.15.2.

Table 4.1.6.15.1: Standards for UN and non-UN pressure receptacles:

Applicable paragraphs	Reference	Title of document
4.1.6.2	EN ISO 11114-1:2020 + A1:2023	Gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic Materials
	EN ISO 11114-2:2021	Gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 2: Non-metallic Materials
4.1.6.4	ISO 11621:1997 or EN ISO 11621:2005	Gas cylinders – Procedures for change of gas service

4.1.6.8 Valves with inherent protection	Clause 4.6.2 of EN ISO 10297:2006, or clause 5.5.2 of EN ISO 10297:2014, or clause 5.5.2 of EN ISO 10297:2014 + A1:2017 or clause 5.4.2 of EN ISO 10297:2024	Gas cylinder – Gas cylinder valves – Specification and type testing
	Clause 5.3.8 of Document No.23D2 <i>of the List</i>	
	Clause 5.3.7 of Document No.23E2 <i>of the List</i>	
	Clause 5.9 of EN ISO 14245:2010, Clause 5.9 EN ISO 14245:2019 or Clause 5.9 EN ISO 14245:2021	Gas cylinders – Specifications and testing of LPG cylinder valves – Self closing
4.1.6.8 Valves with inherent protection	Clause 5.10 of EN ISO 15995:2010, Clause 5.9 of EN ISO 15995:2019 or Clause 5.9 of EN ISO 15995:2021	Gas cylinders – Specifications and testing of LPG cylinder valves – Manually operated
	Clause 5.4.2 of EN ISO 17879:2017	Gas cylinders – Self-closing cylinder valves - Specification and type testing
	Clause 7.4 of EN 12205:2001 or clause 9.2.5 of EN ISO 11118:2015 or clause 9.2.5 of EN ISO 11118:2015 + A1:2020	Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods
4.1.6.8 b)	ISO 11117:1998, ISO 11117:2008 + Cor 1:2009 or ISO 11117:2019	Gas Cylinders – Valve Protection caps and guards– Design construction and tests
	document No.23C <i>of the List</i>	
4.1.6.8 c)	Requirements for shrouds and permanent protection attachments used as valve protection under 4.1.6.8 (c) are given in the relevant pressure receptacle shell design standards (see 6.2.2.3 for UN pressure receptacles and 6.2.4.1 for non- UN pressure receptacles).	
4.1.6.8 b) and c)	ISO 16111:2008 or ISO 16111:2018	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride

Table 4.1.6.15.2: Manufacturing dates applicable to valve protection caps and guards fitted to non-UN pressure receptacles

Reference	Title of document	Applicable for manufacture
ISO 11117:1998	Gas cylinders – Valve protection caps and valve guards for industrial and medical gas cylinders – Design construction and tests	Until 31 December 2014
EN ISO 11117:2008 + Cor 1:2009	Gas cylinders – Valve protection caps and valve guards – Design, construction and tests	Until 31 December 2024
EN ISO 11117:2019	Gas cylinders – Valve protection caps and guards – Design, construction and tests	Until further notice
Document 2C of <i>the List</i>		Until 31 December 2014

4.1.7 SPECIAL PACKING PROVISIONS FOR SELF-REACTIVE SUBSTANCES OF CLASS 4.1 AND ORGANIC PEROXIDES OF CLASS 5.2

4.1.7.0.1 For organic peroxides, all receptacles shall be "effectively closed". Where significant internal pressure may develop in a package by the evolution of a gas, a vent may be fitted, provided the gas emitted will not cause danger, otherwise the degree of filling shall be limited. Any venting device shall be so constructed that liquid will not escape when the package is in an upright position and it shall be able to prevent ingress of impurities. The outer packaging, if any, shall be so designed as not to interfere with the operation of the venting device.

4.1.7.1 Use of packagings (except IBCs)

4.1.7.1.1 Packagings for organic peroxides and self-reactive substances shall conform to the requirements of Chapter 6.1 and shall meet its test requirements for packing group II.

4.1.7.1.2 The packing methods for organic peroxides and self-reactive substances are listed in packing instruction 520 and are designated OP1 to OP8. The quantities specified for each packing method are the maximum quantities authorized per package.

4.1.7.1.3 The packing methods appropriate for the individual currently assigned organic peroxides and self-reactive substances are listed in 2.2.41.4 and 2.2.52.4.

4.1.7.1.4 For new organic peroxides, new self-reactive substances or new formulations of currently assigned organic peroxides or self-reactive substances, the following procedure shall be used to assign the appropriate packing method:

- a) ORGANIC PEROXIDE, TYPE B or SELF-REACTIVE SUBSTANCE, TYPE B:
Packing method OP5 shall be assigned, provided that the organic peroxide (or self-reactive substance) satisfies the criteria of 20.4.3 (b) (resp. 20.4.2 (b)) of the Manual of Tests and Criteria in a packaging authorized by the packing method. If the organic peroxide (or self-reactive substance) can only satisfy these criteria in a smaller packaging than those authorized by packing method OP5 (viz. one of the packagings listed for OP1 to OP4), then the corresponding packing method with the lower OP number is assigned.
- b) ORGANIC PEROXIDE, TYPE C or SELF-REACTIVE SUBSTANCE, TYPE C:
Packing method OP6 shall be assigned, provided that the organic peroxide (or self-reactive substance) satisfies the criteria of 20.4.3 (c) (resp. 20.4.2 (c)) of the Manual of Tests and Criteria in a packaging authorized by the packing method. If the organic peroxide (or self-reactive substance) can only satisfy these criteria in a smaller packaging than those authorized by packing method OP6 then the corresponding packing method with the lower OP number is assigned.
- c) ORGANIC PEROXIDE, TYPE D or SELF-REACTIVE SUBSTANCE, TYPE D:
Packing method OP7 shall be assigned to this type of organic peroxide or self-reactive substance.
- d) ORGANIC PEROXIDE, TYPE E or SELF-REACTIVE SUBSTANCE, TYPE E:
Packing method OP8 shall be assigned to this type of organic peroxide or self-reactive substance.
- e) ORGANIC PEROXIDE, TYPE F or SELF-REACTIVE SUBSTANCE, TYPE F:
Packing method OP8 shall be assigned to this type of organic peroxide or self-reactive substance.

4.1.7.2 Use of intermediate bulk containers

4.1.7.2.1 The currently assigned organic peroxides specifically listed in packing instruction IBC520 may be carried in IBCs in accordance with this packing instruction. IBCs shall conform to the requirements of Chapter 6.5 and shall meet its test requirements for packing group II.

4.1.7.2.2 Other organic peroxides and self-reactive substances of type F may be carried in IBCs under conditions established by the competent authority of the country of origin when, on the basis of the appropriate tests, that competent authority is satisfied that such carriage may be safely conducted. The tests undertaken shall include those necessary:

- a) To prove that the organic peroxide (or self-reactive substance) complies with the principles for classification given in 20.4.3 (f) [resp. 20.4.2 (f)] of the Manual of Tests and Criteria, exit box F of Figure 20.1 (b) of the Manual;

- b) To prove the compatibility of all materials normally in contact with the substance during carriage;
- c) (Reserved)
- d) To design, when applicable, pressure and emergency relief devices; and
- e) To determine if any special provisions are necessary for safe carriage of the substance.

If the country of origin is not an SMGS Contracting State, the classification and transport conditions shall be recognized by the competent authority of the first SMGS Contracting State reached by the consignment.

4.1.7.2.3 Emergencies to be taken into account are self-accelerating decomposition and fire engulfment. To prevent explosive rupture of metal or composite IBCs with a complete metal casing, the emergency-relief devices shall be designed to vent all the decomposition products and vapours evolved during self-accelerating decomposition or during a period of not less than one hour of complete fire engulfment calculated by the equations given in 4.2.1.13.8.

4.1.8 SPECIAL PACKING PROVISIONS FOR INFECTIOUS SUBSTANCES OF CLASS 6.2

4.1.8.1 Consignors of infectious substances shall ensure that packages are prepared in such a manner that they arrive at their destination in good condition and present no hazard to persons or animals during carriage.

4.1.8.2 The definitions in 1.2.1 and the general requirements of 4.1.1.1 to 4.1.1.17, except 4.1.1.10 to 4.1.1.12 and 4.1.1.15 apply to infectious substances packages. However, liquids shall only be filled into packagings which have an appropriate resistance to the internal pressure that may develop under normal conditions of carriage.

4.1.8.3 An itemized list of contents shall be enclosed between the secondary packaging and the outer packaging.

When the infectious substances to be carried are unknown, but suspected of meeting the criteria for inclusion in Category A, the words "suspected Category A infectious substance" shall be shown, in parenthesis, following the proper shipping name on the document inside the outer packaging.

4.1.8.4 Before an empty packaging is returned to the consignor, or sent elsewhere, it shall be disinfected or sterilized to nullify any hazard and any label or mark indicating that it had contained an infectious substance shall be removed or obliterated.

4.1.8.5 Provided an equivalent level of performance is maintained, the following variations in the primary receptacles placed within a secondary packaging are allowed without the need for further testing of the completed packaging:

- a) Primary receptacles of equivalent or smaller size as compared to the tested primary receptacles may be used provided:
 - the primary receptacles are of similar design to the primary receptacle tested (e.g. shape: round, rectangular, etc.);
 - the material of construction of the primary receptacles (e.g. glass, plastics, metal) offers resistance to impact and stacking forces equivalent to or better than that of the primary receptacles originally tested;
 - the primary receptacles have the same or smaller openings and the closure is of equivalent design (e.g. screw cap, friction lid, etc.);
 - sufficient additional cushioning material is used to take up empty spaces and to prevent significant movement of the primary receptacles; and
 - primary receptacles are oriented within the secondary packagings in the same manner as in the tested package.

b) A lesser number of the tested primary receptacles, or of the alternative types of primary receptacles identified in (a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the primary receptacles.

4.1.8.6 Paragraphs 4.1.8.1 to 4.1.8.5 only apply to infectious substances of Category A (UN Nos. 2814 and 2900). They do not apply to UN No. 3373 BIOLOGICAL SUBSTANCE, CATEGORY B (see packing instruction P650 of 4.1.4.1), nor to UN No. 3291 CLINICAL WASTE, UNSPECIFIED, N.O.S. or (BIO) MEDICAL WASTE, N.O.S. or REGULATED MEDICAL WASTE, N.O.S.

4.1.8.7 For the carriage of animal material, packagings or IBCs not specifically authorized in the applicable packing instruction shall not be used for the carriage of a substance or article unless specifically approved by the competent authority of the country of origin⁴ and provided:

- a) The alternative packaging complies with the general requirements of Annex 2 to SMGS, Part 4;
- b) When the packing instruction indicated in column (8) of Table A of Chapter 3.2 so specifies, the alternative packaging meets the requirements of Part 6;
- c) The alternative packaging provides at least the same level of safety as if the substance were packed in accordance with a method specified in the particular packing instruction indicated in column (8) of Table A of Chapter 3.2; The safety level shall be confirmed by the competent authority of the country of origin⁵ and
- d) A copy of the competent authority approval accompanies each consignment or the transport document includes an indication that alternative packaging was approved by the competent authority.

⁴ If the country of origin is not an SMGS Contracting State, the competent authority of the first SMGS Contracting State reached by the consignment.

⁵ If the country of origin is not an SMGS Contracting State, the competent authority of the first SMGS Contracting State reached by the consignment.

4.1.9 SPECIAL PACKING PROVISIONS FOR RADIOACTIVE MATERIALS

4.1.9.1 General

4.1.9.1.1 Radioactive material, packagings and packages shall meet the requirements of Chapter 6.4. The quantity of radioactive material in a package shall not exceed the limits specified in 2.2.7.2.2, 2.2.7.2.4.1, 2.2.7.2.4.4, 2.2.7.2.4.5, 2.2.7.2.4.6, special provision 336 of Chapter 3.3 and 4.1.9.3.

The types of packages for radioactive materials covered by Annex 2 to SMGS, are:

- a) Excepted package (see 1.7.1.5);
- b) Industrial package Type 1 (Type IP-1 package);
- c) Industrial package Type 2 (Type IP-2 package);
- d) Industrial package Type 3 (Type IP-3 package);
- e) Type A package;
- f) Type B(U) package;
- g) Type B(M) package;
- h) Type C package.

Packages containing fissile material or uranium hexafluoride are subject to additional requirements.

4.1.9.1.2 The non-fixed contamination on the external surfaces of any package shall be kept as low as practicable and, under routine conditions of transport, shall not exceed the following limits:

- a) 4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters; and
- b) 0.4 Bq/cm² for all other alpha emitters.

These limits are applicable when averaged over any area of 300 cm² of any part of the surface.

4.1.9.1.3 A package shall not contain any items other than those that are necessary for the use of the radioactive material. The interaction between these items and the package under the conditions of carriage applicable to the design, shall not reduce the safety of the package.

4.1.9.1.4 Except as provided in 7.5.11, CW 33, the level of non-fixed contamination on the external and internal surfaces of overpacks, containers and wagons shall not exceed the limits specified in 4.1.9.1.2. This requirement does not apply to the internal surfaces of containers being used as packagings, either loaded or empty.

4.1.9.1.5 For radioactive material having other dangerous properties the package design shall take into account those properties. Radioactive material with a subsidiary risk, packaged in packages that do not require competent authority approval, shall be carried in packagings, IBCs, tanks or bulk containers fully complying with the requirements of the relevant chapters of Part 6 as appropriate, as well as applicable requirements of chapters 4.1, 4.2 or 4.3 for that subsidiary risk.

4.1.9.1.6 a packaging is first used to carry radioactive material, it shall be confirmed that it has been manufactured in conformity with the design specifications to ensure compliance with the relevant provisions of Annex 2 to SMGS and any applicable certificate of approval. The following requirements shall also be fulfilled, if applicable:

a) If the design pressure of the containment system exceeds 35 kPa (gauge), it shall be ensured that the containment system of each packaging conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure;

b) For each packaging intended for use as a Type B(U), Type B(M) or Type C package and for each packaging intended to contain fissile material, it shall be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the confinement system, are within the limits applicable to or specified for the approved design;

c) For each packaging intended to contain fissile material, it shall be ensured that the effectiveness of the criticality safety features is within the limits applicable to or specified for the design and in particular where, in order to comply with the requirements of 6.4.11.1 neutron poisons are specifically included, checks shall be performed to confirm the presence and distribution of those neutron poisons.

- 4.1.9.1.7** Before each shipment of any package, it shall be ensured that the package contains neither:
- a) Radionuclides different from those specified for the package design; nor
 - b) Contents in a form, or physical or chemical state different from those specified for the package design.
- 4.1.9.1.8** Before each shipment of any package, it shall be ensured that all the requirements specified in the relevant provisions of Annex 2 to SMGS and in the applicable certificates of approval have been fulfilled. The following requirements shall also be fulfilled, if applicable:
- a) It shall be ensured that lifting attachments which do not meet the requirements of 6.4.2.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6.4.2.3;
 - b) Each Type B(U), Type B(M) and Type C package shall be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received unilateral approval;
 - c) For each Type B(U), Type B(M) and Type C package, it shall be ensured by inspection and/or appropriate tests that all closures, valves and other openings of the containment system through which the radioactive contents might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of 6.4.8.8 and 6.4.10.3 were made;
 - d) For packages containing fissile material the measurement specified in 6.4.11.5 (b) and the tests to demonstrate closure of each package as specified in 6.4.11.8 shall be performed.
 - e) For packages intended to be used for shipment after storage, it shall be ensured that all packaging components and radioactive contents have been maintained during storage in a manner such that all the requirements specified in the relevant provisions of Annex 2 to SMGS and in the applicable certificates of approval have been fulfilled.
- 4.1.9.1.9** The consignor shall also have a copy of any instructions with regard to the proper closing of the package and any preparation for shipment before making any shipment under the terms of the certificates.
- 4.1.9.1.10** Except for consignments under exclusive use, the transport index of any package or overpack shall not exceed 10, nor shall the criticality safety index of any package or overpack exceed 50.
- 4.1.9.1.11** Except for packages or overpacks carried under exclusive use under the conditions specified in 7.5.11, CW 33 (3.5) (a), the maximum dose rate at any point on any external surface of a package or overpack shall not exceed 2 mSv/h.
- 4.1.9.1.12** The maximum dose rate at any point on any external surface of a package or overpack under exclusive use shall not exceed 10 mSv/h.
- 4.1.9.2 Requirements and controls for carriage of LSA material and SCO**
- 4.1.9.2.1** The quantity of LSA material or SCO in a single Type IP-1 package, Type IP-2 package, Type IP-3 package, or object or collection of objects, whichever is appropriate, shall be so restricted that the external dose rate at 3 m from the unshielded material or object or collection of objects does not exceed 10 mSv/h.
- 4.1.9.2.2** For LSA material and SCO which are or contain fissile material, which is not excepted under 2.2.7.2.3.5, the applicable requirements of 7.5.11, CW 33 (4.1) and (4.2) shall be met.
- 4.1.9.2.3** For LSA material and SCO which are or contain fissile material, the applicable requirements of 6.4.11.1 shall be met.
- 4.1.9.2.4** LSA material and SCO in groups LSA-I and SCO-I and SCO-III may be carried unpackaged under the following conditions:
- a) All unpackaged material other than ores containing only naturally occurring radionuclides shall be carried in such a manner that under routine conditions of carriage there will be no escape of the radioactive contents from the wagon nor will there be any loss of shielding;

- b) Each wagon shall be under exclusive use, except when only carrying SCO-I on which the contamination on the accessible and the inaccessible surfaces is not greater than ten times the corresponding level according to the definition of "Radioactive contamination" in 2.2.7.1.2;
- c) For SCO-I where it is suspected that non-fixed contamination exists on inaccessible surfaces in excess of the values specified in 2.2.7.2.3.2 (a) (i), measures shall be taken to ensure that the radioactive material is not released into the wagon;
- d) Unpackaged fissile material shall meet the requirements of 2.2.7.2.3.5 (e); and
- (e) For SCO-III:
 - (i) Carriage shall be under exclusive use;
 - (ii) Stacking shall not be permitted;
 - (iii) All activities associated with the shipment, including radiation protection, emergency response and any special precautions or special administrative or operational controls that are to be employed during carriage shall be described in a transport plan. The transport plan shall demonstrate that the overall level of safety in carriage is at least equivalent to that which would be provided if the requirements of 6.4.7.14 (only for the test specified in 6.4.15.6, preceded by the tests specified in 6.4.15.2 and 6.4.15.3) had been met;
 - (iv) The requirements of 6.4.5.1 and 6.4.5.2 for a Type IP-2 package shall be satisfied, except that the maximum damage referred to in 6.4.15.4 may be determined based on provisions in the transport plan, and the requirements of 6.4.15.5 are not applicable;
 - (v) The object and any shielding are secured to the conveyance in accordance with 6.4.2.1;
 - (vi) The shipment shall be subject to multilateral approval.

4.1.9.2.5 LSA material and SCO, except as otherwise specified in 4.1.9.2.4, shall be packaged in accordance with the table below:

Table 4.1.9.2.5

Industrial package requirements for LSA material and SCO

Radioactive contents	Industrial package type	
	Exclusive use	Not under exclusive use
LSA-I Solid ^{a)} Liquid	IP-1 IP-1	IP-1 IP-2
LSA-II Solid Liquid and gas	IP-2 IP-2	IP-2 IP-3
LSA-III	IP-2	IP-3
SCO-I ^{a)}	IP-1	IP-1
SCO-II	IP-2	IP-2

- a) Under the conditions specified in 4.1.9.2.4, LSA-I material and SCO-I may be carried unpackaged.

4.1.9.3 Packages containing fissile materials

The contents of packages containing fissile material shall be as specified for the package design either directly in Annex 2 to SMGS or in the certificate of approval.

4.1.10 SPECIAL PROVISIONS FOR MIXED PACKING

4.1.10.1 When mixed packing is permitted in accordance with the provisions of this section, different dangerous goods or dangerous goods and other goods may be packed together in combination packagings conforming to 6.1.4.21, provided that they do not react dangerously with one another and that all other relevant provisions of this Chapter are complied with.

Note 1: See also 4.1.1.5 and 4.1.1.6.

Note 2: For radioactive material, see 4.1.9.

4.1.10.2 Except for packages containing Class 1 goods only or Class 7 goods only, if wooden or fibreboard boxes are used as outer packagings, a package containing different goods packed together shall not weigh more than 100 kg.

4.1.10.3 Unless otherwise prescribed by a special provision applicable according to 4.1.10.4, dangerous goods of the same class and the same classification code may be packed together.

4.1.10.4 When indicated (MP1-MP24) for a given entry in Column (9b) of Table A of Chapter 3.2, the following special provisions shall apply to the mixed packing of the goods assigned to that entry with other goods in the same package:

MP1 May only be packed together with goods of the same type within the same compatibility group.

MP2 Shall not be packed together with other goods.

MP3 Mixed packing of UN No. 1802 with UN No. 1873 is permitted.

MP4 Shall not be packed together with goods of other classes or with goods which are not subject to the requirements of Annex 2 to SMGS. However, if this organic peroxide is a hardener or compound system for Class 3 substances, mixed packing is permitted with these substances of Class 3.

MP5 UN No. 2814 and UN No. 2900 may be packed together in a combination packaging in conformity with P620, and together with:

- substances used as coolants (e.g. ice, dry ice or refrigerated liquid nitrogen);
- UN No. 3373 Biological substance, Category B packed in accordance with P650.

MP6 Shall not be packed together with other goods. This does not apply to substances added as coolants, e.g. ice, dry ice or refrigerated liquid nitrogen.

MP7 May – in quantities not exceeding 5 litres per inner packaging – be packed together in a combination packaging conforming to 6.1.4.21:

- with goods of the same class covered by other classification codes when mixed packing is also permitted for these; or
- with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.

MP8 May – in quantities not exceeding 3 litres per inner packaging – be packed together in a combination packaging conforming to 6.1.4.21:

- with goods of the same class covered by other classification codes when mixed packing is also permitted for these; or
- with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.

MP9 May be packed together in an outer packaging for combination packagings in accordance with 6.1.4.21:

- with other goods of Class 2;
- with goods of other classes, when the mixed packing is also permitted for these; or
- with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.

MP10 May – in quantities not exceeding 5 kg per inner packaging – be packed together in a combination packaging conforming to 6.1.4.21:

- with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or

- with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.
- MP11** May – in quantities not exceeding 5 kg per inner packaging – be packed together in a combination packaging conforming to 6.1.4.21:
 - with goods of the same class covered by other classification codes or with goods of other classes (except substances of packing group I or II of Class 5.1) when mixed packing is also permitted for these; or
 - with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.
- MP12** May – in quantities not exceeding 5 kg per inner packaging – be packed together in a combination packaging conforming to 6.1.4.21:
 - with goods of the same class covered by other classification codes or with goods of other classes (except substances of packing group I or II of Class 5.1) when mixed packing is also permitted for these; or
 - with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.

Packagings shall not weigh more than 45 kg. If fibreboard boxes are used as outer packagings however, a package shall not weigh more than 27 kg.
- MP13** May – in quantities not exceeding 3 kg per inner packaging and per package – be packed together in a combination packaging conforming to 6.1.4.21:
 - with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or
 - with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.
- MP14** May – in quantities not exceeding 6 kg per inner packaging – be packed together in a combination packaging conforming to 6.1.4.21:
 - with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or
 - with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.
- MP15** May – in quantities not exceeding 3 litres per inner packaging – be packed together in a combination packaging conforming to 6.1.4.21:
 - with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or
 - with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.
- MP16** (Reserved).
- MP17** May – in quantities not exceeding 0.5 litre per inner packaging and 1 litre per package – be packed together in a combination packaging conforming to 6.1.4.21:
 - with goods of other classes, except Class 7, when mixed packing is also permitted for these; or
 - with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.
- MP18** May – in quantities not exceeding 0.5 kg per inner packaging and 1 kg per package – be packed together in a combination packaging conforming to 6.1.4.21:
 - with goods of other classes, except Class 7, when mixed packing is also permitted for these; or
 - with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.

- MP19** May – in quantities not exceeding 5 litres per inner packaging – be packed together in a combination packaging conforming to 6.1.4.21:
- with goods of the same class covered by other classification codes or with goods of other classes, when mixed packing is also permitted for these; or
 - with goods which are not subject to the requirements of Annex 2 to SMGS, provided they do not react dangerously with one another.
- MP20** May be packed together with substances covered by the same UN number. Shall not be packed together with goods of Class 1 having different UN numbers, except if provided for by special provision MP 24. Shall not be packed together with goods of other classes or with goods which are not subject to the requirements of Annex 2 to SMGS.
- MP21** May be packed together with substances covered by the same UN number. Shall not be packed together with goods of Class 1 having different UN numbers, except for:
- a) their own means of initiation, provided that:
 - the means of initiation will not function under normal conditions of carriage; or;
 - such means have at least two effective protective features which prevent explosion of an article in the event of accidental functioning of the means of initiation; or
 - when such means do not have two effective protective features (i.e. means of initiation assigned to compatibility group B), in the opinion of the competent authority of the country of origin, the accidental functioning of the means of initiation does not cause the explosion of an article under normal conditions of carriage;
 - b) articles of compatibility groups C, D and E.
- Shall not be packed together with goods of other classes or with goods which are not subject to the requirements of Annex 2 to SMGS.
- When goods are packed together in accordance with this special provision, account shall be taken of a possible amendment of the classification of packages in accordance with 2.2.1.1.
- For the description of the goods in the transport document, see 5.4.1.2.1 (b).
- MP22** May be packed together with substances covered by the same UN number. Shall not be packed together with goods of other classes, or with goods that are not subject to the requirements of Annex 2 to SMGS, or with goods of Class 1 having different UN numbers, except
- a) With their own means of initiation, provided that the means of initiation will not function under normal conditions of carriage; or
 - b) With articles of compatibility groups C, D and E; or
 - c) If provided for by special provision MP 24.
- When goods are packed together in accordance with this special provision, account shall be taken of a possible amendment of the classification of packages in accordance with 2.2.1.1.
- For the description of the goods in the transport document, see 5.4.1.2.1 (b).
- MP23** May be packed together with substances covered by the same UN number. Shall not be packed together with goods of Class 1 having different UN numbers, except
- a) With their own means of initiation, provided that the means of initiation will not function under normal conditions of carriage; or
 - b) If provided for by special provision MP 24.
- Shall not be packed together with goods of other classes, or with goods which are not subject to the requirements of Annex 2 to SMGS.
- When goods are packed together in accordance with this special provision, account shall be taken of a possible amendment of the classification of packages in accordance with 2.2.1.1. For the description of the goods in the transport document, see 5.4.1.2.1 (b).

MP24 May be packed together with goods with the UN numbers shown in the table below, under the following conditions:

- if a letter A is indicated in the table, the goods with those UN numbers may be included in the same package without any special limitation of mass;
- if a letter B is indicated in the table, the goods with those UN numbers may be included in the same package up to a total mass of 50 kg of explosive substances.
- if neither letter A or letter B is indicated in the table, such goods shall not be packed together.

When goods are packed together in accordance with this special provision, account shall be taken of a possible amendment of the classification of packages in accordance with 2.2.1.1.

For the description of the goods in the transport document, see 5.4.1.2.1 b).

Table: some Class 1 goods that may be packed together

UN No.	0012	0014	0027	0028	0044	0054	0160	0161	0186	0191	0194	0195	0197	0238	0240	0312	0333	0334	0335	0336	0337	0373	0405	0428	0429	0430	0431	0432	0505	0506	0507	0509
0012	A																															
0014	A																															
0027				B	B		B	B																								B
0028			B	B	B		B	B																								B
0044			B	B			B	B																								B
0054									B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0160			B	B	B			B																								B
0161			B	B	B		B																									B
0186						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0191						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0194						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0195						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0197						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0238						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0240						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0312						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0333																	A	A	A	A	A											
0334																	A	A	A	A	A											
0335																	A	A	A	A	A											
0336																	A	A	A	A	A											
0337																	A	A	A	A	A											
0373						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0405						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0428						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0429						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0430						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0431						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0432						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0505						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0506						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0507						B			B	B	B	B	B	B	B	B						B	B	B	B	B	B	B	B	B	B	B
0509			B	B	B		B	B																								

CHAPTER 4.2

USE OF PORTABLE TANKS AND UN MULTIPLE-ELEMENT GAS CONTAINERS (MEGCs)

Note 1 This Chapter shall also apply to tank-containers made under ISO 1496-3:1995 standard and instructions for portable tanks T1-T23, T50 and T75.

Note 2 For built-in tanks (tank-wagons), demountable tanks, tank-containers excluding the tank-containers made under the ISO1496-3:1995 standard and instructions for portable tanks T1-T23, T50, T75, and tank swap bodies, with shells made of metallic materials, and battery-wagons and multiple element gas containers (MEGCs) excluding the UN MEGCs, see Chapter 4.3; for vacuum-operated waste tanks, see Chapter 4.5.

Note 3 Portable tanks and UN MEGCs marked in accordance with the requirements of Chapter 6.7, but which were approved in a State that is not an SMGS Contracting State or approved in accordance with Chapter 6.7 of the IMDG Code, may nevertheless be used for carriage in accordance with Annex 2 to SMGS.

4.2.1 GENERAL PROVISIONS FOR THE USE OF PORTABLE TANKS FOR THE CARRIAGE OF SUBSTANCES OF CLASSES 1 AND 3 TO 9

4.2.1.1 This section provides general provisions applicable to the use of portable tanks for the carriage of substances of Classes 1, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, 7, 8 and 9. In addition to these general provisions, portable tanks shall conform to the design, construction, inspection and testing requirements detailed in 6.7.2. Substances shall be carried in portable tanks conforming to the applicable portable tank instruction identified in Column (10) of the Table A in Chapter 3.2 and described in 4.2.5.2.6 (T1 to T23) and the portable tank special provisions assigned to each substance in Column (11) of Table A in Chapter 3.2 and described in 4.2.5.3

4.2.1.2 During carriage, portable tanks shall be adequately protected against damage to the shell and service equipment resulting from impact and overturning. If the shell and service equipment are so constructed as to withstand impact or overturning, it need not be protected in this way. Examples of such protection are given in 6.7.2.17.5.

4.2.1.3 Certain substances are chemically unstable. They are accepted for carriage only when the necessary steps have been taken to prevent their dangerous decomposition, transformation or polymerization. To this end, care shall in particular be taken to ensure that shells do not contain any substances liable to promote these reactions.

4.2.1.4 The temperature of the outer surface of the shell excluding openings and their closure devices or of the thermal insulation shall not exceed 70°C during carriage. When substances are carried under high temperatures in the liquid or solid state, the shell shall, if necessary, be thermally insulated to meet to the requirement.

4.2.1.5 Empty portable tanks not cleaned and not gas-free shall comply with the same provisions as portable tanks filled with the previous substance.

4.2.1.6 Substances shall not be carried in the adjoining compartments of shells when they may react dangerously with each other (see Section 1.2.1)

4.2.1.7 The design approval certificate, the test report and the certificate showing the results of the initial inspection and test for each portable tank issued by the competent authority or its authorized body shall be retained by the authority or body and the owner. Owners shall be able to provide this documentation upon the request of any competent authority.

4.2.1.8 Unless the name of the substance(s) being carried appears on the metal plate described in 6.7.2.20.2 a copy of the certificate specified in 6.7.2.18.1 shall be made available upon the request of a competent authority or its authorized body and readily provided by the consignor, consignee or another party to the carriage.

4.2.1.9 Degree of filling

4.2.1.9.1 The consignor shall ensure that the appropriate portable tank is used for filling and that the portable tank is not filled with substances which in contact with the materials of the shell, gaskets, service equipment and any protective linings, are likely to react dangerously with them to form dangerous products or appreciably weaken these materials. If necessary, the

consignor shall consult the manufacturer of the portable tank and the manufacturer of the substance in conjunction with the competent authority for guidance on the compatibility of the substance to be carried with the constructive materials of the portable tank.

4.2.1.9.1.1 Portable tanks shall not be filled above the extent provided in 4.2.1.9.2 to 4.2.1.9.6. The applicability of 4.2.1.9.2, 4.2.1.9.3 or 4.2.1.9.5.1 to individual substances is specified in the applicable portable tank instruction or special provisions in 4.2.5.2.6 or 4.2.5.3 and Column (10) or (11) of Table A of Chapter 3.2.

4.2.1.9.2 The maximum degree of filling (in %) for general use is determined by the formula:

$$\text{degree of filling} = \frac{97}{1 + \alpha(t_m - t_f)}, \%$$

in which α is the mean coefficient of cubical expansion of the liquid in the limit of 15°C and 50°C;

t_f is the maximum mean bulk temperature of the liquid during carriage, °C;

t_f is the temperature of the liquid during filling, °C.

4.2.1.9.3 The maximum degree of filling (in %) for liquids of Class 6.1 and Class 8, in packing groups I and II, and liquids with an absolute vapour pressure of more than 175 kPa (1.75 bar) at 65 °C, is determined by the formula:

$$\text{degree of filling} = \frac{95}{1 + \alpha(t_m - t_f)}, \%$$

4.2.1.9.4 For liquids carried under ambient conditions α could be calculated by the formula as follows:

$$\alpha = \frac{d_{15} - d_{50}}{35d_{50}}$$

in which d_{15} and d_{50} are the densities of the liquid at 15 °C and 50 °C, respectively.

4.2.1.9.4.1 The maximum mean bulk temperature (t_f) shall be taken as 50 °C except that, for journeys under temperate or extreme climatic conditions, the competent authorities concerned may agree to a lower or require a higher temperature, as appropriate.

4.2.1.9.5 The provisions of 4.2.1.9.2 to 4.2.1.9.4.1 do not apply to portable tanks which contain substances maintained at a temperature above 50 °C during carriage (e.g. by means of a heating device). For portable tanks equipped with a heating device, a temperature regulator shall be used to ensure the maximum degree of filling is not more than 95% full at any time during carriage.

4.2.1.9.5.1 The maximum degree of filling for solids carried above their melting points and for high temperature liquids shall be determined by the following formula:

$$\text{Degree of filling} = 95 \frac{d_r}{d_f}, \%$$

in which d_r and d_f are the densities of the liquid at the mean temperature of the liquid during filling and the maximum mean bulk temperature during carriage respectively.

4.2.1.9.6. Portable tanks shall not be offered for carriage:

- With a degree of filling, for liquids having a viscosity less than 2 680 mm²/s at 20 °C or maximum temperature of the substance during carriage in the case of the heated substance, of more than 20% but less than 80% unless the shells of portable tanks are divided, by partitions or surge plates, into sections of not more than 7 500 litres capacity;
- With residue of substances previously carried adhering to the outside of the shell or service equipment;
- When leaking or damaged to such an extent that the integrity of the portable tank or its lifting or securing arrangements may be affected; and

d) Unless the service equipment has been examined and found to be in good working order.

4.2.1.9.7 Forklift pockets of portable tanks shall be closed off when the tank is filled. This provision does not apply to portable tanks which according to 6.7.2.17.4 need not be provided with a means of closing off the forklift pockets

4.2.1.10 Additional provisions applicable to the carriage of Class 3 substances

4.2.1.10.1 The portable tanks intended for the carriage of flammable liquids shall be closed and be fitted with relief devices in accordance with 6.7.2.8 to 6.7.2.15.

4.2.1.10.1.1 For portable tanks intended for use only on land, open venting systems may be used if allowed according to Chapter 4.3.

4.2.1.11 Additional provisions applicable to the carriage of Classes 4.1, 4.2 or 4.3 substances (other than Class 4.1 self-reactive substances)

(reserved)

Note: For Class 4.1 self-reactive substances see 4.2.1.13.1.

4.2.1.12 Additional provisions applicable to the carriage of Class 5.1 substances

(Reserved)

4.2.1.13 Additional provisions applicable to the carriage of Class 5.2 substances and Class 4.1 self-reactive substances

4.2.1.13.1 Each substance shall have been tested and a report submitted to the competent authority of the country of origin for approval. Notification thereof shall be sent to the competent authority of the country of destination. The notification shall contain relevant transport information and the report with test results. The tests undertaken shall include those necessary:

- a) To prove the compatibility of all materials normally in contact with the substance during carriage;
- b) To provide data for the design of the pressure and emergency relief devices taking into account the design characteristics of the portable tank.

Any additional provision necessary for safe carriage of the substance shall be clearly described in the report.

4.2.1.13.2 The following provisions apply to portable tanks intended for the carriage of Type F organic peroxides or Type F self-reactive substances with a Self-Accelerating Decomposition Temperature (SADT) of 55 °C or more. In case of conflict these provisions prevail over those specified in Section 6.7.2. Emergencies to be taken into account are self-accelerating decomposition of the substance and fire-engulfment (see 4.2.1.13.8).

4.2.1.13.3 The additional provisions for carriage of organic peroxides or self-reactive substances with a SADT less than 55 °C in portable tanks shall be specified by the competent authority of the country of origin. Notification thereof shall be sent to the competent authority of the country of destination.

4.2.1.13.4 The portable tank shall be designed for a test pressure of at least 0.4 MPa (4 bar).

4.2.1.13.5 Portable tanks shall be fitted with temperature sensing devices.

4.2.1.13.6 Portable tanks shall be fitted with pressure-relief devices and emergency-relief devices. Vacuum-relief devices may also be used. Vacuum-relief devices may also be used. Pressure-relief devices shall operate at pressures determined according to both the properties of the substance and the construction characteristics of the portable tank. Fusible elements are not allowed in the shell.

4.2.1.13.7 The pressure-relief devices shall consist of spring-loaded valves fitted to prevent significant build-up within the portable tank of the decomposition products and vapours released at a temperature of 50 °C. The capacity and start-to-discharge pressure of the relief valves shall be based on the results of the tests specified in 4.2.1.13.1. The start-to-discharge pressure shall, however, in no case be such that liquid would escape from the valve(s) if the portable tank were overturned

4.2.1.13.8 The emergency-relief devices may be of the spring-loaded or frangible types, or a combination of the two. They shall be designed to vent all the decomposition products and vapours evolved during a period of not less than one hour of complete fire-engulfment as calculated by the following formula:

$$q = 70961 \cdot FA^{0.82}$$

where:

q = heat absorption, W;

A = wetted area, m²;

F = insulation factor,

$F = 1$ for non-insulated shells; or

$$F = \frac{U(923 - T)}{47032} \text{ for insulated shells,}$$

where:

$$U = \frac{K}{L} - \text{heat transfer coefficient of the insulation, Wm}^{-2} \cdot \text{K}^{-1};$$

K – heat conductivity of insulation layer, Wm⁻¹·K⁻¹;

L – thickness of insulation layer, m;

T – temperature of the substance at relieving conditions, °K.

The start-to-discharge pressure of the emergency-relief device(s) shall be higher than that specified in 4.2.1.13.7 and based on the results of the tests referred to in 4.2.1.13.1. The emergency-relief devices shall be dimensioned in such a way that the maximum pressure in the portable tank never exceeds the test pressure of the tank.

Note: An example of a method to determine the size of emergency-relief devices is given in Appendix 5 of the "Manual of Tests and Criteria".

4.2.1.13.9 For insulated portable tanks the capacity and setting of emergency-relief device(s) shall be determined assuming a loss of insulation from 1% of the surface area.

4.2.1.13.10 Vacuum-relief devices and spring-loaded valves shall be provided with flame arresters. Due attention shall be paid to the reduction of the relief capacity caused by the flame arrester.

4.2.1.13.11 Service equipment such as valves and external piping shall be so arranged that no substance remains in them after filling the portable tank.

4.2.1.13.12 The portable tank shall be completely insulated if:

- it is constructed of aluminium;
- it is designed for the substance the SADT of which is 55 °C or less.

The outer surface shall be coloured in white or coated with reflecting material.

4.2.1.13.13 The degree of filling shall not exceed 90% at 15 °C.

4.2.1.13.14 The markings as required in 6.7.2.20.2 shall include the UN number and the technical name with the concentration of the substance concerned, being approved by a competent authority.

4.2.1.13.15 Organic peroxides and self-reactive substances specifically listed in portable tank instruction T23 in 4.2.5.2.6 may be carried in portable tanks.

4.2.1.14 Additional provisions applicable to the carriage of Class 6.1 substances in portable tanks

(Reserved)

- 4.2.1.15 Additional provisions applicable to the carriage of Class 6.2 substances in portable tanks**
(Reserved)
- 4.2.1.16 Additional provisions applicable to the carriage of Class 7 substances in portable tanks**
- 4.2.1.16.1** Portable tanks used for the carriage of radioactive material shall not be used for the carriage of other goods.
- 4.2.1.16.2** The degree of filling for portable tanks shall not exceed 90% or, alternatively, any other value approved by a competent authority.
- 4.2.1.17 Additional provisions applicable to the carriage of Class 8 substances in portable tanks**
- 4.2.1.17.1** Pressure-relief devices of portable tanks used for the carriage of Class 8 substances shall be inspected at intervals not exceeding one year.
- 4.2.1.18 Additional provisions applicable to the carriage of Class 9 substances in portable tanks**
(Reserved)
- 4.2.1.19 Additional provisions applicable to the carriage of solid substances carried above their melting point.**
- 4.2.1.19.1** Solid substances carried or offered for carriage above their melting point which are not assigned a portable tank instruction in column (10) of the Table A of Chapter 3.2 or when the assigned portable tank instruction does not apply to carriage at temperatures above their melting point may be carried in portable tanks provided that the solid substances are classified in classes 4.1, 4.2, 4.3, 5.1, 6.1, 8 or 9 and have no subsidiary risk other than that of Class 6.1 or Class 8 and are in packing group II or III.
- 4.2.1.19.2** Unless otherwise indicated in Table A of Chapter 3.2, portable tanks used for the carriage of these solid substances above their melting point shall conform to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II. A portable tank which affords an equivalent or greater level of safety may be selected according to 4.2.5.2.5. The maximum degree of filling (in %) shall be determined according to 4.2.1.9.5 (TP3).
- 4.2.2 GENERAL PROVISIONS FOR THE USE OF PORTABLE TANKS FOR THE CARRIAGE OF NON-REFRIGERATED LIQUEFIED GASES AND CHEMICALS UNDER PRESSURE.**
- 4.2.2.1** This section provides general provisions applicable to the use of portable tanks for the carriage of non-refrigerated liquefied gases and chemicals under pressure.
- 4.2.2.2** Portable tanks shall conform to the design, construction, inspection and testing requirements detailed in 6.7.3. Non-refrigerated liquefied gases and chemicals under pressure shall be carried in portable tanks conforming to portable tank instruction T50 as described in 4.2.5.2.6 and any portable tank special provisions assigned to specific non-refrigerated liquefied gases in Column (11) of Table A of Chapter 3.2 and described in 4.2.5.3.
- 4.2.2.3** During carriage, portable tanks shall be adequately protected against damage to the shell and service equipment resulting from lateral and longitudinal impact and overturning. If the shell and service equipment are so constructed as to withstand impact or overturning it need not be protected in this way. Examples of such protection are given in 6.7.3.13.5.
- 4.2.2.4** Certain non-refrigerated liquefied gases are chemically unstable. They are accepted for carriage only when the necessary steps have been taken to prevent their dangerous decomposition, transformation or polymerization during carriage. To this end, care shall in particular be taken to ensure that portable tanks do not contain any non-refrigerated liquefied gases liable to promote these reactions.
- 4.2.2.5** Unless the name of the gas(es) being carried appears on the metal plate described in 6.7.3.16.2, a copy of the certificate specified in 6.7.3.14.1 shall be made available upon a competent authority request and readily provided by the consignor, consignee or another party to the carriage.

- 4.2.2.6** Empty portable tanks not cleaned and not gas-free shall comply with the same provisions as portable tanks filled with the previous non-refrigerated liquefied gas.
- 4.2.2.7 Filling**
- 4.2.2.7.1** Prior to filling the consignor or the filler shall inspect the portable tank to ensure that it is authorized for the non-refrigerated liquefied gas or the propellant of the chemical under pressure to be carried and that the portable tank is not loaded with non-refrigerated liquefied gases, or with chemicals under pressure which in contact with the materials of the shell, gaskets, service equipment and any protective linings, are likely to react dangerously with them to form dangerous products or appreciably weaken these materials. During filling, the temperature of the non-refrigerated liquefied gas or propellant of chemicals under pressure shall fall within the limits of the design temperature range.
- 4.2.2.7.2** The maximum mass of non-refrigerated liquefied gas per litre of shell capacity (kg/l) shall not exceed the density of the non-refrigerated liquefied gas at 50 °C multiplied by 0.95. Furthermore, the shell shall not be liquid-full at 60 °C.
- 4.2.2.7.3** Portable tanks shall not be filled above their maximum permissible gross mass and the maximum permissible load mass specified for each gas to be carried.
- 4.2.2.8** Portable tanks shall not be offered for carriage:
- a) In a filling condition, liable to produce an unacceptable hydraulic force due to surge within the shell;
 - b) When leaking;
 - c) When damaged to such an extent that the integrity of the tank or its lifting or securing arrangements may be affected; and
 - d) Unless the service equipment has been examined and found to be in good working order.
- Forklift pockets of portable tanks shall be closed off when the tank is filled. This provision does not apply to portable tanks which according to 6.7.3.13.4 need not be provided with a means of closing off the forklift pockets.
- 4.2.3 GENERAL PROVISIONS FOR THE USE OF PORTABLE TANKS FOR THE CARRIAGE OF REFRIGERATED LIQUEFIED GASES**
- 4.2.3.1** This section provides general provisions applicable to the use of portable tanks for the carriage of refrigerated liquefied gases.
- 4.2.3.2** Portable tanks shall conform to the design, construction, inspection and testing requirements detailed in 6.7.4. Refrigerated liquefied gases shall be carried in portable tanks conforming to portable tank instruction T75 as described in 4.2.5.2.6 and the portable tank special provisions assigned to each substance in Column (11) of Table A of Chapter 3.2 and described in 4.2.5.3.
- 4.2.3.3** During carriage, portable tanks shall be adequately protected against damage to the shell and service equipment resulting from lateral and longitudinal impact and overturning. If the shell and service equipment are so constructed as to withstand impact or overturning it need not be protected in this way. Examples of such protection are provided for in 6.7.4.12.5.
- 4.2.3.4** Unless the name of the gas(es) being carried appears on the metal plate described in 6.7.4.15.2, a copy of the certificate specified in 6.7.4.13.1 shall be made available upon a competent authority request and readily provided by the consignor, consignee or another party to the carriage.
- 4.2.3.5** Empty portable tanks not cleaned and not gas-free shall comply with the same provisions as portable tanks filled with the previous substance.
- 4.2.3.6 Filling**
- 4.2.3.6.1** Prior to filling the portable tank shall be inspected to ensure that it is authorized for the refrigerated liquefied gas to be carried and that the portable tank is not loaded with refrigerated liquefied gases which in contact with the materials of the shell, gaskets, service equipment and any protective linings, are likely to react dangerously with them to form dangerous products or appreciably weaken these materials. During filling, the

temperature of the refrigerated liquefied gas shall be within the limits of the design temperature range.

- 4.2.3.6.2** In estimating the initial degree of filling the necessary holding time for the intended journey including any delays which might be encountered shall be taken into consideration. The initial degree of filling of the shell, except as provided for in 4.2.3.6.3 and 4.2.3.6.4, shall be such that if the contents, except helium, were to be raised to a temperature at which the vapour pressure is equal to the maximum allowable working pressure (MAWP) the volume occupied by liquid would not exceed 98%.
- 4.2.3.6.3** Shells intended for the carriage of helium can be filled up to but not above the inlet of the pressure-relief device.
- 4.2.3.6.4** A higher initial degree of filling may be allowed, subject to approval by the competent authority, when the intended duration of carriage is considerably shorter than the holding time.
- 4.2.3.7 The estimated time of the pressure limiting device being in closing off state (holding time)**
- 4.2.3.7.1** The estimated holding time shall be calculated for each journey in accordance with a procedure recognized by the competent authority, on the basis of the following:
- (a) The reference holding time for the refrigerated liquefied gas to be carried (see 6.7.4.2.8.1) (as indicated on the plate referred to in 6.7.4.15.1);
 - b) The actual filling density;
 - c) The actual filling pressure;
 - d) The lowest set pressure of the pressure limiting device(s).
- 4.2.3.7.2** The estimated holding time shall be marked either on the portable tank itself or on a metal plate firmly secured to the portable tank, in accordance with 6.7.4.15.2.
- 4.2.3.7.3** The date at which the actual holding time ends shall be entered in the transport document (see 5.4.1.2.2 (d)).
- 4.2.3.8** Portable tanks shall not be offered for carriage:
- a) In a filling condition liable to produce an unacceptable hydraulic force due to surge within the shell;
 - b) When leaking;
 - c) When damaged to such an extent that the integrity of the portable tank or its lifting or securing arrangements may be affected;
 - d) Unless the service equipment has been examined and found to be in good working order;
 - e) Unless the estimated holding time for the refrigerated liquefied gas being carried has been determined in accordance with 4.2.3.7 and the portable tank is marked in accordance with 6.7.4.15.2; and
 - f) Unless the duration of carriage, after taking into consideration any delays which might be encountered, does not exceed the estimated holding time.
- 4.2.3.9** Forklift pockets of portable tanks shall be closed off when the tank is filled. This provision does not apply to portable tanks which according to 6.7.4.12.4, need not be provided with a means of closing off the forklift pockets.
- 4.2.4 GENERAL PROVISIONS FOR THE USE OF UN MULTIPLE-ELEMENT GAS CONTAINERS (MEGCS)**
- 4.2.4.1** This section provides general requirements applicable to the use of multiple-element gas containers (MEGCs) for the carriage of non-refrigerated gases referred to in 6.7.5.
- 4.2.4.2** MEGCs shall conform to the design, construction, inspection and testing requirements detailed in 6.7.5. The elements of MEGCs shall be periodically inspected according to the provisions set out in packing instruction P200 of 4.1.4.1 and in 6.2.1.6.
- 4.2.4.3** During carriage, MEGCs shall be protected against damage to the elements and service equipment resulting from lateral and longitudinal impact and overturning. If the elements

and service equipment are so constructed as to withstand impact or overturning, they need not be protected in this way. Examples of such protection are given in 6.7.5.10.4.

4.2.4.4 The periodic testing and inspection requirements for MEGCs are specified in 6.7.5.12. MEGCs or their elements shall not be charged or filled after they become due for periodic inspection but may be carried after the expiry of the time limit.

4.2.4.5 Filling

4.2.4.5.1 Prior to filling, the MEGC shall be inspected to ensure that it is authorized for the gas to be carried and that the applicable provisions of Annex 2 to SMGS have been.

4.2.4.5.2 Elements of MEGCs shall be filled according to the working pressures, filling ratios and filling provisions specified in packing instruction P200 of 4.1.4.1 for the specific gas being filled into each element. In no case shall an MEGC or group of elements be filled as a unit in excess of the lowest working pressure of any given element.

4.2.4.5.3 MEGCs shall not be filled above their maximum permissible gross mass.

4.2.4.5.4 Isolation valves shall be closed after filling and remain closed during carriage. Toxic gases (gases of groups T, TF, TC, TO, TFC and TOC) shall only be carried in MEGCs where each element is equipped with an isolation valve.

4.2.4.5.5 The opening(s) for filling shall be closed by caps or plugs. The leakproofness of the closures and equipment shall be verified by the filler after filling.

4.2.4.5.6 MEGCs shall not be offered for filling:

- a) When damaged to such an extent that the integrity of the pressure receptacles or its structural or service equipment may be affected;
- b) Unless the pressure receptacles and its structural and service equipment has been examined and found to be in good working order; and
- c) Unless the required certification, retest, and filling markings are legible.

4.2.4.6 Charged MEGCs shall not be offered for carriage;

- a) When leaking;
- b) When damaged to such an extent that the integrity of the pressure receptacles or its structural or service equipment may be affected;
- c) Unless the pressure receptacles and its structural and service equipment have been examined and found to be in good working order; and
- d) Unless the required certification, retest, and filling markings are legible.

4.2.4.7 Empty MEGCs that have not been cleaned and purged shall comply with the same requirements as MEGCs filled with the previous substance.

4.2.5 PORTABLE TANK INSTRUCTIONS AND SPECIAL PROVISIONS

4.2.5.1 General

4.2.5.1.1 This section includes the portable tank instructions and special provisions applicable to dangerous goods authorized to be carried in portable tanks. Each portable tank instruction is identified by an alpha-numeric code (e.g. T1). Column (10) of Table A of Chapter 3.2 indicates the portable tank instruction that shall be used for each substance permitted for carriage in a portable tank. When no portable tank instruction appears in Column (10) for a specific dangerous goods entry then carriage of the substance in portable tanks is not permitted unless a competent authority approval is granted as detailed in 6.7.1.3. Portable tank special provisions are assigned to specific dangerous goods in Column (11) of Table A of Chapter 3.2. Each portable tank special provision is identified by an alpha-numeric code (e.g. TP1). A listing of the portable tank special provisions is provided in 4.2.5.3.

***Note:** The gases authorized for carriage in MEGCs are indicated with the letter "(M)" in Column (10) of Table A of Chapter 3.2.*

4.2.5.2 Portable tank instructions

4.2.5.2.1 Portable tank instructions apply to dangerous goods of Classes 1 to 9. Portable tank instructions provide specific information relevant to portable tanks provisions applicable to specific substances. These provisions shall be met in addition to the general provisions in this Chapter and the general requirements in Chapter 6.7 or Chapter 6.9.

4.2.5.2.2 For substances of Classes 1 and 3 to 9, the portable tank instructions indicate the applicable minimum test pressure, the minimum shell thickness, bottom opening requirements and pressure relief requirements. In portable tank instruction T23, self-reactive substances of Class 4.1 and Class 5.2 organic peroxides permitted to be carried in portable tanks are listed.

4.2.5.2.3 Non-refrigerated liquefied gases are assigned to portable tank instruction T50. T50 provides the maximum allowable working pressures, the requirements for the openings below liquid level, pressure-relief requirements and maximum filling density requirements for non-refrigerated liquefied gases permitted for carriage in portable tanks.

4.2.5.2.4 Refrigerated liquefied gases are assigned to portable tank instruction T75.

4.2.5.2.5 Determination of the appropriate portable tank instructions

When a specific portable tank instruction is specified in Column (10) of Table A of Chapter 3.2 for a specific dangerous goods entry additional portable tanks which possess higher minimum test pressures, greater shell thicknesses, more stringent bottom opening and pressure-relief device arrangements may be used. The following guidelines apply to determining the appropriate portable tanks which may be used for carriage of particular substances:

Portable tank instruction specified	Portable tank instructions also permitted
T1	T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T2	T4, T5, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T3	T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T4	T5, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T5	T10, T14, T19, T20, T22
T6	T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T7	T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T8	T9, T10, T13, T14, T19, T20, T21, T22
T9	T10, T13, T14, T19, T20, T21, T22
T10	T14, T19, T20, T22
T11	T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22
T12	T14, T16, T18, T19, T20, T22
T13	T14, T19, T20, T21, T22
T14	T19, T20, T22
T15	T16, T17, T18, T19, T20, T21, T22
T16	T18, T19, T20, T22
T17	T18, T19, T20, T21, T22
T18	T19, T20, T22
T19	T20, T22
T20	T22
T21	T22
T22	Her
T23	Her

4.2.5.2.6 Portable tank instructions

Portable tank instructions specify the requirements applicable to a portable tank when used for the carriage of specific substances. Portable tank instructions T 1 to T 22 specify the applicable minimum

test pressure, the minimum shell thickness (in mm reference steel) or the minimum shell thickness for fibre reinforced plastics (FRP) portable tanks, and the pressure-relief and bottom-opening requirements.

T1–T22	PORTABLE TANK INSTRUCTIONMNS			T1–T22
These portable tank instructions apply to liquid and solid substances of Class 1 and Classes 3 to 9. The general provisions of Section 4.2.1 and the requirements of Section 6.7.2 shall be met. The instructions for portable tanks with FRP shells apply to substances of classes 1, 3, 5.1, 6.1, 6.2, 8 and 9. Additionally, the requirements of Chapter 6.9 apply.				
Portable tank instruction	Minimum test pressure (bar)	Minimum shell thickness (in mm-reference steel) (see 6.7.2.4)	Pressure-relief requirements (see 6.7.2.8) ^(a)	Bottom opening requirements (see 6.7.2.6) ^(b)
T 1	1,5	See 6.7.2.4.2	Normal	See 6.7.2.6.2
T 2	1,5	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T 3	2,65	See 6.7.2.4.2	Normal	See 6.7.2.6.2
T 4	2,65	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T 5	2,65	See 6.7.2.4.2	See 6.7.2.8.3	Not allowed
T 6	4	See 6.7.2.4.2	Normal	See 6.7.2.6.2
T 7	4	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T 8	4	See 6.7.2.4.2	Normal	Not allowed
T 9	4	6 mm	Normal	Not allowed
T 10	4	6 mm	See 6.7.2.8.3	Not allowed
T 11	6	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T 12	6	See 6.7.2.4.2	See 6.7.2.8.3	See 6.7.2.6.3
T 13	6	6 mm	Normal	Not allowed
T 14	6	6 mm	See 6.7.2.8.3	Not allowed
T 15	10	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T 16	10	See 6.7.2.4.2	See 6.7.2.8.3	See 6.7.2.6.3
T 17	10	6 mm	Normal	See 6.7.2.6.3
T 18	10	6 mm	See 6.7.2.8.3	See 6.7.2.6.3
T 19	10	6 mm	See 6.7.2.8.3	Not allowed
T 20	10	8 mm	See 6.7.2.8.3	Not allowed
T 21	10	10 mm	Normal	Not allowed
T 22	10	10 mm	See 6.7.2.8.3	Not allowed

a) When the word "Normal" is indicated, all the requirements of 6.7.2.8 apply except for 6.7.2.8.3.

b) When this column indicates "Not allowed", bottom openings are not permitted when the substance to be carried is a liquid (see 6.7.2.6.1). When the substance to be carried is a solid at all temperatures encountered under normal conditions of carriage, bottom openings conforming to the requirements of 6.7.2.6.2 are authorized.

T23	PORTABLE TANK INSTRUCTIONS					T23
This portable tank instruction applies to self-reactive substances of Class 4.1 and organic peroxides of Class 5.2. The general provisions of Section 4.2.1 and the requirements of Section 6.7.2 shall be met. The additional provisions specific to self-reactive substances of Class 4.1 and organic peroxides of Class 5.2 in 4.2.1.13 shall also be met. The formulations not listed in 2.2.41.4 or in 2.2.52.4 but listed below may also be carried packed in accordance with packing method OP8 of packing instruction P 520 of 4.1.4.1.						
UN No.	Substance	Minimum test pressure (bar)	Minimum shell thickness (mm- reference steel)	Bottom opening requirements	Pressure-relief requirements	Degree of filling
3109	ORGANIC PEROXIDE, TYPE F, LIQUID tert-Butyl hydroperoxide(a), not more than 72% with water tert-Butyl hydroperoxide, not more than 56% in diluent type B ^(b) Cumyl hydroperoxide, not more than 90% in diluent type A Di-tert-butyl peroxide, not more than 32% in diluent type A Isopropyl cumyl hydroperoxide, not more than 72% in diluent type A p-Menthyl hydroperoxide, not more than 72% in diluent type A Pinanyl hydroperoxide, not more than 56% in diluent type A	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2, 4.2.1.13.6, 4.2.1.13.7, 4.2.1.13.8	See 4.2.1.13.13
3110	ORGANIC PEROXIDE TYPE F, SOLID Dicumyl peroxide ^(b)	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2, 4.2.1.13.6, 4.2.1.13.7, 4.2.1.13.8	See 4.2.1.13.13
3229	SELF-REACTIVE LIQUID TYPE F	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2, 4.2.1.13.6, 4.2.1.13.7, 4.2.1.13.8	See 4.2.1.13.13
3230	SELF-REACTIVE SOLID TYPE F	4	See 6.7.2.4.2	See 6.7.2.6.3	See 6.7.2.8.2, 4.2.1.13.6, 4.2.1.13.7, 4.2.1.13.8	See 4.2.1.13.13

- (a) Provided that steps have been taken to achieve the safety equivalence of 65% tert-Butyl hydroperoxide and 35% water.
- (b) Diluent type B is tert-Butyl alcohol.
- (c) Maximum quantity per portable tank: 2000 kg.

T50	PORTABLE TANK INSTRUCTIONS	T50

This portable tank instruction applies to non-refrigerated liquefied gases and chemicals under pressure (UN Nos. 3500, 3501, 3502, 3503, 3504 and 3505). The general provisions of Section 4.2.2 and the requirements of Section 6.7.3 shall be met.								
UN No.	Substance	Max. allowable working pressure, (bar) for tanks ^{a), b), c), d)} :				Openings below liquid level	Pressure relief requirements ^{e)} (See 6.7.3.7)	Max. filling ratio, kg/l
		Small	Bare	Sun-shield	Insulated			
1	2	3a)	3b)	3c)	3d)	4	5	6
1005	Ammonia, anhydrous	29,0	25,7	22,0	19,7	Allowed	See 6.7.3.7.3	0,53
1009	Bromotrifluoromethane (refrigerant gas R 13B1)	38,0	34,0	30,0	27,5	Allowed	Normal	1,13
1010	Butadienes, stabilized	7,5	7,0	7,0	7,0	Allowed	Normal	0,55
1010	Butadienes and hydrocarbon mixture, stabilized	See MAWP definition in 6.7.3.1				Allowed	Normal	See 4.2.2.7
1011	Butan	7,0	7,0	7,0	7,0	Allowed	Normal	0,51
1012	Butylene	8,0	7,0	7,0	7,0	Allowed	Normal	0,53
1017	Chlorine	19,0	17,0	15,0	13,5	Not Allowed	See 6.7.3.7.3	1,25
1018	Chlorodifluoromethane (refrigerant gas R 22)	26,0	24,0	21,0	19,0	Allowed	Normal	1,03
1020	Chloropentafluoroethane (refrigerant gas R 115)	23,0	20,0	18,0	16,0	Allowed	Normal	1,06
1021	1-Chloro-1,2,2,2-tetra- fluoroethane (refrigerant gas R 124)	10,3	9,8	7,9	7,0	Allowed	Normal	1,20
1027	Cyclopropane	18,0	16,0	14,5	13,0	Allowed	Normal	0,53
1028	Dichlorodifluoromethane (refrigerant gas R 12)	16,0	15,0	13,0	11,5	Allowed	Normal	1,15
1029	Dichlorofluoromethane (refrigerant gas R 21)	7,0	7,0	7,0	7,0	Allowed	Normal	1,23
1030	Chlorodifluoromethane (refrigerant gas R 22)	16,0	14,0	12,4	11,0	Allowed	Normal	0,79
1032	Chloropentafluoroethane (refrigerant gas R 115)	7,0	7,0	7,0	7,0	Allowed	Normal	0,59
1033	1-Chloro-1,2,2,2-tetra- fluoroethane (refrigerant gas R 124)	15,5	13,8	12,0	10,6	Allowed	Normal	0,58
1036	Cyclopropane	7,0	7,0	7,0	7,0	Allowed	Normal	0,61
1037	Dichlorodifluoromethane (refrigerant gas R 12)	7,0	7,0	7,0	7,0	Allowed	Normal	0,80
1040	Dichlorofluoromethane (refrigerant gas R 21)	-	-	-	10,0	Not Allowed	See 6.7.3.7.3	0,78
1041	Chlorodifluoromethane (refrigerant gas R 22)	See MAWP definition in 6.7.3.1				Allowed	Normal	See 4.2.2.7

UN No.	Substance	Max. allowable working pressure, (bar) for tanks ^{a), b), c), d)} :				Openings below liquid level	Pressure relief requirements ^{e)} (see 6.7.3.7)	Max. filling ratio, kg/l
		Small	Bare	Sun-shield	Insulated			
1	2	3a)	3b)	3c)	3d)	4	5	6
1055	Isobutylene	8,1	7,0	7,0	7,0	Allowed	Normal	0,52
1060	Methylacetylene and propadiene mixture, stabilized	28,0	24,5	22,0	20,0	Allowed	Normal	0,43
1061	Methylamine, anhydrous	10,8	9,6	7,8	7,0	Allowed	Normal	0,58
1062	Methyl bromide with not more than 2% chloropicrin	7,0	7,0	7,0	7,0	Not Allowed	See 6.7.3.7.3	1,51
1063	Methyl chloride (refrigerant gas R 40)	14,5	12,7	11,3	10,0	Allowed	Normal	0,81
1064	Methyl mercaptan	7,0	7,0	7,0	7,0	Not Allowed	See 6.7.3.7.3	0,78
1067	Dinitrogen tetroxide	7,0	7,0	7,0	7,0	Not Allowed	See 6.7.3.7.3	1,30
1075	Petroleum gases, liquefied	See MAWP definition in 6.7.3.1				Allowed	Normal	See 4.2.2.7
1077	Propylene	28,0	24,5	22,0	20,0	Allowed	Normal	0,43
1078	Refrigerant gas, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	Normal	See 4.2.2.7
1079	Sulphur dioxide	11,6	10,3	8,5	7,6	Not Allowed	See 6.7.3.7.3	1,23
1082	Trifluorochloroethylene, stabilized (refrigerant gas R 1113)	17,0	15,0	13,1	11,6	Not Allowed	See 6.7.3.7.3	1,13
1083	Trimethylamine, anhydrous	7,0	7,0	7,0	7,0	Allowed	Normal	0,56
1085	Vinyl bromide, stabilized	7,0	7,0	7,0	7,0	Allowed	Normal	1,37
1086	Vinyl chloride, stabilized	10,6	9,3	8,0	7,0	Allowed	Normal	0,81
1087	Vinyl methyl ether, stabilized	7,0	7,0	7,0	7,0	Allowed	Normal	0,67
1581	Chloropicrin and methyl bromide mixture with more than 2% chloropicrin	7,0	7,0	7,0	7,0	Not Allowed	See 6.7.3.7.3	1,51
1582	Chloropicrin and methyl chloride mixture	19,2	16,9	15,1	13,1	Not Allowed	See 6.7.3.7.3	0,81
1858	Hexafluoropropylene (refrigerant gas R 1216)	19,2	16,9	15,1	13,1	Allowed	Normal	1,11
1912	Methyl chloride and methylene chloride mixture	15,2	13,0	11,6	10,1	Allowed	Normal	0,81
1958	1,2-Dichloro-1,1,2,2-tetrafluoroethane (refrigerant gas R 114)	7,0	7,0	7,0	7,0	Allowed	Normal	1,30
1965	Hydrocarbon gas, mixture liquefied, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	Normal	See 4.2.2.7
1969	Isobutane	8,5	7,5	7,0	7,0	Allowed	Normal	0,49

UN No.	Substance	Max. allowable working pressure, (bar) for tanks ^{a), b), c), d)} :				Openings below liquid level	Pressure relief requirements ^{e)} (see 6.7.3.7)	Max. filling ratio, kg/l Small
		Small	Bar e	Sun-shield d	Insulated			
1	2	3a)	3b)	3c)	3d)	4	5	6
1973	Chlorodifluoromethane and chloropentafluoroethane mixture with fixed boiling point, with approximately 49% chlorodifluoromethane (refrigerant gas R 502)	28,3	25,3	22,8	20,3	Allowed	Normal	1,05
1974	Chlorodifluorobromomethane (refrigerant gas R 12B1)	7,4	7,0	7,0	7,0	Allowed	Normal	1,61
1976	Octafluorocyclobutane (refrigerant gas RC 318)	8,8	7,8	7,0	7,0	Allowed	Normal	1,34
1978	Propane	22,5	20,4	18,0	16,5	Allowed	Normal	0,42
1983	1-Chloro-2,2,2-trifluoroethane (refrigerant gas R 133A)	7,0	7,0	7,0	7,0	Allowed	Normal	1,18
2035	1,1,1-Trifluoroethane (refrigerant gas R 143A)	31,0	27,5	24,2	21,8	Allowed	Normal	0,76
2424	Octafluoropropane (refrigerant gas R 218)	23,1	20,8	18,6	16,6	Allowed	Normal	1,07
2517	1-Chloro-1,1-difluoroethane (refrigerant gas R 142B)	8,9	7,8	7,0	7,0	Allowed	Normal	0,99
2602	Dichlorodifluoromethane and 1,1-difluoroethane azeotropic mixture with approximately 74% dichlorodifluoromethane (refrigerant gas R 500)	20,0	18,0	16,0	14,5	Allowed	Normal	1,01
3057	Trifluoroacetyl chloride	14,6	12,9	11,3	9,9	Not Allowed	See 6.7.3.7.3	1,17
3070	Ethylene oxide and dichlorodifluoromethane mixture with not more than 12.5% ethylene oxide	14,0	12,0	11,0	9,0	Allowed	See 6.7.3.7.3	1,09

UN No.	Substance	Max. allowable working pressure, (bar) for tanks ^{a), b), c), d)} :				Openings below liquid level	Pressure relief requirements ^{e)} (see 6.7.3.7)	Max. filling ratio, kg/l Small
		Small	Bar e	Sun-shield	Insulated			
1	2	3a)	3b)	3c)	3d)	4	5	6
3153	Perfluoro (methyl vinyl ether)	14,3	13,4	11,2	10,2	Allowed	Normal	1,14
3159	1,1,1,2-Tetrafluoroethane (refrigerant gas R 134A)	17,7	15,7	13,8	12,1	Allowed	Normal	1,04
3161	Liquefied gas, flammable, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	Normal	See 4.2.2.7
3163	Liquefied gas, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	Normal	См. п. 4.2.2.7
3220	Pentafluoroethane (refrigerant gas R 125)	34,4	30,8	27,5	24,5	Allowed	Normal	0,87
3252	Difluoromethane (refrigerant gas R 32)	43,0	39,0	34,4	30,5	Allowed	Normal	0,78
3296	Heptafluoropropane (refrigerant gas R 227)	16,0	14,0	12,5	11,0	Allowed	Normal	1,20
3297	Ethylene oxide and chlorotetrafluoroethane mixture, with not more than 8.8% ethylene oxide	8,1	7,0	7,0	7,0	Allowed	Normal	1,16
3298	Ethylene oxide and pentafluoroethane mixture, with not more than 7.9% ethylene oxide	25,9	23,4	20,9	18,6	Allowed	Normal	1,02
3299	Ethylene oxide and tetrafluoroethane mixture, with not more than 5.6% ethylene oxide	16,7	14,7	12,9	11,2	Allowed	Normal	1,03
3318	Ammonia solution, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	See MAWP definition in 6.7.3.1				Allowed	See 6.7.3.7.3	See 4.2.2.7
3337	Refrigerant gas R 404A	31,6	28,3	25,3	22,5	Allowed	Normal	0,84
3338	Refrigerant gas R 407A	31,3	28,1	25,1	22,4	Allowed	Normal	0,95
3339	Refrigerant gas R 407B	33,0	29,6	26,5	23,6	Allowed	Normal	0,95
3340	Refrigerant gas R 407C	29,9	26,8	23,9	21,3	Allowed	Normal	0,95

UN No.	Substance	Max. allowable working pressure, (bar) for tanks ^{a), b), c), d),}				Openings below liquid level	Pressure relief requirements ^{e)} (see 6.7.3.7)	Max. filling ratio, kg/l Small
		Small	Bare	Sun-shield	Insulated			
1	2	3a)	3b)	3c)	3d)	4	5	6
3500	Chemical under pressure, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	See 6.7.3.7.3	TP4 ^{g)}
3501	Chemical under pressure, flammable, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	See 6.7.3.7.3	TP4 ^{g)}
3502	Chemical under pressure, toxic, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	See 6.7.3.7.3	TP4 ^{g)}
3503	Chemical under pressure, corrosive, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	See 6.7.3.7.3	TP4 ^{g)}
3504	Chemical under pressure, flammable, toxic, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	See 6.7.3.7.3	TP4 ^{g)}
3505	Chemical under pressure, flammable, corrosive, n.o.s.	See MAWP definition in 6.7.3.1				Allowed	See 6.7.3.7.3	TP4 ^{g)}

a) "Small" means tanks having a shell with a diameter of 1.5 m or less.

b) "Bare" means tanks having a shell with a diameter of more than 1.5 m without insulation or sun shield (see 6.7.3.2.12).

c) "Sunshield" means tanks having a shell with a diameter of more than 1.5 m with sun shield (see 6.7.3.2.12).

d) "Insulated" means tanks having a shell with a diameter of more than 1.5 m with insulation (see 6.7.3.2.12); (see definition of "Design reference temperature" in 6.7.3.1).

e) The word "Normal" in the pressure relief requirements column indicates that a frangible disc as specified in 6.7.3.7.3 is not required

g) In this particular case the degree of filling shall be considered for a chemical under pressure (specific provision TP4 see 4.2.5.3) instead of the maximum filling ratio.

T75	PORTABLE TANK INSTRUCTIONS	T75
This portable tank instruction applies to refrigerated liquefied gases. The general provisions of Section 4.2.3 and the requirements of Section 6.7.4 shall be met.		

4.2.5.3 Portable tank special provisions

Portable tank special provisions are assigned to certain substances to indicate provisions which are in addition to or in lieu of those provided by the portable tank instructions or the requirements in Chapter 6.7. Portable tank special provisions are identified by an alpha numeric code beginning with the letters "TP" (tank provision) and are assigned to specific substances in Column (11) of Table A of Chapter 3.2. The following is a list of the portable tank special provisions:

TP1 The degree of filling prescribed in 4.2.1.9.2 shall not be exceeded.

$$\frac{97}{1 + \alpha(t_r - t_f)}$$

TP2 The degree of filling prescribed in 4.2.1.9.3 shall not be exceeded.

$$\frac{95}{1 + \alpha(t_r - t_f)}$$

TP 3 The maximum degree of filling (in %) for solids carried above their melting point and for high temperature liquids shall be determined in accordance with 4.2.1.9.5.

TP 4 The degree of filling shall not exceed 90% or, alternatively, any other value approved by the competent authority (see 4.2.1.16.2).

TP 5 The degree of filling prescribed in 4.2.3.6 shall be met.

TP 6 To prevent the tank bursting in any event, including fire engulfment, it shall be provided with pressure-relief devices which are adequate in relation to the capacity of the tank and to the nature of the substance carried. The devices shall also be compatible with the substance.

TP 7 Air shall be eliminated from the vapour space by nitrogen or other means.

TP 8 The test pressure may be reduced to 1.5 bar when the flash point of the substances carried is greater than 0 °C.

TP 9 A substance under this description shall only be carried in a portable tank under an approval granted by the competent authority.

TP 10 A lead lining, not less than 5 mm thick, which shall be tested annually, or another suitable lining material approved by the competent authority is required. A portable tank may be offered for carriage after the date of expiry of the last lining inspection for a period not to exceed three months beyond that date, after emptying but before cleaning, for purposes of performing the next required test or inspection prior to refilling.

TP 11 – TP15 (reserved)

TP 16 The tank shall be fitted with a special device to prevent under-pressure and excess pressure during normal carriage conditions. This device shall be approved by the competent authority. Pressure-relief requirements are as indicated in 6.7.2.8.3 to prevent crystallization of the product in the pressure-relief valve.

TP 17 Only inorganic non-combustible materials shall be used for thermal insulation of the tank.

TP 18 Temperature shall be maintained during carriage between 18 °C and 40 °C. Portable tanks containing solidified methacrylic acid shall not be reheated during carriage.

TP 19 At the time of construction, the minimum shell thickness determined according to 6.7.3.4 shall be increased by 3 mm as a corrosion allowance. Shell thickness shall be verified ultrasonically at intervals midway between periodic hydraulic tests and shall never be lower than the minimum shell thickness determined according to 6.7.3.4.

TP 20 This substance shall only be carried in insulated tanks under a nitrogen blanket.

TP 21 The shell thickness shall be not less than 8 mm. Tanks shall be hydraulically tested and internally inspected at intervals not exceeding 2.5 years.

- TP 22** Lubricant for joints or other devices shall be oxygen compatible.
- TP 23** "TP 23 *reserved*".
- TP 24** The portable tank may be fitted with a device located under maximum filling conditions in the vapour space of the shell to prevent the buildup of excess pressure due to the slow decomposition of the substance carried. This device shall also prevent an unacceptable amount of leakage of liquid in the case of overturning or entry of foreign matter into the tank. This device shall be approved by the competent authority or its authorized body.
- TP 25** (Reserved)
- TP 26** When carried under heated conditions, the heating device shall be fitted outside the shell. For UN 3176 this requirement only applies when the substance reacts dangerously with water.
- TP 27** A portable tank having a minimum test pressure of 4 bar may be used if it is shown that a test pressure of 4 bar or less is acceptable according to the test pressure definition in 6.7.2.1.
- TP 28** A portable tank having a minimum test pressure of 2.65 bar may be used if it is shown that a test pressure of 2.65 bar or less is acceptable according to the test pressure definition in 6.7.2.1.
- TP 29** A portable tank having a minimum test pressure of 1.5 bar may be used if it is shown that a test pressure of 1.5 bar or less is acceptable according to the test pressure definition in 6.7.2.1.
- TP 30** This substance shall be carried in insulated tanks.
- TP 31** This substance may only be carried in tanks in the solid state.
- TP 32** For UN Nos. 0331, 0332 and 3375, portable tanks may be used subject to the following conditions:
- a) Each portable tank constructed of metal or fibre-reinforced plastics shall be fitted with a pressure-relief device that may be of the spring-loaded type, a frangible disc or a fusible element. The set to discharge or burst pressure, as applicable, shall not be greater than 2.65 bar for portable tanks with minimum test pressures greater than 4 bar.
 - b) For UN 3375 only, the suitability for carriage in tanks shall be demonstrated. One method to evaluate this suitability is test 8 (d) in Test Series 8 (see Manual of Tests and Criteria, Part 1, Sub-section 18.7).
 - c) Substances shall not be allowed to remain in the portable tank for any period that could result in caking. Appropriate measures shall be taken to avoid accumulation and packing of substances in the tank (e.g. cleaning, etc.).
- TP 33** The portable tank instruction assigned for this substance applies to granular and powdered solids and to solids which are filled and discharged at temperatures above their melting point which are cooled and carried as a solid mass. For solids which are carried above their melting point, see 4.2.1.19.
- TP 34** Portable tanks need not be subjected to the impact test as specified in 6.7.4.14.1 if the portable tank is marked "NOT FOR RAIL TRANSPORT" on the plate specified in 6.7.4.15.1 and also in letters of at least 10 cm high on both sides of the outer jacket.
- TP 35** (reserved)
- TP 36** Fusible elements in the vapour space may be used on portable tanks.

- TP 40** Portable tanks shall not be carried when connected with spray application equipment.
- TP 41** With the agreement of the competent authority, the 2.5 year internal examination may be waived or substituted by other test methods or inspection procedures, provided that the portable tank is dedicated to the carriage of the organometallic substances to which this tank special provision is assigned. However, this examination is required when the conditions of 6.7.2.19.7 are met.
- TP 42** Portable tanks are not authorized for the carriage of caesium or rubidium dispersions.
- TP60** (reserved)

CHAPTER 4.3

USE OF TANK-WAGONS, DEMOUNTABLE TANKS, TANK-CONTAINERS AND TANK SWAP BODIES WITH SHELLS MADE OF METALLIC MATERIALS, AND BATTERY-WAGONS AND MULTIPLE-ELEMENT GAS CONTAINERS (MEGCS)

Note 1: For portable tanks and UN multiple-element gas containers (MEGCs) see Chapter 4.2; for vacuum-operated waste tanks, see Chapter 4.5.

Note 2: For use of tank-containers, tank swap bodies and MEGCS on the 1520 mm railways, see 4.3.2.1.8.

Note 3: For tank-containers made under ISO Standard 1496-3:1995 and portable tank instructions T1-T23, T50, T75, see Chapter 4.2

4.3.1 SCOPE OF APPLICATION

4.3.1.1 This Chapter sets out requirements for tank-wagons, demountable tanks and battery-wagons, and to tank-containers, tank swap bodies and MEGCs, which are used for the carriage of gas, liquefied, solid powdered or granulated substances.

4.3.1.2 If provisions take up the whole width of the page, they apply to tank-wagons, demountable tanks and battery-wagons, and to tank-containers, tank swap bodies and MEGCs, indicated in 4.3.1.1. If the page is divided into two columns with a vertical line, then:

- The left-hand column includes requirements applied to tank-wagons, demountable tanks and battery-wagons only;

- The left-hand column includes requirements applied to tank-containers, tank swap bodies and MEGCs only.

4.3.1.3 Section 4.3.2 lists the provisions applicable to tank-wagons, demountable tanks, tank-containers and tank swap bodies, intended for the carriage of substances of all classes, and to battery-wagons and MEGCs intended for the carriage of gases of Class 2. Sections 4.3.3 and 4.3.4 contain special provisions adding to or amending the provisions of Section 4.3.2.

4.3.1.4 For requirements concerning the construction, equipment, type approval, tests (examination) and marking, see Chapter 6.8 or Chapter 6.20.

4.3.1.5 For transitional measures concerning the application of this Chapter, see:
Section 1.6.3. | Section 1.6.4.

4.3.2 PROVISIONS APPLICABLE TO ALL CLASSES

4.3.2.1 Use

A substance subject to provisions of Annex 2 to SMGS may be carried in tank-wagons, demountable tanks, battery-wagons, tank-containers, tank swap bodies and MEGCs only when provision is made for a tank code according to 4.3.3.1.1 and 4.3.4.1.1 in Column (12) of Table A in Chapter 3.2.

4.3.2.1.2. The required type of tank, battery-wagon and MEGC is given in code form in Column (12) of Table A in Chapter 3.2. The identification codes appearing there are made up of letters or numbers in a given order. The explanations for reading the four parts of the code are given as follows:

- In 4.3.3.1.1 (when the substance to be carried belongs to Class 2)

- In 4.3.4.1.1 (when the substance to be carried belongs to Classes 3 to 9)

Additional requirements for the substances to be carried which belong to Classes 5.2 и 7 are listed in 4.3.4.1.3.

4.3.2.1.3 The required type according to 4.3.2.1.2 corresponds to the least stringent construction requirements which are acceptable for the dangerous substance in question unless otherwise prescribed in this Chapter or in Chapter 6.8 or in Chapter 6.20. It is possible to use tanks corresponding to codes prescribing a higher minimum calculation pressure, or more stringent requirements for filling or discharge openings or for safety valves/devices (see 4.3.3.1.1 for Class 2 and 4.3.4.1.1 for Classes 3 to 9).

- 4.3.2.1.4** For certain substances, tanks, battery-wagons or MEGCs are subject to additional provisions which are included as special provisions in Column (13) of Table A in Chapter 3.2.
- 4.3.2.1.5** Tanks, battery-wagons and MEGCs shall not be loaded with any dangerous substances other than those for the carriage of which they have been approved according to 6.8.2.3.1 or 6.20.2.3.1 and which, in contact with the materials of the shell, gaskets, equipment and protective linings, are not liable to react dangerously with them (see section 1.2.1), to form dangerous products or appreciably to weaken these materials⁷.
- 4.3.2.1.6** Foodstuffs shall not be carried in tanks used for dangerous substances unless the necessary steps have been taken to prevent any harm to public health and animals⁸.
- 4.3.2.1.7** The tank record shall be retained by the owner or the operator who shall be able to provide this documentation at the request of the competent authority.
- The tank record shall be maintained throughout the life of the tank and retained for 15 months after the tank is taken out of service.
- Should a change of owner or operator occur during the lifetime of the tank, the tank record shall be transferred to the new owner or operator.
- On the occasion of periodic inspections or tests, copies of the tank record or all necessary documents shall be made available to the inspection body or the undertaking authorised by the competent body for tests, inspections and checks on tanks (see 6.8.2.4.5, 6.8.3.4.18 or 6.20.2.4.5)

Note: *The tank record may alternatively be maintained in electronic form.*

4.3.2.1.8 (reserved)

Additional requirements for use of tank containers on the railways of 1520 mm gauge

The following additional requirements shall be applied to tank containers used on the railways of 1520 mm gauge, which meet the requirements of Chapter 6.8.

4.3.2.1.8.1 (reserved)

Tank containers shall be designed to withstand the longitudinal inertial force equal to $4 R_g$, where:
 R is maximum gross weight of container;
 $g = 9.81 \text{ m/s}^2$ is gravity acceleration.
 The carriage of tank containers designed to withstand the longitudinal inertial force being equal to $2 R_g$, in accordance with 6.8.2.1.2, may be implemented as agreed individually only.

4.3.2.1.8.2 (reserved)

Except for the Republic of Latvia, Republic of Lithuania, Ukraine, Republic of Estonia, the barrels of tank containers shall be used, which are made of materials with a minimum estimated ambient temperature being equal to minus 40°C (see 6.8.2.1.8 and 6.8.2.1.10).

For carriage to destinations in the Russian Federation and Republic of Kazakhstan or by transit via their territories in the period from 1 November until 1 April, the minimum estimated ambient temperature shall be equal to minus 50°C .

Other ranges of ambient temperatures may be adopted as agreed by the competent authority.

The operator of tank containers shall be liable for use of tank containers in an established climatic zone in the course of operation.

⁷ It may be necessary to consult the manufacturer of the tank, battery-wagon or MEGC as well as the manufacturer of the substance and the competent authority for guidance on the compatibility of the substance with the materials of the tank, battery-wagon or MEGC.

⁸ Imported and exported foodstuffs shall not be carried in tanks used for dangerous goods to/from the Republic of Kazakhstan and Russian Federation.

4.3.2.2 Degree of filling

4.3.2.2.1 The following degrees of filling shall not be exceeded in tanks intended for the carriage of liquids at ambient temperatures:

- a) for flammable substances, environmentally hazardous substances and flammable environmentally hazardous substances, without additional risks (e.g. toxicity or corrosivity), in tanks with a breather device or with safety valves (even where preceded by a bursting disc):

$$\text{Degree of filling} = \frac{100}{1 + \alpha(t_r - t_f)}, \% \text{ of capacity};$$

Here and below

α is the mean coefficient of cubical expansion of the liquid between 15 °C and 50 °C, which is calculated by the formula:

$$\alpha = \frac{d_{15} - d_{50}}{35d_{50}}$$

where:

d_{15} and d_{50} are the relative densities of the liquid at 15 °C and 50 °C respectively.

t_r is the maximum mean bulk temperature during carriage, °C.

t_f is the mean temperature of the liquid during filling, °C.

- b) for flammable substances, environmentally hazardous substances and flammable environmentally hazardous substances, without additional risks (e.g. toxicity or corrosivity), in tanks with a breather device or with safety valves (even where preceded by a bursting disc):

$$\text{Degree of filling} = \frac{98}{1 + \alpha(t_r - t_f)}, \% \text{ of capacity};$$

- c) for flammable substances, environmentally hazardous substances and slightly toxic or corrosive substances (whether flammable or environmentally hazardous or not) in hermetically closed tanks without a safety device:

$$\text{Degree of filling} = \frac{97}{1 + \alpha(t_r - t_f)}, \% \text{ of capacity};$$

- d) for highly toxic, toxic, highly corrosive or corrosive substances (whether flammable or environmentally hazardous or not) in hermetically closed tanks without a safety device:

$$\text{Degree of filling} = \frac{95}{1 + \alpha(t_r - t_f)}, \% \text{ of capacity}.$$

4.3.2.2.2 The maximum mean bulk temperature during carriage (t_r) shall be taken to be equal to 50°C, except for carriage under moderate and extreme climatic conditions, where the respective competent authority may allow using a lower or a higher temperature on a case-by-case basis.

4.3.2.2.3 The provisions of 4.3.2.2.1 a) to d) above shall not apply to tanks carrying liquids at a temperature above 50°C during carriage.

The degree of filling of:

- a) liquid substances carried at a temperature above 50 °C;
 b) liquid substances filled below 50 °C but intended to be heated above 50 °C during the carriage operation, and
 c) solid substances carried above their melting point,
 shall be such that the tank is not more than 95% full at any time during carriage.

The maximum degree of filling shall be determined by the following formula:

$$\text{Degree of filling} = 95 \frac{d_r}{d_f} \% \text{ of capacity}$$

in which d_r and d_f are the densities of the substance at the mean temperature during filling and the maximum mean bulk temperature during carriage respectively.

Tanks with a heating device shall have the temperature so regulated that the maximum degree of filling of 95% of capacity is not exceeded at any time during carriage.

- 4.3.2.2.4** Shells intended for the carriage of substances in the liquid state or liquefied gases or refrigerated liquefied gases, which are not divided by partitions or surge plates into sections of not more than 7 500 litres capacity, shall be filled to not less than 80% or not more than 20% of their capacity.

This provision is not applicable to:

- liquids with a kinematic viscosity at 20 °C of at least 2680 mm²/s;
- molten substances with a kinematic viscosity at the temperature of filling of at least 2680 mm²/s;
- UN 1963 HELIUM, REFRIGERATED, LIQUID and UN 1966 HYDROGEN, REFRIGERATED, LIQUID.

4.3.2.3 Operation

- 4.3.2.3.1** The thickness of the walls of the shell shall not, throughout its use, fall below the minimum figure prescribed in:

6.8.2.1.17 and 6.8.2.1.18 or 6.20.2.1.17, 6.20.2.1.18	6.8.2.1.17 to 6.8.2.1.20

4.3.2.3.2 (Reserved)

During carriage tank-containers/MEGCs shall be loaded on the carrying wagon in such a way as to be adequately protected by the fittings of the carrying wagon or of the tank-container/MEGC itself against lateral and longitudinal impact and against overturning⁹. If the tank-containers/MEGCs, including the service equipment, are so constructed as to withstand impact or overturning they need not be protected in this way.

- 4.3.2.3.3** During filling and discharge of tanks, battery-wagons and MEGCs, appropriate measures shall be taken to prevent the release of dangerous quantities of gases and vapours. Tanks, battery-wagons and MEGCs shall be closed so that the contents cannot spill out uncontrolled. The openings of bottom-discharge tanks shall be closed by means of screw-threaded plugs, blank flanges or other equally effective devices. After filling, the filler shall ensure that all the closures of the tanks, battery-wagons and MEGCs are in the closed position and there is no leakage. This also applies to the upper part of the dip tube.

- 4.3.2.3.4** Where several closure systems are fitted in series, the nearest to the substance being carried shall be closed first.

- 4.3.2.3.5** No dangerous residue of the filling substance shall adhere to the outside of the tank after loading and during carriage.

⁹ Examples of protection of shells:

- protection against lateral impact may, for example, consist of longitudinal bars protecting the shell on both sides at the level of the median line;
- protection against overturning may, for example, consist of reinforcing rings or bars fixed transversally in relation to the frame;
- protection against rear impact, may, for example, consist of a bumper or frame.

- 4.3.2.3.6** Substances which may react dangerously with each other shall not be carried in adjoining compartments of tanks unless:
- the compartments are separated by a partition with a wall thickness equal to or greater than that of the tank itself
 - the loaded compartments are separated by an empty space or an empty compartment.
- Note:** *Separation of loaded compartments by empty compartments during carriage in the territory of the Russian Federation shall not be allowed.*
- 4.3.2.3.7** Tank-wagons, demountable tanks, battery-wagons, tank-containers, tank swap bodies and MEGCs may not be filled or offered for carriage after the date specified for the next inspection required by 6.8.2.4.2, 6.8.2.4.3, 6.8.3.4.6 6.8.3.4.12, 6.20.2.4.2, 6.20.2.4.3 and 6.8.3.20.6.
- However, tank-wagons, demountable tanks, battery-wagons, tank-containers, tank swap bodies and MEGCs filled prior to the date specified for the next inspection may be carried:
- a) for a period not to exceed one month after the date specified if the inspection due is a periodic inspection in accordance with 6.8.2.4.2, 6.8.3.4.6 a), 6.8.3.4.12, 6.20.2.4.2 and 6.20.3.4.6;
 - b) unless otherwise approved by the competent authority, for a period not to exceed three months after the expiry of the date specified, if the inspection due is a periodic inspection in accordance with 6.8.2.4.2, 6.8.3.4.6 a), 6.8.3.4.12, 6.20.2.4.2 and 6.20.3.4.6 in order to allow the return of dangerous goods for proper disposal or recycling. Reference to this exemption shall be mentioned in the transport document;
 - c) for a period not to exceed three months after the date specified, if the inspection due is an intermediate inspection in accordance with 6.8.2.4.3, 6.8.3.4.6 b), 6.8.3.4.12, 6.20.2.4.3 и 6.20.3.4.6 b).
- 4.3.2.4** Uncleaned empty tanks, battery-wagons and MEGCs,
- Note:** *For empty tanks, battery-wagons and MEGCs, uncleaned, special provisions TU1, TU2, TU4, TU16 and TU35 of 4.3.5 may apply.*
- 4.3.2.4.1** No dangerous residue of the filling substance shall adhere to the outside of the tank during carriage.
- 4.3.2.4.2** To be accepted for carriage, empty tanks, battery-wagons and MEGCs, uncleaned, shall be closed in the same manner and be leakproof to the same degree as if they were full.
- 4.3.2.4.3** Where empty tanks, battery-wagons and MEGCs, uncleaned, are not closed in the same manner and are not leakproof to the same degree as if they were full and where the provisions of Annex 2 to SMGS cannot be complied with, they shall be carried, with due regard to adequate safety, to the nearest suitable place where cleaning or repair can be carried out.
- Carriage is adequately safe if suitable measures have been taken to ensure equivalent safety commensurate with the provisions of Annex 2 to SMGS and to prevent the uncontrolled release of the dangerous goods.
- 4.3.2.4.4** Empty tank-wagons, demountable tanks, battery-wagons, tank-containers, tank swap bodies and MEGCs, uncleaned, may also be carried after the expiry of the periods established in 6.8.2.4.2 , 6.8.2.4.3, 6.20.2.4.2 and 6.20.2.4.3 for undergoing the inspection.

4.3.3 SPECIAL PROVISIONS APPLICABLE TO CLASS 2

4.3.3.1 Coding and hierarchy of tanks

4.3.3.1.1 Coding of tanks, battery-wagons and MEGCs

The four parts of the codes (tank codes) given in Column (12) of Table A in Chapter 3.2 have the following meanings:

Serial number of the Part	Description	Tank code and tank purpose
1	Types of tank, battery-wagons or MEGC	C – tank, battery-wagon or MEGC for compressed gases P – tank, battery-wagon or MEGC for liquefied gases or dissolved gases R – tank for refrigerated liquefied gases
2	Calculation pressure	X = value of the minimum relevant test pressure according to the table in 4.3.3.2.5; or 22 = minimum calculation pressure in bar
3	Openings (see 6.8.2.2, 6.8.3.2, 6.20.2.2 and 6.20.3.2)	B – tank with bottom filling or discharge openings with 3 closures; or battery-wagon or MEGC with openings below the surface of the liquid or for compressed gases C – tank with top filling or discharge openings with 3 closures with only cleaning openings below the surface of the liquid D – tank with top filling or discharge openings with 3 closures; or battery-wagon or MEGC with no openings below the surface of the liquid
4	Safety valves and devices	N – tank, battery-wagon or MEGC with safety valve according to 6.8.3.2.9, 6.8.3.2.10 or 6.20.3.2.9 which is not hermetically closed (see 1.2.1 for the tank hermetically closed). H – hermetically closed tank, battery-wagon or MEGC (see 1.2.1 for the tank hermetically closed)

Note 1: The special provision TU 17 indicated in Column 13 of Table A in Chapter 3.2 for certain gases means that the gas may only be carried in a battery-wagon or MEGC, the elements of which are composed of receptacles.

Note 2: The special provision TU 40 indicated in Column (13) of Table A in Chapter 3.2 for certain gases means that the gas may only be carried in a battery-wagon or an MEGC, the elements of which are composed of seamless receptacles.

Note 3: The pressures indicated on the tank itself or on the panel shall be not less than the value of "X" or the minimum calculation pressure.

4.3.3.1.2 Hierarchy of tanks

Tank code	Other tank code(s) permitted for the substances under this code
C*BN	C#BN, C#CN, C#DN, C#BH, C#CH, C#DH
C*BH	C#BH, C#CH, C#DH
C*CN	C#CN, C#DN, C#CH, C#DH
C*CH	C#CH, C#DH
C*DN	C#DN, C#DH
C*DH	C#DH
P*BN	P#BN, P#CN, P#DN, P#BH, P#CH, P#DH
P*BH	P#BH, P#CH, P#DH
P*CN	P#CN, P#DN, P#CH, P#DH
P*CH	P#CH, P#DH
P*DN	P#DN, P#DH
P*DH	P#DH
R*BN	R#BN, R#CN, R#DN
R*CN	R#CN, R#DN
R*DN	R#DN

The figure represented by "#" shall be equal to or greater than the figure represented by "*".

Note: This hierarchy does not take any special provisions of Column 13, Table A, Chapter 3.2. into account (see also 4.3.5, 6.8.4 and 6.20.4).

4.3.3.2 Filling conditions and values of test pressures

4.3.3.2.1 The test pressure for tanks intended for the carriage of compressed gases shall be at least 1.5 times in excess of the working pressure as defined in 1.2.1.

4.3.3.2.2 The test pressure for tanks intended for the carriage of high pressure liquefied gases and dissolved gasses shall exceed the pressure of the abovementioned gases (when the shell is filled to the maximum filling ratio):

- at 55°C for tanks with thermal insulation;
- at 65°C for tanks without thermal insulation.

4.3.3.2.3 The test pressure for tanks intended for the carriage of low pressure liquefied gases will be as follows:

- a) If the tank is equipped with thermal insulation, at least equal to the vapour pressure, reduced by 0.1 MPa (1 bar) of the liquid at 60°C, but not less than 1 MPa (10 bar);
- b) If the tank is not equipped with thermal insulation, at least equal to the vapour pressure, reduced by 0.1 MPa (1 bar), of the liquid at 65°C, but not less than 1 MPa (10 bar).

The maximum permissible mass of contents per litre of capacity shall not exceed 95% of density of the liquid phase at 50°C (in kg/l). Moreover the vapour phase shall not disappear below 60°C. If the shells are not more than 1.5 m in diameter, the values of the test pressure and maximum filling ratio (kg/l) conforming to packing instruction P200 in 4.1.4.1 shall be applicable.

4.3.3.2.4 The test pressure for tanks intended for the carriage of refrigerated liquefied gases shall be not less than 1.3 times the maximum working pressure indicated on the tank but not less than 300 kPa bar (gauge pressure); for tanks with vacuum insulation the test pressure shall be not less than 1.3 times the maximum working pressure increased by 100 kPa (1 bar).

4.3.3.2.5 Table of gases and gas mixtures which may be carried in tank-wagons, battery-wagons, demountable tanks, tank-containers or MEGCs indicating the minimum test pressure for tanks and as far as applicable the filling ratio (kg/l).

In the case of gases and gas mixtures classified under n.o.s. entries, the values of the test pressure and the maximum filling ratio shall be prescribed by the inspection body.

When tanks for compressed or high pressure liquefied gases have been subjected to a test pressure lower than shown in the table, and the tanks are fitted with thermal insulation, a lower maximum load may be prescribed by the inspection body, provided that the pressure reached in the tank by the substance at 55°C does not exceed the test pressure stamped on the tank.

UN No.	Name	Classification code	Minimum test pressure for tanks				Maximum permissible mass of contents per litre of capacity kg
			With thermal insulation		Without thermal insulation		
			MPa	bar	MPa	bar	
1	2	3	4	5	6	7	8
1001	Acetylene, dissolved	4F	only in battery-wagons and MEGCs composed of receptacles				
1002	Air, compressed	1A	see 4.3.3.2.1				
1003	Air, refrigerated liquid	3O	see 4.3.3.2.4				
1005	Ammonia, anhydrous	2TC	2,6	26	2.9	29	0.53
1006	Argon, compressed	1A	see 4.3.3.2.1				
1008	Boron trifluoride	2TC	22,5 30	225 300	22.5 30	225 300	0.715 0.86
1009	Bromotrifluoromethane (refrigerant gas R13B1)	2A	12	120	4,2 12 25	42 120 250	1.50 1.13 1.44 1.60
1010	Butadienes, stabilized (1.3- butadiene) or Butadienes, stabilized (1,2- butadiene) or Butadienes and hydrocarbon mixture, stabilized	2F	1 1 1	10 10 10	1 1 1	10 10 10	0.59 0.55 0.50
1011	Butane	2F	1	10	1	10	0.51
1012	BUTYLENE (1-Butylene) or BUTYLENE (trans-2-Butylene) or BUTYLENE (cis-2-Butylene) or BUTYLENE (Butylenes mixture)	2F	1 1 1 1	10 10 10 10	1 1 1 1	10 10 10 10	0.53 0.54 0,55 0.50
1013	Carbon dioxide	2A	19 22,5	190 225	19 25	190 250	0.73 0.78 0.66 0.75
1016	Carbon monoxide, compressed	1TF	see 4.3.3.2.1				
1017	Chlorine	2TOC	1.7	17	1.9	19	1.25
1018	Chlorodifluoromethane (refrigerant gas R22)	2A	2.4	24	2.6	26	1.03
1020	Chloropentafluoroethane (refrigerant gas R115)	2A	2	20	2.3	23	1.08
1021	1-Chloro-1,2,2,2--tetrafluoroethane (refrigerant gas R124)	2A	1	10	1.1	11	1.2
1022	Chlorotrifluoromethane (refrigerant gas R13)	2A	12 22,5	120 225	10 12 19 25	100 120 190 250	0.96 1.12 0.83 0.90 1.04 1.10
1023	Coal gas, compressed	1TF	see 4.3.3.2.1				
1026	Cyanogen	2TF	10	100	10	100	0.70
1027	Cyclopropane	2F	1.6	1.6	1.8	1.8	0.53
1028	Dichlorodifluoromethane (refrigerant gas R12)	2A	1.5	15	1.6	16	1.15
1029	Dichlorofluoromethane (refrigerant gas R21)	2A	1	10	1	10	1.23
1030	1,1- Difluoroethane (refrigerant gas R152a)	2F	1.4	14	1.6	16	0.79

UN No.	Name	Classification code	Minimum test pressure for tanks				Maximum permissible mass of contents per litre of capacity kg
			With thermal insulation		Without thermal insulation		
			MPa	bar	MPa	bar	
1	2	3	4	5	6	7	8
1032	Dimethylamine, anhydrous	2F	1	10	1	10	0.59
1033	Dimethyl ether	2F	1.4	14	1.6	16	0.58
1035	Ethane	2F	12	120	9,5 12 30	95 120 300	0.32 0.25 0.29 0.39
1036	Ethylamine	2F	1	10	1	10	0.61
1037	Ethyl chloride	2F	1	10	1	10	0.8
1038	Ethylene, refrigerated liquid	3F	see 4.3.3.2.4				
1039	Ethyl methyl ether	2F	1	10	1	10	0.64
1040	Ethylene oxide with nitrogen up to a total pressure of 1 MPa (10 bar) at 50°C	2TF	1.5	15	1.5	15	0.78
1041	Ethylene oxide and carbon dioxide mixture, with more than 9% but not more than 87% ethylene oxide	2F	2.4	24	2.6	26	0.73
1046	Helium, compressed	1A	see 4.3.3.2.1				
1048	Hydrogen bromide, anhydrous	2TC	5	50	5.5	55	1.54
1049	Hydrogen, compressed	1F	see 4.3.3.2.1				
1050	Hydrogen chloride, anhydrous	2TC	12	120	10 12 15 20	100 120 150 200	0.69 0.30 0.56 0.67 0.74
1053	Hydrogen sulphide	2TF	4,5	45	5	50	0.67
1055	Isobutylene	2F	1	10	1	10	0.52
1056	Krypton, compressed	1A	see 4.3.3.2.1				
1058	Liquefied gases, non flammable, charged with nitrogen, carbon dioxide or air	2A	1.5 × filling pressure (see 4.3.3.2.2 or 4.3.3.2.3)				
1060	Methylacetylene and propadiene mixture, stabilized: Mixture P1 Mixture P2 Propadiene with 1-4% methylacetylene	2F	see 4.3.3.2.2 or 4.3.3.2.3				
			2,5	25	2.8	28	0.49
			2,2	22	2.3	23	0.47
			2.2	22	2.2	22	0.50
1061	Methylamine, anhydrous	2F	1	10	1.1	11	0.58
1062	Methyl bromide with not more than 2% chloropicrin	2T	1	10	1	10	1.51
1063	Methyl chloride (refrigerant gas R40)	2F	1.3	13	1.5	15	0.81
1064	Methylmercaptan	2TF	1	10	1	10	0.78
1065	Neon, compressed	1A	see 4.3.3.2.1				
1066	Nitrogen, compressed	1A	see 4.3.3.2.1				
1067	Dinitrogen tetroxide (nitrogen dioxide)	2TOC	only in battery-wagons and MEGCs composed of receptacles				
1070	Nitrous oxide	2O	22,5	225	18 22,5 25	180 225 250	0.78 0.68 0.74 0.75
1071	Oil gas, compressed	1TF	see 4.3.3.2.1				
1072	Oxygen, compressed	1O	see 4.3.3.2.1				
1073	Oxygen, refrigerated liquid	3O	see 4.3.3.2.4				
1075	Petroleum gases, liquefied	2F	see 4.3.3.2.2 or 4.3.3.2.3				

UN No.	Name	Classification code	Minimum test pressure for tanks				Maximum permissible mass of contents per litre of capacity kg
			With thermal insulation		Without thermal insulation		
			MPa	bar	MPa	bar	
1	2	3	4	5	6	7	8
1076	Phosgene	2TC	only in battery-wagons and MEGCs composed of receptacles				
1077	Propylene	2F	2,5	25	2,7	27	0,43
1078	Refrigerant gases, n.o.s., such as: Mixture F1 Mixture F2 Mixture F3 Other mixtures	2A	1 1,5 2,4	10 15 24	1.1 1.6 2.7	11 16 27	1.23 1.15 1.03
			see 4.3.3.2.2 or 4.3.3.2.3				
1079	Sulphur dioxide	2TC	1	10	1.2	12	1.23
1080	Sulphur hexafluoride	2A	12	120	7 14 16	70 140 160	1.34 1.04 1.33 1.37
1081	Tetrafluoroethylene, stabilized	2F	only in battery-wagons and MEGCs composed of seamless receptacles				
1082	Trifluorochloroethylene, stabilized (refrigerant gas R1113)	2TF	1.5	15	1.7	17	1.13
1083	Trimethylamine, anhydrous	2F	1	10	1	10	0.56
1085	Vinyl bromide, stabilized	2F	1	10	1	10	1.37
1086	Vinyl chloride stabilized	2F	1	10	1.1	11	0.81
1087	Vinyl methyl ether stabilized	2F	1	10	1	10	0.67
1581	Chloropicrin and methyl bromide mixture with more than 2% chloropicrin	2T	1	10	1	10	1.51
1582	Chloropicrin and methyl chloride mixture	2T	1.3	13	1.5	15	0.81
1612	Hexaethyl tetraphosphate and compressed gas mixture	1T	see 4.3.3.2.1				
1749	Chlorine trifluoride	2TOC	3	30	3	30	1.40
1858	Hexafluoropropylene (refrigerant gas R1216)	2A	1.7	17	1.9	19	1.11
1859	Silicon tetrafluoride	2TC	20 30	200 300	20 30	200 300	0,74 1.10
1860	Vinyl fluoride, stabilized	2F	12 22,5	120 225	25	250	0.58 0.65 0.64
1912	Methyl chloride and methylene chloride mixture	2F	1.3	13	1.5	15	0.81
1913	Neon, refrigerated liquid	3 A	see 4.3.3.2.4				
1951	Argon, refrigerated liquid	3A	see 4.3.3.2.4				
1952	Ethylene oxide and carbon dioxide mixture, with not more than 9% ethylene oxide	2A	19 25	190 250	19 25	190 250	0.66 0.75
1953	Compressed gas, toxic, flammable, n.o.s.*	1TF	see 4.3.3.2.1 or 4.3.3.2.2				
1954	Compressed gas, flammable n.o.s.	1F	see 4.3.3.2.1 or 4.3.3.2.2				
1955	Compressed gas, toxic, n.o.s *	1T	see 4.3.3.2.1 or 4.3.3.2.2				
1956	Compressed gas, n.o.s.	1A	see 4.3.3.2.1 or 4.3.3.2.2				
1957	Deuterium,compressed	1F	see 4.3.3.2.1				
1958	1,2-Dichloro-1,1,2,2- tetrafluoroethane (refrigerant gas R114)	2A	1	10	1	10	1.3

UN No.	Name	Classification code	Minimum test pressure for tanks				Maximum permissible mass of contents per litre of capacity kg
			With thermal insulation		Without thermal insulation		
			MPa	bar	MPa	bar	
1	2	3	4	5	6	7	8
1959	1,1-Difluoroethylene (refrigerant gas R1132a)	2F	12 22,5	120 225	 25	 250	0.66 0.78 0.77
1961	Ethane, refrigerated liquid	3F	see 4.3.3.2.4				
1962	Ethylene	2F	12 22.5	120 225	 22,5 30	 225 300	0.25 0.36 0.34 0.37
1963	Helium, refrigerated liquid	3A	see 4.3.3.2.4				
1964	Hydrocarbon gas mixture, compressed, n.o.s.	1F	see 4.3.3.2.1 or 4.3.3.2.2				
1965	Hydrocarbon gas mixture, liquefied, n.o.s. Mixture A Mixture A01 Mixture A02 Mixture A0 Mixture A1 Mixture B1 Mixture B2 Mixture B Mixture C Other mixtures	2F	 1 1.2 1.2 1.2 1.6 2 2 2 2.5	 10 12 12 12 16 20 20 20 25	 1 1.4 1.4 1.4 1.8 2.3 2.3 2.3 2.7	 10 14 14 14 18 23 23 23 27	 0.50 0.49 0.48 0.47 0.46 0.45 0.44 0.43 0.42
1966	Hydrogen, refrigerated liquid	3F	see 4.3.3.2.4				
1967	Insecticide gas, toxic, n.o.s.*	2T	see 4.3.3.2.2 or 4.3.3.2.3				
1968	Insecticide gas, n.o.s.	2A	see 4.3.3.2.2 or 4.3.3.2.3				
1969	Isobutane	2F	1	10	1	10	0,49
1970	Krypton, refrigerated liquid	3A	see 4.3.3.2.4				
1971	Methane, compressed or natural gas, compressed with high methane content	1F	see 4.3.3.2.1				
1972	Methane, refrigerated liquid or natural gas, refrigerated liquid with high methane content	3F	see 4.3.3.2.4				
1973	Chlorodifluoromethane and chloropentafluoroethane mixture with fixed boiling point, with approximately 49% chlorodifluoromethane (refrigerant gas R502)	2A	2.5	25	2.8	28	1.05
1974	Chlorodifluorobromomethane (refrigerant gas R12B1)	2A	1	10	1	10	1.61
1976	Octafluorocyclobutane (refrigerant gas RC318)	2A	1	10	1	10	1.34
1977	Nitrogen, refrigerated liquid	3A	see 4.3.3.2.4				
1978	Propane	2F	2.1	21	2.3	23	0.42
1982	Tetrafluoromethane (refrigerant gas R14)	2A	20 30	200 300	20 30	200 300	0.62 0.94
1983	1-Chloro-2,2,2- trifluoroethane (refrigerant gas R133a)	2A	1	10	1	10	1.18
1984	Trifluoromethane (refrigerant gas R23)	2A	19 25	190 250	 19 25	 190 250	0.92 0.99 0.87 0.95

UN No.	Name	Classification code	Minimum test pressure for tanks				Maximum permissible mass of contents per litre of capacity kg
			With thermal insulation		Without thermal insulation		
			MPa	bar	MPa	bar	
1	2	3	4	5	6	7	8
2034	Hydrogen and methane mixture, compressed	1F	see 4.3.3.2.1				
2035	1,1,1- Trifluoroethane (refrigerant gas R143a)	2F	2,8	28	3.2	32	0.79
2036	Xenon	2A	12	120	13	130	1.30 1.24
2044	2,2-Dimethylpropane	2F	1	10	1	10	0.53
2073	Ammonia solution, relative density less than 0.880 at 15 °C in water, with more than 35% and not more than 40% ammonia with more than 40% and not more than 50% ammonia	4A	1 1.2	10 12	1 1.2	10 12	0.80 0.77
2187	Carbon dioxide, refrigerated liquid	3A	see 4.3.3.2.4				
2189	Dichlorosilane	2TFC	1	10	1	10	0.90
2191	Sulfuryl fluoride	2T	5	50	5	50	1.1
2193	Hexafluoroethane (refrigerant gas R116)	2A	16 20	160 200	20	200	1.28 1.34 1.10
2197	Hydrogen iodide, anhydrous	2TC	1.9	19	2.1	21	2.25
2200	Propadiene, stabilized	2F	1.8	18	2.0	20	0.50
2201	Nitrous oxide, refrigerated liquid	3O	see 4.3.3.2.4				
2203	Silane **	2F	22.5 25	225 250	22.5 25	225 250	0.32 0.36
2204	Carbonyl sulphide	2TF	2.7	27	3.0	30	0.84
2417	Carbonyl fluoride	2TC	20 30	200 300	20 30	200 300	0.47 0.70
2419	Bromotrifluoroethylene	2F	1	10	1	10	1.19
2420	Hexafluoroacetone	2TC	1.6	16	1.8	18	1.08
2422	Octafluorobut-2-ene (refrigerant gas R1318)	2A	1	10	1	10	1.34
2424	Octafluoropropane (refrigerant gas R218)	2A	2.1	21	2,3	23	1.07
2451	Nitrogen trifluoride	2O	20 30	200 300	20 30	200 300	0.50 0.75
2452	Ethylacetylene, stabilized	2F	1	10	1	10	0.57
2453	Ethyl fluoride (refrigerant gas R161)	2F	2.1	21	2.5	25	0.57
2454	Methyl fluoride (refrigerant gas R41)	2F	30	300	30	300	0.36
2517	1-Chloro-1,1- difluoroethane (refrigerant gas R142b)	2F	1	10	1	10	0.99
2591	Xenon, refrigerated liquid	3A	see 4.3.3.2.4				
2599	Chlorotrifluoromethane and trifluoromethane, azeotropic mixture with approximately 60% chlorotrifluoromethane (refrigerant gas R503)	2A	3.1 4,2 10	31 42 100	3,1 4,2 10	31 42 100	0.11 0.21 0.76 0.20 0.66
2601	Cyclobutane	2F	1	10	1	10	0.63
2602	Dichlorodifluoromethane and difluoro-1,1 ethane, azeotropic mixture with approximately 74% dichlorodifluoromethane (refrigerant gas R500)	2A	1.8	18	2	20	1.01
2901	Bromine chloride	2TOC	1	10	1	10	1.50

UN No.	Name	Classification code	Minimum test pressure for tanks				Maximum permissible mass of contents per litre of capacity kg
			With thermal insulation		Without thermal insulation		
			MPa	bar	MPa	bar	
1	2	3	4	5	6	7	8
3057	Trifluoroacetyl chloride	2TC	1.3	13	1.5	15	1.17
3070	ethylene oxide and dichlorodifluoromethane mixture with not more than 12.5% ethylene oxide	2A	1.5	15	1.6	16	1.09
3083	Perchloryl fluoride	2TO	2.7	27	3.0	30	1.21
3136	Trifluoromethane, refrigerated liquid	3A	see 4.3.3.2.4				
3138	Ethylene, acetylene propylene in mixture, refrigerated liquid, containing at least 71.5% ethylene with not more than 22.5% acetylene and not more than 6% propylene	3F	see 4.3.3.2.4				
3153	Perfluoro(methyl vinyl ether)	2F	1.4	14	1.5	15	1.14
3154	Perfluoro(ethyl vinyl ether)	2F	1	10	1	10	0.98
3156	Compressed gas, oxidizing, n.o.s.	1O	see 4.3.3.2.1 or 4.3.3.2.2				
3157	Liquefied gas, oxidizing, n.o.s.	2O	see 4.3.3.2.2 or 4.3.3.2.3				
3158	Gas, refrigerated liquid, n.o.s.	3A	see 4.3.3.2.4				
3159	1,1,1,2- Tetrafluoroethane (refrigerant gas R134a)	2A	1.6	16	1.8	18	1.04
3160	Liquefied gas, toxic, flammable, n.o.s	2TF	see 4.3.3.2.2 or 4.3.3.2.3				
3161	Liquefied gas, flammable, n.o.s.	2F	see 4.3.3.2.2 or 4.3.3.2.3				
3162	Liquefied gas, toxic, n.o.s.*	2T	see 4.3.3.2.2 or 4.3.3.2.3				
3163	Liquefied gas, n.o.s.	2A	see 4.3.3.2.2 or 4.3.3.2.3				
3220	Pentafluoroethane (refrigerant gas R125)	2A	4.1	4.1	4.9	49	0.95
3252	Difluoromethane (refrigerant gas R32)	2 F	3.9	39	4.3	43	0.78
3296	Heptafluoropropane (refrigerant gas R227)	2A	1.4	14	1.6	16	1.20
3297	Ethylene oxide and pentafluoroethane mixture, with not more 8.8% ethylene oxide	2A	1	10	1	10	1.16
3298	Ethylene oxide and pentafluoroethane mixture, with not more 7.9% ethylene oxide	2A	2.4	24	2,6	26	1.02
3299	Ethylene oxide and tetrafluoroethane mixture, with not more 5.6% ethylene oxide	2A	1.5	15	1.7	17	1.03
3300	Ethylene oxide and carbon dioxide mixture, with more than 87% ethylene oxide	2TF	2.8	28	2.8	28	0.73
3303	Compressed gas, toxic, oxidizing, n.o.s. *	1TO	see 4.3.3.2.1 or 4.3.3.2.2				
3304	Compressed gas, toxic, corrosive, n.o.s. *	1TC	see 4.3.3.2.1 or 4.3.3.2.2				
3305	Compressed gas, toxic, flammable, corrosive, n.o.s.*	1TFC	see 4.3.3.2.1 or 4.3.3.2.2				
3306	Compressed gas, toxic, oxidizing, corrosive, n.o.s. *	1TOC	see 4.3.3.2.1 or 4.3.3.2.2				
3307	Liquefied gas, toxic, oxidizing, n.o.s.*	2TO	see 4.3.3.2.2 or 4.3.3.2.3				

UN No.	Name	Classification code	Minimum test pressure for tanks				Maximum permissible mass of contents per litre of capacity kg
			With thermal insulation		Without thermal insulation		
			MPa	bar	MPa	bar	
1	2	3	4	5	6	7	8
3308	Liquefied gas, toxic, corrosive, n.o.s.*	2TC	see 4.3.3.2.2 or 4.3.3.2.3				
3309	Liquefied gas, toxic, flammable, corrosive, n.o.s.*	2TFC	see 4.3.3.2.2 or 4.3.3.2.3				
3310	Liquefied gas, toxic, oxidizing, corrosive, n.o.s.*	2TOC	see 4.3.3.2.2 or 4.3.3.2.3				
3311	Gas, refrigerated liquid, oxidizing, n.o.s.	3O	see 4.3.3.2.4				
3312	Gas, refrigerated liquid, flammable, n.o.s.	3F	see 4.3.3.2.4				
3318	AMMONIA SOLUTION, relative density less than 0.880 at 15 °C in water, with more than 50% ammonia	4TC	see 4.3.3.2.2				
3337	Refrigerant gas R404A	2A	2.9	29	3.2	32	0.84
3338	Refrigerant gas R407A	2A	2.8	28	3.2	32	0.95
3339	Refrigerant gas R407B	2A	3.0	30	3.3	33	0.95
3340	Refrigerant gas R407C	2A	2.7	27	3.0	30	0.95
3354	Insecticide gas,flammable, n.o.s.	2F	see 4.3.3.2.2 or 4.3.3.2.3				
3355	Insecticide gas, toxic, flammable, n.o.s.*	2TF	see 4.3.3.2.2 or 4.3.3.2.3				

* Allowed if LC_{50} equal to or greater than 200 ppm.

** Considered as pyrophoric

4.3.3.3 Operation

4.3.3.3.1 When tanks, battery-wagons or MEGCs are approved for different gases, the change of use shall include emptying, purging and evacuation operations to the extent necessary for safe operation.

4.3.3.3.2 (reserved).

4.3.3.3.3 All the elements of a battery-wagons or MEGC shall contain only one and the same gas.

4.3.3.3.4 When the external overpressure could be greater than the tank resistance to external pressure (e.g. due to low ambient temperatures), adequate measures shall be taken to protect tanks carrying low pressure liquefied gases against the risk of deformation, e.g. by filling them with nitrogen or another inert gas in order to maintain sufficient pressure inside the tank.

4.3.3.3.5 A tank wagon designed to be operated on 1520 mm gauge railways may be filled by level with regard to each substance (See 6.20.3.4.4) taking account of minimum permissible temperature of the filling (in compliance with technical prescriptions or specifications concerning the filling). The maximum level of the filling shall not be higher than 85% of the shell. Minimum permissible temperature of the filling shall be defined as to prevent exceeding 95% of the shell at temperature of 50 °C.

4.3.3.4	Provisions for the filling of liquid gas tank-wagons	(Reserved)

4.3.3.4.1	Control measures before filling The consignor shall: a) check the details on the tank plate for each gas to be carried (see 6.8.2.5.1, 6.8.3.5.1 - 6.8.3.5.5, 6.20.2.5.1, 6.20.3.5.1 – 6.20.3.5.5) to agree with those on the tank wagon (see 6.8.2.5.2, 6.8.3.5.6, 6.8.3.5.7 6.20.2.5.2, 6.20.3.5.6 and 6.20.3.5.7), check the tank-wagons for multiple use to ensure that the correct folding panels are visible and securely fixed by the means referred to in 6.8.3.5.7 or 6.20.3.5.7 on both sides of the wagon, the load limits on the wagon panel shall not exceed the maximum permissible filling mass on the tank plate, b) determine the last load either from particulars in the transport document or by analysis. If necessary, the tank shall be cleaned. c) determine the mass of the residue (e.g. by weighing) and take into account in determining the filling quantity so that the tank wagon is not overfilled or overloaded. d) check the leakproofness of the shell and its items of equipment, and their ability to function.	(Reserved)

4.3.3.4.2	Filling procedure	(Reserved)

	For filling, the consignor shall comply with the provisions of the operating instructions of the tank-wagon.	(Reserved)

4.3.3.4.3

Control measures after filling

The consignor or the filler shall:

- (a) After filling, whether the wagon is overfilled or overloaded shall be checked by calibrated checking devices (e.g. by weighing on a calibrated weighbridge). Overfilled or overloaded tank-wagons shall be immediately discharged in a safe manner until the permitted filling quantity is reached.
- (b) The partial pressure of inert gases in the gas phase shall not exceed 0.2 MPa (2 bar), or the gauge pressure in the gas phase shall not exceed by more than 0.1 MPa (1 bar) the vapour pressure (absolute) of the liquid gas at the temperature of the liquid phase (however, for UN 1040 Ethylene oxide with nitrogen, the maximum allowable total pressure shall be 1 MPa (10 bar) at 50 °C).
- (c) After filling, bottom-discharge wagons shall be checked to ensure that the internal shut-off devices are closed so as to be leak-proof.
- (d) Before blank flanges or other equally effective devices are fitted, the vents shall be checked for leakproofness; any leaks shall be stopped by suitable means.
- (e) Blank flanges or other equally effective devices shall be fitted on the outlet of the vents. These closures shall be equipped with suitable seals. They shall be closed when using all elements provided for in their design types.
- (f) Lastly, a final visual check of the wagon, its equipment and marks shall be made to ensure that no filling substance is escaping.

(Reserved)

4.3.3.5

The actual holding time shall be determined for each journey of a tank carrying a refrigerated liquefied gas on the basis of the following:

- a) The reference holding time for the refrigerated liquefied gas to be carried (see 6.8.3.4.10 or 6.20.3.4.10) as indicated on the plate referred to in 6.8.3.5.4 or 6.20.3.5.4;
- b) The actual filling density;
- c) The actual filling pressure;
- d) The lowest set pressure of the pressure limiting device(s);
- e) The deterioration of the insulation*.

Note: ISO 21014:2006 "Cryogenic vessels – Cryogenic insulation performance" details methods of determining the insulation performance of cryogenic vessels and provides a method of calculating the holding time.

The date at which the actual holding time ends shall be entered in the transport document (see 5.4.1.2.2 d)).

The requirements of 4.3.3.5 need not be complied with for empty, uncleaned tanks.

4.3.3.6

Tanks shall not be offered for carriage:

- a) In a filling condition liable to produce an unacceptable hydraulic force due to surge within the shell;
- b) When leaking;
- c) When damaged to such an extent that the integrity of the tank or its lifting or securing arrangements may be affected;
- d) Unless the service equipment has been examined and found to be in good working order;

and for refrigerated liquefied gases:

- e) Unless the actual holding time for the gas being carried has been determined.
- f) Unless the duration of carriage, after taking into consideration any delays which might be encountered, does not exceed the actual holding time;

- (g) Unless the pressure is steady and has been lowered to a level such that the actual holding time may be achieved¹⁰;
 (h) When empty, uncleaned, unless the pressure has been reduced to a level that ensures that the pressure relief devices will not activate to relieve the pressure ¹⁰.

4.3.3.7 Carriage of tank-wagons provided for in 6.20.5, with shells in which brazed joints are used, may be implemented on 1520 mm railways as is agreed individually (see 6.20.5.1.3 and 6.20.5.1.4). (Reserved)

4.3.4 SPECIAL PROVISIONS APPLICABLE TO TANKS TO CARRY SUBSTANCES OF CLASSES 3 TO 9

4.3.4.1 Coding, rationalized approach and hierarchy of tanks

4.3.4.1.1 Coding of tanks

The four parts of the codes (tank codes) given in Column 12 of Table A in Chapter 3.2 have the following meanings:

Part	Description	Tank code
1	Types of tank	L – tank for substances in the liquid state (liquids or solids handed over for carriage in the molten state); S – tank for substances in the solid state (powdery or granular)
2	Calculation pressure	G – minimum calculation pressure according to the general requirements of 6.8.20.1.14 or 6.20.2.1.14 or 1.5; 2.65; 4; 10; 15 or 21 – minimum calculation pressure in bar, (see 6.8.20.1.14 or 6.20.2.1.14)
3	Openings (see 6.8.2.2.2 or 6.20.2.2.2)	A – tank with bottom-filling or bottom-discharge openings with 2 closures; B – tank with bottom-filling or bottom-discharge openings with 3 closures; C – tank with top-filling and discharge openings with only cleaning openings below the surface of the liquid; D – tank with top-filling and discharge openings with no openings below the surface of the liquid
4	Safety valves or devices	V – tank with a breather device, according to 6.8.2.2.6 or 6.20.2.2.6, but no device protecting against the propagation of a flame; or non-explosion pressure shock resistant tank F – tank with a breather device, according to 6.8.2.2.6 or 6.20.2.2.6, fitted with a device protecting against the propagation of a flame; or explosion pressure shock resistant tank N – tank without a breather device according to 6.8.2.2.6 or 6.20.2.2.6 and not hermetically closed (see 1.2.1 for the tank hermetically closed); H – hermetically closed tank (see 1.2.1 for the tank hermetically closed).

¹⁰ Respective guidance is provided in the European Industrial Gases Association (EIGA) document "Methods to prevent the premature activation of relief devices on tanks" available at www.eiga.eu.

4.3.4.1.2 Rationalized approach for assignment of tank codes to groups of substances and hierarchy of tanks.

Note 1: Tanks for certain substances and groups of substances are not included in the rationalized approach, see 4.3.4.1.3.

Rationalized approach			
Tank code	Group of permitted substances		
	Class	Classification code	Packing group
1. LIQUIDS			
LGAV	3	F2	III
	9	M9	III
LGBV	4.1	F2	II, III
	5.1	O1	III
	5.1	OT1	III
	9	M6	III
		M11	III
	and groups of permitted substances for tank code LGAV		
LGBF	3	F1	II vapour pressure at 50°C < 1,1 bar
			III
		D	II vapour pressure at 50°C < 1,1 bar
			III
		and groups of permitted substances for tank codes LGAV, LGBV	
L1,5BN	3	F1	II vapour pressure at 50 °C > 1.1 bar
		D	II vapour pressure at 50 °C > 1.1 bar
	and groups of permitted substances for tank codes LGAV, LGBV and LGBF		
L4BN	3	F1	I
		FC	III
		D	I
	5.1	O1	II
		OT1	II
	8	C1	II, III
		C3	II, III
		C4	II, III
		C5	II, III
		C7	II, III
		C8	II, III
		C9	II, III
		C10	II, III
		CF1	II
		CF2	II
		CS1	II
		CS2	II
		CW1	II
		CW2	II
		CO1	II
		CO2	II
		CT1 ^a	II, III
		CT2	II, III

^a Substances except hydrofluoric acid and hydrogen difluoride solutions shall be assigned to this tank code.

L4BN	8	CFT	II
	9	M11	III
	and groups of permitted substances for tank codes LGAV, LGBV, LGBF and L1.5BN		
L4BH	3	FT1	II, III
		FT2	II
		FC	II
		FTC	II
	6.1	T1	II, III
		T2	II, III
		T3	II, III
		T4	II, III
		T5	II, III
		T6	II, III
		T7	II, III
		TF1	II
		TF2	II, III
		TF3	II
		TS	II
		TW1	II
		TW2	II
		TO1	II
		TO2	II
		TC1	II
		TC2	II
		TC3	II
		TC4	II
		TFC	II
	6.2	I4	
	9	M2	II
	and groups of permitted substances for tank codes LGAV, LGBV, LGBF, L1.5BN and L4BN		
L4DH	4.2	S1	II, III
		S3	II, III
		ST1	II, III
		ST3	II, III
		SC1	II, III
		SC3	II, III
	4.3	W1	II, III
		WF1	II, III
		WT1	II, III
		WC1	II, III
	8	CT1	II, III ^b
	and groups of permitted substances for tank codes LGAV, LGBV, LGBF, L1.5BN, L4BN and L4BH		
L10BH	8	C1	I
		C3	I
		C4	I
		C5	I
		C7	I
		C8	I
		C9	I
		C10	I
		CF1	I

^b Hydrofluoric acid and hydrogen difluoride solutions shall be assigned to this tank code.

L10BH	8	CF2	I
		CS1	I
		CW1	I
		CW2	I
		CO1	I
		CO2	I
		CT1	I ^c
		CT2	I
		COT	I
	and groups of permitted substances for tank codes LGAV, LGBV, LGBF, L1.5BN, L4BN, and L4BH		
L10CH	3	FT1	I
		FT2	I
		FC	I
		FTC	I
	6.1*	T1	I
		T2	I
		T3	I
		T4	I
		T5	I
		T6	I
		T7	I
		TF1	I
		TF2	I
		TF3	I
		TS	I
		TW1	I
		TO1	I
		TC1	I
		TC2	I
		TC3	I
		TC4	I
		TFC	I
		TFW	I
	and groups of permitted substances for tank codes LGAV, LGBV, LGBF, L1.5BN, L4BN, L4BH, and L10BH		
	* Substances with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀ shall be assigned to tank code L15CH		
L10DH	4.3	W1	I
		WF1	I
		WT1	I
		WC1	I
		WFC	I
	5.1	OTC	I
	8	CT1	I ^e
	and groups of permitted substances for tank codes LGAV, LGBV, LGBF, L1.5BN, L4BN, L4BH, L4DH, L10BH and L10CH		

^c Substances except those containing hydrofluoric acid shall be assigned to this tank code..

^e Substances containing hydrofluoric acid shall be assigned to this tank code, with the exception of hydrofluoric acid with more than 85% hydrogen fluoride.

L15CH	3	FT1	I
	6.1**	T1	I
		T4	I
		TF1	I
		TW1	I
		TO1	I
	6.1**	TC1	I
		TC3	I
		TFC	I
		TFW	I
and groups of permitted substances for tank codes LGAV, LGBV, LGBF, L1.5BN, L4BN, L4BH, L10BH and L10CH			
** Substances with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀ shall be assigned to this tank code			
L21DH	4.2	S1	I
		S3	I
		SW1	I
		ST3	I
and groups of permitted substances for tank codes LGAV, LGBV, LGBF, L1.5BN, L4BN, L4BH, L4DH, L10BH, L10CH, L10DH and L15CH			
2. SOLIDS			
SGAV	4.1	F1	III
		F3	III
	4.2	S2	II, III
		S4	III
	5.1	O2	II, III
	8	C2	II, III
		C4	III
		C6	III
		C8	III
		C10	II, III
		CT2	III
	9	M7	III
		M11	II, III
SGAN	4.1	F1	II
		F3	II
		FT1	II, III
		FT2	II, III
		FC1	II, III
		FC2	II, III
	4.2	S2	II
		S4	II, III
		ST2	II, III
		ST4	II, III
		SC2	II, III
		SC4	II, III
	4.3	W2	II, III
		WF2	II
		WS	II, III
		WT2	II, III
		WC2	II, III
	5.1	O2	II, III
		OT2	II, III

	8	OC2	II, III
		C2	II
		C4	II
		C6	II
		C8	II
		C10	II
		CF2	II
		CS2	II
		CW2	II
		CO2	II
		CT2	II
	9	M3	III
	and groups of permitted substances for tank codes SGAV		
SGAH	6.1	T2	II, III
		T3	II, III
		T5	II, III
SGAH	6.1	T7	II, III
		T9	II
		TF3	II
		TS	II
		TW2	II
		TO2	II
		TC2	II
		TC4	II
	9	M1	II, III
	and groups of permitted substances for tanks codes SGAV and SGAN		
S4AH	9	M2	II
	and groups of permitted substances for tanks codes SGAV, SGAN and SGAH		
S10AN	8	C2	I
		C4	I
		C6	I
		C8	I
		C10	I
		CF2	I
		CS2	I
		CW2	I
		CO2	I
		CT2	I
	and groups of permitted substances for tank codes SGAV and SGAN		
S10AH	6.1	T2	I
		T3	I
		T5	I
		T7	I
		TS	I
		TW2	I
		TO2	I
		TC2	I
		TC4	I
	and groups of permitted substances for tank codes SGAV, SGAN, SGAH and S10AN		

Hierarchy of tanks

Tanks with tank codes different from those indicated in this table or in Table A of Chapter 3.2 may also be used provided that any element (number or letter) of parts 1 to 4 of these tank codes correspond to a level of safety at least equivalent to the corresponding element of the tank code indicated in Table A of Chapter 3.2, according to the following increasing order:

Part 1: Types of tanks

S → L

Note: Part 1 of tanks hierarchy shall not be applicable on railways of Kazakhstan, Russian Federation and Ukraine.

Part 2: Calculation pressure

G → 1.5 → 2.65 → 4 → 10 → 15 → 21 bar

Part 3: Openings

A → B → C → D

Part 4: Safety valves/devices

V → F → N → H

For example:

- A tank with the tank code L10CN is authorized for the carriage of a substance to which the tank code L4BN has been assigned.
- A tank with the tank code L4BN is authorized for the carriage of a substance to which the tank code SGAN has been assigned.

Note: The hierarchy does not take account of any special provisions in Column 13 of Table A in Chapter 3.2 (see 4.3.5, 6.8.4 and 6.20.4).

4.3.4.1.3

The following substances and groups of substances in respect of which a "(+)" is given after the tank code in Column (12) of Table A in Chapter 3.2 are subject to special provisions. In that case the alternate use of the tanks for other substances and groups of substances is permitted only where this is specified in the certificate of type approval. Higher value tanks according to the provisions at the end of the table in 4.3.4.1.2 may be used with due regard to the special provisions indicated in Column (13) of Table A in Chapter 3.2.

The requirements for these tanks are given by the following tank codes supplemented by the relevant special provisions indicated in column (13) of table A in Chapter 3.2.

Serial No.	Class	UN No.	Name and description	Tank code
a)			(Reserved)	
b)	4.1	2448	Sulphur, molten	LGBV
		3531	Polymerizing substance, solid, stabilized, n.o.s.	SGAN
		3532	Polymerizing substance, liquid, stabilized, n.o.s.	L4BN
c)	4.2	1381	Phosphorus, white or yellow, dry, or under water or in solution	L10DH
		2447	Phosphorus, white molten	
d)	4.3	1389	Alkali metal amalgam, liquid	L10BN
		1391	Alkali metal dispersion	
		1391	Alkaline earth metal dispersion	
		1392	Alkaline earth metal amalgam, liquid	
		1415	Lithium	
		1420	Potassium metal alloys, liquid	
		1421	Alkali metal alloy, liquid, n.o.s.	
		1422	Potassium sodium alloys, liquid	
		1428	Sodium	
		2257	Potassium	
		3401	Alkali metal amalgam, solid	
		3402	Alkaline earth metal amalgam, solid	
		3403	Potassium metal alloys, solid	
		3404	Potassium sodium alloys, solid	

		3482	Alkali metal dispersion, flammable	L10CH S2,65AN
		3482	Alkaline earth metal dispersion, flammable	
		1407	Caesium	
		1423	Rubidium	
		1402	Calcium carbide, packing group I	
e)	5.1	1873	Perchloric acid 50-72%	L4DN
		2015	Hydrogen peroxide with more than 70% hydrogen peroxide	L4DV
		2014	Hydrogen peroxide, aqueous solution with 20-60% hydrogen peroxide	L4BV
		2015	Hydrogen peroxide with 60-70% hydrogen peroxide	L4BV
		2426	AMMONIUM NITRATE, LIQUID (hot concentrated solution)	
		3149	Hydrogen peroxide and peroxyacetic acid mixture, stabilized	L4BV
		3375	Ammonium nitrate emulsion, suspension or gel, intermediate for blasting explosives, liquid	LGAV
		3375	Ammonium nitrate emulsion, suspension or gel, intermediate for blasting explosives, solid	SGAV
f)	5.2	3109	Organic peroxide type F, liquid	L4BN
		3110	Organic peroxide, type F, solid	S4AN
g)	6.1	1613	Hydrogen cyanide, aqueous solution	L15DH
		3294	Hydrogen cyanide solution in alcohol	
h)	7*		All substances	special tanks
			Minimum requirements for liquids	L2,65CN
			Minimum requirements for solids	S2,65AN
i)	8	1052	Hydrogen fluoride, anhydrous	L21DH
		1744	Bromine or bromine solution	
		1790	Hydrofluoric acid, solution, with more than 85% hydrofluoric acid	
		1791	Hypochlorite solution	L4BV
		1908	Chlorite solution	

^d Notwithstanding the general requirements of this paragraph, tanks used for radioactive material may also be used for the carriage of other goods provided the requirements of 5.1.3.2 are complied with.

4.3.4.1.4 (Reserved)

Tank-containers or tank swap bodies intended for the carriage of liquid waste, which are in accordance with the requirements of Chapter 6.10 and are fitted with two closures in accordance with 6.10.3.2, shall be assigned to tank code L4AH. If the tanks in question are equipped for the carriage of liquids and solids alternatively, they shall be assigned to combined codes L4AH and S4AH.

4.3.4.2 General provisions

4.3.4.2.1 Where hot substances are loaded, the temperature of the outer surface of the shell, excluding openings and their closures, or of the thermal insulation shall not exceed 70 °C during carriage.

4.3.4.2.2 The connecting pipes between the shells of several independent but interconnected tank-wagons (complete train, for example) shall be empty during carriage. (Reserved)

4.3.4.2.3 When shells approved for liquefied gases of Class 2 are also approved for liquids of other classes, the orange band in accordance with 5.3.5 shall be covered or made unrecognisable by other means so that it is not visible during the carriage of these liquids. (Reserved)

During the carriage of these liquids, the particulars according to 6.8.3.5.6 or 6.20.3.5.6 (b) or (c) shall no longer be visible on the two sides of the tank-wagon or on the panels.

4.3.5 Special provisions

When they are shown under an entry in Column 13 of Table of A in Chapter 3.2, the following special provisions apply:

TU1 The tanks shall not be handed over for carriage until the substance has solidified completely and been covered by an inert gas. Uncleaned empty tanks which have contained these substances shall be filled with an inert gas.

TU2 The substance shall be covered by an inert gas. Uncleaned empty tanks which have contained these substances shall be filled with an inert gas.

TU3 The inside of the shell and all parts liable to come into contact with the substance shall be kept clean. No lubricant capable of combining dangerously with the substance shall be used for pumps, valves or other devices.

TU4 During carriage, these substances shall be under a layer of inert gas, the pressure of which shall not be less than 50 kPa (0.5 bar) (gauge pressure).

Uncleaned empty tanks which have contained these substances shall, when handed over for carriage, be filled with an inert gas at a pressure of at least 50 kPa (0.5 bar) (gauge pressure).

TU5 (Reserved)

TU6 Not authorized for carriage in tanks, battery-wagons and MEGCs when having a LC₅₀ lower than 200 ppm.

TU7 The materials used to ensure leakproofness of the joints or for the maintenance of the closures shall be compatible with the contents.

TU8 An aluminium-alloy tank shall not be used for carriage unless the tank is reserved solely for such carriage and the acetaldehyde is free from acid.

TU9 UN No.1203 Petrol (Gasoline) with a vapour pressure at 50 °C of more than 110 kPa (1.1 bar) but not above 150 kPa (1.5 bar) may also be carried in tanks designed according to 6.8.2.1.14 (a) and 6.20.2.1.14 (a) having equipment conforming to 6.8.2.2.6 or 6.20.2.2.6.

TU10 (Reserved)

TU11 During filling, the temperature of this substance shall not exceed 60 °C. A maximum filling temperature of 80 °C is allowed provided that smoulder spots are prevented and that the following conditions are met. After filling, the tanks shall be pressurized (e.g. with compressed air) to check tightness. It shall be ensured that no depressurization takes place during carriage. Before discharge, it shall be checked if pressure in the tanks is still above atmospheric. If this is not the case, an inert gas shall be introduced into the tanks prior to discharge.

TU12 In the event of a change of use, shells and equipment shall be thoroughly cleansed of all residues before and after the carriage of this substance.

TU13 Tanks shall be free from impurities at the time of filling. Service equipment such as valves and external piping shall be emptied after filling or discharging.

TU14 The protective caps of closures shall be locked during carriage.

TU15 Tanks shall not be used for the carriage of foodstuffs, articles of consumption or animal feeds.

TU16 When handed over for carriage, uncleaned empty tanks shall be filled with a protective agent fulfilling one of the following measures:

Protective agent	Degree of filling of water	Additional requirements for carriage at low ambient temperatures
Nitrogen ^a	—	—
Water and nitrogen ^a	—	—
Water ^a	not less than 96 % and not more than 98%	The water shall contain sufficient anti-freeze agent to prevent it from freezing. The anti-freeze agent shall be free from corrosive action and not liable to react with the substance.

^a The tank shall be filled with nitrogen in such a way that, even after cooling, the pressure at no time falls below atmospheric pressure. The tank shall be closed in such a way that no leakage of gas occurs.

An additional entry shall be included in the transport document:

"TANK FILLED WITH _____¹¹ IN ACCORDANCE WITH SPECIAL PROVISION TU 16."

TU17 Only to be carried in battery-wagons or MEGCs the elements of which are composed of receptacles

TU18 The degree of filling shall remain below the level at which, if the contents were raised to a temperature at which the vapour pressure equalled the opening pressure of the safety valve, the volume of the liquid would reach 95% of the tank's capacity at that temperature. The provision in 4.3.2.3.4 shall not apply.

TU19 Tanks may be filled to 98% at the filling temperature and pressure. The provision in 4.3.2.3.4 shall not apply.

TU20 (Reserved)

TU21 The substance shall be protected by a protective agent in the following ways:

Protective agent	A layer of water		Degree of filling of the substance (including water if any) at a temperature of 60° C shall not exceed	Additional requirements for carriage at low ambient temperatures
	In the tank-wagon	In other tanks		
Nitrogen ^a	—	—	96%	—
Water and nitrogen ^a	—	—	98%	The water shall contain sufficient anti-freeze agent to prevent it from freezing. The antifreeze agent shall be free from corrosive action and not liable to react with the substance.

TU22 Tanks shall be filled to not more than 90% of their capacity; for liquids, a space of 5% shall remain empty when the liquid is at an average temperature of 50 °C.

TU23 The filling shall not exceed 0.93 kg per litre of capacity, if filling is by mass. If filling is by volume, the degree of filling shall not exceed 85%.

¹¹ Indicates the name(s) of the protective agent(s). Where the tank is filled with water, its mass shall be indicated in kg; in the case of nitrogen, its pressure shall be given in MPa or bar.

- TU24** The filling shall not exceed 0.95 kg per litre of capacity, if filling is by mass. If filling is by volume, the degree of filling shall not exceed 85%.
- TU25** The filling shall not exceed 1.14 kg per litre of capacity, if filling is by mass. If filling is by volume, the degree of filling shall not exceed 85%.
- TU26** The degree of filling shall not exceed 85%.
- TU27** Tanks shall not be filled to more than 98% of their capacity.
- TU28** Tanks shall be filled to not more than 95% of their capacity at a reference temperature of 15 °C.
- TU29** Tanks shall be filled to not more than 97% of their capacity and the maximum temperature after filling shall not exceed 140 °C.
- TU30** Tanks shall be filled as set out in the test report for the type approval of the tank but shall be filled to not more than 90% of their capacity.
- TU31** Tanks shall not be filled to more than 1 kg per litre of capacity.
- TU32** Tanks shall not be filled to more than 88% of their capacity.
- TU33** Tanks shall be filled to not less than 88% and not more than 92% of their capacity or to 2.86 kg per litre of capacity.
- TU34** Tanks shall not be filled to more than 0.84 kg per litre of capacity.
- TU35** Empty fixed tank-wagons, empty demountable tanks and empty tank-containers, uncleaned, which have contained these substances are not subject to the requirements of Annex 2 to SMGS if adequate measures have been taken to nullify any hazard.
- TU36** The degree of filling according to 4.3.2.2, at the reference temperature of 15 °C, shall not exceed 93% of the capacity.
- TU37** Carriage in tanks is limited to substances containing pathogens which are unlikely to be a serious hazard, and for which, while capable of causing serious infection on exposure, effective treatment and preventive measures are available and the risk of spread of infection is limited (i.e. moderate individual risk and low community risk).
- TU38**
- | | |
|--|------------|
| <p>Procedure following activation of energy absorption elements</p> <p>When energy absorption elements have undergone plastic deformation in accordance with 6.8.4, special provision TE 22, the tank-wagon or battery-wagon shall, after undergoing an inspection, be removed to a repair workshop immediately.</p> <p>If the loaded tank-wagon or loaded battery-wagon is capable of absorbing the shocks of a collision that might occur in normal conditions of rail trans-port, e.g. after the energy absorption buffers fitted have been replaced with normal buffers or after the damaged energy absorption elements have been, temporarily blocked off, the tank-wagon or battery wagon may, after undergoing an inspection, be moved for the purpose of emptying and finally to a repair workshop.</p> <p>The information that the energy absorption elements are not working shall be made available with the tank-wagon or battery-wagon.</p> | (Reserved) |
|--|------------|
- TU39** The suitability of the substance for carriage in tanks shall be demonstrated. The method to evaluate this suitability shall be approved by the competent authority. One method is test 8(d) in Test Series 8 (see Manual of Tests and Criteria, Part 1, sub-section 18.7). Substances shall not be allowed to remain in the tank for any period that could result in caking. Appropriate measures shall be taken to avoid accumulation and packing of substances in the tank (e.g. cleaning etc.).

- TU40** Only to be carried in battery-wagons or MEGCs, the elements of which are composed of seamless receptacles.
- TU42** Tanks with a shell constructed of aluminium alloy, including those with a protective lining, shall only be used if the pH value of the substance is not less than 5.0 and not more than 8.0.
- TU43** An empty uncleaned tank may be offered for carriage after the date of expiry of the last inspection of the lining for a period not to exceed three months beyond this date for the purposes of performing the next inspection of the lining prior to refilling (see special provision TT 2 in 6.8.4 (d) or 6.20.4 (d)).
- TU50** Only to be carried in battery-wagons or MEGCs, the elements of which are composed of seamless receptacles to the Republic of Belarus, Republic of Kazakhstan, Russian Federation, Ukraine or by transit in the territory of these countries.
- TU51** Reserved.

PART 5

CONSIGNMENT PROCEDURES

CHAPTER 5.1

GENERAL PROVISIONS

5.1.1 APPLICATION AND GENERAL PROVISIONS

This Part sets forth the provisions for dangerous goods consignments relative to marking, labelling, and documentation, and, where appropriate, authorization of consignments and advance notifications.

5.1.2 USE OF OVERPACKS

5.1.2.1 a) Unless marks and labels required in Chapter 5.2, except 5.2.1.3 to 5.2.1.6, 5.2.1.7.2 to 5.2.1.7.8 and 5.2.1.10, representative of all dangerous goods in the overpack are visible, the overpack shall be:

- marked with the word "OVERPACK". The lettering of the "OVERPACK" mark shall be at least 12 mm high. The mark shall be in an official language of the country of origin and also, if that language is not English, French or German, in English, French or German, unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise; and
- labelled and marked with the UN number and other marks, as required for packages in Chapter 5.2 except 5.2.1.3 to 5.2.1.6, 5.2.1.7.2 to 5.2.1.7.8 and 5.2.1.10, for each item of dangerous goods contained in the overpack. Each applicable mark or label only needs to be applied once.

Labelling of overpacks containing radioactive material shall be in accordance with 5.2.2.1.11.

b) Orientation arrows illustrated in 5.2.1.10 shall be displayed on two opposite sides of overpacks containing packages which shall be marked in accordance with 5.2.1.10.1, unless the marks remain visible.

5.1.2.2 Each package of dangerous goods contained in an overpack shall comply with all applicable provisions of Annex 2 to SMGS. The intended function of each package shall not be impaired by the overpack.

5.1.2.3 Each package bearing package orientation marks as prescribed in 5.2.1.10 and which is overpacked or placed in a large packaging shall be oriented in accordance with such marks.

5.1.2.4 The prohibitions on mixed loading as provided for in section 7.5.2 shall also apply to these overpacks.

5.1.3 EMPTY UNCLEARED PACKAGINGS (INCLUDING IBCS AND LARGE PACKAGINGS), TANKS, WAGONS AND CONTAINERS FOR CARRIAGE IN BULK

5.1.3.1 Empty uncleared packagings (including IBCs and large packagings), tanks (including tank-wagons, battery-wagons, demountable tanks, portable tanks, tank-containers, MEGCs), wagons and containers for carriage in bulk having contained dangerous goods of the different classes other than Class 7, shall be marked and labelled as if they were full.

Note: For documentation see Chapter 5.4.

5.1.3.2 Containers, tanks, IBCs, as well as other packagings and overpacks, used for the carriage of radioactive material shall not be used for the storage or carriage of other goods unless decontaminated below the level of 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm² for all other alpha emitters.

Note: Containers, tanks, IBCs as well as other packagings and overpacks used for the carriage of radioactive material shall not be used for the storage or carriage of other goods with destination in the Russian Federation or by transit through the territory of the Russian Federation.

5.1.4 MIXED PACKING

When two or more dangerous goods are packed within the same outer packaging, the package shall be labelled and marked as required for each substance or article. If the same label is required for different goods, it only needs to be applied once.

5.1.5 GENERAL PROVISIONS FOR CLASS 7

5.1.5.1 Approval of shipments and notification

5.1.5.1.1 General

In addition to the approval of package designs described in Chapter 6.4, multilateral shipment approval is also required in certain circumstances (5.1.5.1.2 and 5.1.5.1.3). In some circumstances it is also necessary to notify competent authorities of a shipment (5.1.5.1.4).

5.1.5.1.2 Shipment approvals

Multilateral approval shall be required for:

- a) The shipment of Type B(M) packages not conforming with the requirements of 6.4.7.5 or designed to allow controlled intermittent venting or excessive pressure release;
- b) The shipment of Type B(M) packages containing radioactive material with an activity greater than 3000A1 or 3000A2, as appropriate, or 1000 TBq, whichever is the lower;
- c) The shipment of packages containing fissile materials if the sum of the criticality safety indexes of the packages in a single wagon or container exceeds 50;

except that a competent authority may authorize carriage into or through its country without shipment approval, by a specific provision in its design approval (see 5.1.5.2.1).
- d) (Reserved);
- e) The shipment of SCO-III"

5.1.5.1.3 Shipment approval by special arrangement

Provisions may be approved by a competent authority under which a consignment, which does not satisfy all of the applicable requirements of Annex 2 to SMGS, may be carried under special arrangement (see 1.7.4).

5.1.5.1.4 Notifications

Notification to competent authorities is required as follows:

- a) before the first shipment of any package requiring competent authority approval, the consignor shall ensure that copies of each applicable competent authority certificate applying to that package design have been submitted to the competent authority of the country of origin of the shipment and to the competent authority of each country through or into which the consignment is to be carried. The consignor is not required to await an acknowledgement from the competent authority, nor is the competent authority required to make such acknowledgement of receipt of the certificate;
- b) For each of the following types of shipments:
 - I) Type C packages containing radioactive material with an activity greater than 3000A1 or 3000A2, as appropriate, or 1000 TBq, whichever is the lower;
 - II) Type B(U) packages containing radioactive material with an activity greater than 3000A1 or 3000A2, as appropriate, or 1000 TBq, whichever is the lower;
 - III) Type B(M) packages;
 - IV) Shipment under special arrangement.

The consignor shall notify the competent authority of the country of origin of the shipment and the competent authority of each country through or into which the consignment is to be carried. This notification shall be in the hands of each competent authority prior to the commencement of the shipment, and preferably at least 7 days in advance;

- c) The consignor is not required to send a separate notification if the required information has been included in the application for approval of shipment (see 6.4.23.2);
- d) The consignment notification shall include:
 - I) sufficient information to enable the identification of the package or packages including all applicable certificate numbers and identification marks;
 - II) information on the date of shipment, the expected date of arrival and proposed route;
 - III) the names of the radioactive materials or nuclides;
 - IV) descriptions of the physical and chemical forms of the radioactive material, or whether it is special form radioactive material or low dispersible radioactive material; and
 - V) the maximum activity of the radioactive contents during carriage expressed in becquerels (Bq) with an appropriate SI prefix symbol (see 1.2.2.1). For fissile material, the mass of fissile material (or of each fissile nuclide for mixtures when appropriate) in grams (g), or multiples thereof, may be used in place of activity.

5.1.5.2 Certificates issued by the competent authority

5.1.5.2.1 Certificates issued by the competent authority are required for the following:

- a) Designs for:
 - I) special form radioactive material;
 - II) low dispersible radioactive material;
 - III) fissile material excepted under 2.2.7.2.3.5 (f);
 - IV) packages containing 0.1 kg or more of uranium hexafluoride;
 - V) packages containing fissile material unless excepted by 2.2.7.2.3.5, 6.4.11.2 or 6.4.11.3;
 - VI) Type B(U) packages and Type B(M) packages;
 - VII) Type C packages;
- b) Special arrangements;
- c) Certain shipments (see 5.1.5.1.2);
- d) Determination of the basic radionuclide values referred to in 2.2.7.2.2.1 for individual radionuclides which are not listed in Table 2.2.7.2.2.1 (see 2.2.7.2.2.2 (a));
- e) Alternative activity limits for an exempt consignment of instruments or articles (see 2.2.7.2.2.2b).

The certificates shall confirm that the applicable requirements are met. An identification mark shall be indicated in the certificates of approval for design.

The certificates of approval for the package design and the shipment may be combined into a single certificate.

Certificates and applications for these certificates shall be in accordance with the requirements in 6.4.23.

5.1.5.2.2 The consignor shall be in possession of a copy of each applicable certificate.

5.1.5.2.3 For package design where it is not required that a competent authority issue a certificate of approval, the consignor shall, on request, make available for inspection by the competent authority, documentary evidence of the compliance of the package design with all the applicable requirements.

5.1.5.3 Determination of transport index (TI) and criticality safety index (CSI)

5.1.5.3.1 The transport index (TI) for a package, overpack or container, or for unpackaged LSA-I, SCO-I or SCO-III, shall be the number derived in accordance with the following procedure:

- a) Determine the maximum dose rate in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, container, or unpackaged LSA-I, SCO-I or SCO-III. The value determined shall be multiplied by 100.

For uranium and thorium ores and their concentrates, the maximum dose rate at any point 1 m from the external surface of the load may be taken as:

0.4 mSv/h for ores and physical concentrates of uranium and thorium;

0.3 mSv/h for chemical concentrates of thorium;

0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride.

- b) For tanks, containers and unpackaged LSA-I, SCO-I and SCO-III, the value determined in step (a) above shall be multiplied by the appropriate factor from Table 5.1.5.3.1.
- c) The value obtained in steps (a) and (b) above shall be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero and the resulting number is the TI value.

Multiplication factors for tanks, containers and unpackaged LSA-I, SCO-I and SCO-III

Largest cross-sectional area ^a , m ²	Multiplication factor
Largest cross-sectional area ≤ 1 m ²	1
1 m ² < Largest cross-sectional area ≤ 5 m ²	2
5 m ² < Largest cross-sectional area ≤ 20 m ²	3
Largest cross-sectional area > 20 m ²	10

^a To be determined by the results of measurements.

- 5.1.5.3.2** The TI for each rigid overpack, container or wagon shall be determined as the sum of the TIs of all the packages contained therein. For a shipment from a single consignor, the consignor may determine the TI by direct measurement of dose rate.

The TI for a non-rigid overpack shall be determined only as the sum of the TIs of all the packages within the overpack.

- 5.1.5.3.3** The criticality safety index for each overpack or container shall be determined as the sum of the CSIs of all the packages contained. The same procedure shall be followed for determining the total sum of the CSIs in a consignment or aboard a wagon.

- 5.1.5.3.4** Packages, overpacks and containers shall be assigned to either category I-WHITE, II-YELLOW or III- YELLOW in accordance with the conditions specified in Table 5.1.5.3.4 and with the following requirements:

- a) For a package, overpack or container, both the transport index and the surface dose rate conditions shall be taken into account in determining which one is the appropriate category. Where the transport index satisfies the condition for one category but the surface radiation level satisfies the condition for a different category, the package, overpack or container shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category.
- b) The TI shall be determined following the procedures specified in 5.1.5.3.1 and 5.1.5.3.2;
- c) If the surface dose rate is greater than 2 mSv/h, the package or overpack shall be carried under exclusive use and under the provisions of 7.5.11, CW 33 (3.5) (a);
- d) A package carried under a special arrangement shall be assigned to category III-YELLOW except under the provisions of 5.1.5.3.5;
- e) An overpack or container which contains packages carried under special arrangement shall be assigned to category III-YELLOW except under the provisions of 5.1.5.3.5.

Таблица 5.1.5.3.4: Categories of packages, overpacks and containers

Conditions		
Transport index (TI)	Maximum dose rate at any point on external surface	Category
0 ^a	Not more than 0.005 mSv/h	I-WHITE
More than 0 but not more than 1 ^a	More than 0.005 mSv/h but not more than 0.5 mSv/h	II-YELLOW
More than 1 but not more than 10	More than 0.5 mSv/h but not more than 2 mSv/h	III-YELLOW
More than 10	More than 2 mSv/h but not more than 10 mSv/h	III- YELLOW ^(b)

^a If the measured TI is not greater than 0.05, the value quoted may be zero in accordance with 5.1.5.3.1 (c).

^b Shall also be carried under exclusive use except for containers (see Table D in 7.5.11 CW 33 (3.3)).

5.1.5.3.5 For the carriage of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the categorization shall be in accordance with the certificate of the country of origin of design.

5.1.5.4 Specific provisions for excepted packages of radioactive material of Class 7

5.1.5.4.1 Excepted packages of radioactive material of Class 7 shall be legibly and durably marked on the outside of the packaging with:

- a) The UN number preceded by the letters "UN";
- b) An identification of either the consignor or consignee, or both;
- c) The permissible gross mass if this exceeds 50 kg.

5.1.5.4.2 The documentation requirements of Chapter 5.4 do not apply to excepted packages of radioactive material of Class 7, except that:

- a) The UN number preceded by the letters "UN" and the name and address of the consignor and the consignee and, if relevant, the identification mark for each competent authority certificate of approval (see 5.4.1.2.5.1 (g)) shall be shown on a consignment not;
- b) If relevant, the requirements of 5.4.1.2.5.1 (g), 5.4.1.2.5.3 and 5.4.1.2.5.4 shall apply;
- c) The requirements of 5.4.2 and 5.4.4 shall apply.

5.1.5.4.3 The requirements of 5.2.1.7.8 and 5.2.2.1.11.5 shall apply if relevant.

5.1.5.5 Summary of approval and prior notification requirements

Note 1: Before first shipment of any package requiring competent authority approval of the design, the consignor shall ensure that a copy of the approval certificate for that design has been submitted to the competent authority of each country en route (see 5.1.5.1.4 (a)).

Note 2: Notification required if contents exceed 3000 A1 or 3000 A2 or 1000TBq (see 5.1.5.1.4 b)).

Note 3: Multilateral approval of shipment required if contents exceed 3000 A1 or 3000 A2 or 1000TBq, or if controlled intermittent venting is allowed (see 5.1.5.1).

Note 4: See approval and prior notification provisions for the applicable package for carrying this material.

Subject	UN Number	Competent authority approval required		Consignor required to notify the competent authorities of the country of origin and of the countries en route ^(a) before each shipment ^(a)	Reference
		Country of origin	Countries en route ^(a)		
1	2	3	4	5	6
Calculation of unlisted A ₁ and A ₂	-	Yes	Yes	No	2.2.7.2.2.2 (a), 5.1.5.2.1 (d)
Excepted packages – package design – shipment	2908, 2909, 2910, 2911	No No	No No	No No	-
LSA material ^b and SCO ^b /Industrial packages types 1, 2 or 3, non fissile and fissile excepted – package design – shipment	2912, 2913, 3321, 3322	No No	No No	No No	-
Type packages A ^b , non fissile and fissile excepted – package design – shipment	2915, 3332	No No	No No	No No	-
Type packages B(U) ^b , non fissile and fissile excepted – package design – shipment.	2916	Yes No	No No	See Note 1 See Note 2	5.1.5.1.4 b), 5.1.5.2.1 a), 6.4.22.2
Type packages B(M) ^b , non fissile and fissile excepted – package design – shipment	2917	Yes See Note 3	Yes See Note 3	No Yes	5.1.5.1.4 (b), 5.1.5.2.1 (a), 5.1.5.1.2, 6.4.22.3
Type packages C ^b , non fissile and fissile excepted – package design – shipment	3323	Yes No	No No	See Note 1 See Note 2	5.1.5.1.4 (b), 5.1.5.2.1 (a), 6.4.22.2
Packages for fissile material – package design – shipment – sum of criticality safety indexes not more than 50 – sum of criticality safety indexes greater than 50	2977, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3333	Yes ^{c)} No ^{d)} Yes	Yes ^{c)} No ^{d)} Yes	No See note 2 See Note 2	5.1.5.2.1 (a), 5.1.5.1.2, 6.4.22.4
Special form radioactive material – package design – shipment:	- See Note 4	Yes See Note 4	No See Note 4	No See Note 4	1.6.6.4, 5.1.5.2.1 (a), 6.4.22.5

Subject	UN Number	Competent authority approval required		Consignor required to notify the competent authorities of the country of origin and of the countries en route ^(a) before each shipment ^(a)	Reference
		Country of origin	Countries en route ^(a)		
1	2	3	4	5	6
Low dispersable radioactive material – package design – shipment:	- See Note 4	Yes See Note 4	No See Note 4	No See Note 4	5.1.5.2.1 (a), 6.4.22.5
Packages containing 0.1 kg or more of uranium hexafluoride – package design – shipment	- See Note 4	Yes See Note 4	No See Note 4	No See Note 4	5.1.5.2.1 (a), 6.4.22.1
Special Agreement – shipment	2919, 3331	Yes	Yes	Yes	1.7.4.2; 5.1.5.2.1 (b), 5.1.5.1.4 (b)
Approved packages designs subjected to transitional measures		See 1.6.6	See 1.6.6	See Note 1	1.6.6.2, 5.1.5.1.4 (b), 5.1.5.2.1 (a), 5.1.5.1.2 6.4.22.9
Alternative activity limits for an exempt consignment of instruments or articles	–	Yes	Yes	No	5.1.5.2.1 (e), 6.4.22.7
Fissile material excepted in accordance with 2.2.7.2.3.5 (f)	–	Yes	Yes	No	5.1.5.2.1 (a) (iii), 6.4.22.6

Indications applied in the table:

- a) Countries from, through or into which the consignment is carried.
- b) If the radioactive contents are fissile material which is not excepted from the provisions for packages containing fissile material, then the provisions for fissile material packages apply (see 6.4.11).
- c) Designs of packages for fissile material may also require approval in respect of one of the other items in the table.
- d) Shipments may, however, require approval in respect of one of the other items in the table.

CHAPTER 5.2

MARKING AND LABELLING

5.2.1 MARKING OF PACKAGES

Note 1: For marks related to the construction, testing and approval of packagings, large packagings, pressure receptacles and IBCs, see Part 6.

Note 2: In accordance with the GHS, a GHS pictogram not required by Annex 2 to SMGS should only appear in carriage as part of a complete GHS label and not independently (see GHS 1.4.10.4.4).

5.2.1.1 The UN number corresponding to the dangerous goods contained, preceded by the letters "UN" shall be clearly and durably marked on each package. The UN number and the letters "UN" shall be at least 12 mm high, except for packages of 30 litres capacity or less or of 30 kg maximum net mass and for cylinders of 60 litres water capacity or less when they shall be at least 6 mm in height and except for packages of 5 litres capacity or less or of 5 kg maximum net mass when they shall be of an appropriate size. In the case of unpacked articles the mark shall be displayed on the article, on its cradle or on handling, storage or launching device.

5.2.1.2 All package marks required by this Chapter:

- a) shall be readily visible and legible;
- b) shall be able to withstand open weather exposure without a substantial reduction in effectiveness.

5.2.1.3 Salvage packagings including large salvage packagings and salvage pressure receptacles shall additionally be marked with the word "SALVAGE". The lettering of the "SALVAGE" marking shall be at least 12 mm high.

5.2.1.4 Intermediate bulk containers of more than 450 litres capacity and large packagings shall be marked on two opposite sides.

5.2.1.5 Additional provisions for goods of Class 1

For goods of Class 1, packages shall bear the UN number and the shipping name as determined in accordance with 3.1.2. The mark, which shall be clearly legible and indelible, shall be in one or more languages, one of which shall be Chinese or Russian unless any agreements concluded between the countries concerned in the transport operation provide otherwise.

5.2.1.6 Additional provisions for goods of Class 2

Refillable receptacles shall bear the following particulars in clearly legible and durable characters:

- a) The UN number and the proper shipping name of the gas or mixture of gases, as determined in accordance with 3.1.2. For gases classified under an N.O.S. entry, only the technical name¹ of the gas has to be indicated in addition to the UN number¹;

For mixtures, not more than the two constituents which most predominantly contribute to the hazards have to be indicated;

¹ Instead of the technical name the use of one of the following names is permitted:

- For UN No. 1078 refrigerant gas, n.o.s.: mixture F1, mixture F2, mixture F3;
- For UN No. 1060 methylacetylene and propadiene mixtures, stabilized: mixture P1, mixture P2;
- For UN No. 1965 hydrocarbon gas mixture, liquefied, N.O.S.: mixture A or butane, mixture A01 or butane, mixture A02 or butane, mixture A0 or butane, mixture A1, mixture B1, mixture B2, mixture B, mixture C or propane;
- For UN No. 1010 Butadienes, stabilized: 1,2-Butadiene, stabilized, 1,3-Butadiene, stabilized.
- For UN No. 1012 Butylene: 1-butylene, cis-2-butylene, trans-2-butylene, butylenes mixture.

The use of the trade name of gas is not permitted.

- b) For compressed gases filled by mass and for liquefied gases, either the maximum filling mass and the tare of the receptacle with fittings and accessories as fitted at the time of filling, or the gross mass;
- c) The date (year) of the next periodic inspection.

These particulars can either be engraved or indicated on a durable information disk or label attached on the receptacle or indicated by an adherent and clearly visible mark such as by printing or by any equivalent process.

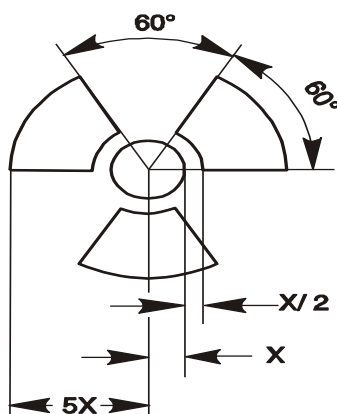
Note 1: See also 6.2.2.7.

Note 2: For non refillable receptacles, see 6.2.2.8.

5.2.1.7 Special marking provisions for radioactive material

- 5.2.1.7.1** Each package shall be legibly and durably marked on the outside of the packaging with an identification of either the consignor or consignee, or both. Each overpack shall be legibly and durably marked on the outside of the overpack with an identification of either the consignor or consignee, or both unless these marks of all packages within the overpack are clearly visible.
- 5.2.1.7.2** For each package, other than excepted packages, the UN number preceded by the letters "UN" and the proper shipping name shall be legibly and durably marked on the outside of the packaging. The marking of excepted packages shall be as required by 5.1.5.4.1.
- 5.2.1.7.3** Each package of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the outside of the packaging.
- 5.2.1.7.4** Each package which conforms to:
 - a) a Type IP-1 package, a Type IP-2 package or a Type IP-3 package design shall be legibly and durably marked on the outside of the packaging with "TYPE IP-1", "TYPE IP-2" or "TYPE IP-3" as appropriate;
 - b) a Type A package design shall be legibly and durably marked on the outside of the packaging with "TYPE A";
 - c) a Type IP-2 package, a Type IP-3 package or a Type A package design shall be legibly and durably marked on the outside of the packaging with the distinguishing sign used on vehicles in international road traffic² of the country of origin of design and either the name of the manufacturer or other identification of the packaging specified by the competent authority of the country of origin of design.
- 5.2.1.7.5** Each package which conforms to a design approved under one or more of paragraphs 1.6.6.2.1, 5.1.5.2.1, 6.4.22.1 to 6.4.22.4 and 6.4.23.4 to 6.4.23.7 shall be legibly and durably marked on the outside of the package with the following information:
 - a) the identification mark allocated to that design by the competent authority;
 - b) a serial number to uniquely identify each packaging which conforms to that design;
 - c) "Type B(U)", "Type B(M)" or "Type C", in the case of a Type B(U), Type B(M) or Type C package design.
- 5.2.1.7.6** Each package which conforms to a Type B(U), Type B(M) or Type C package design shall have the outside of the outermost receptacle which is resistant to the effects of fire and water plainly marked by embossing, stamping or other means resistant to the effects of fire and water with the trefoil symbol shown in the figure below.

² Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.



Basic trefoil symbol with proportions based on a central circle of radius X .

The minimum allowable size of X shall be 4 mm.

Any mark on the package made in accordance with the requirements of 5.2.1.7.4 (a) and (b) and 5.2.1.7.5 (c) relating to the package type that does not relate to the UN number and proper shipping name assigned to the consignment shall be removed or covered.

5.2.1.7.7 Where LSA-I or SCO-I material is contained in receptacles or wrapping materials and is carried under exclusive use as permitted by 4.1.9.2.4, the outer surface of these receptacles or wrapping materials may bear the marks "RADIOACTIVE LSA-I" or "RADIOACTIVE SCO-I", as appropriate.

5.2.1.7.8 For packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, marking shall be in accordance with the certificate of the country of origin of the design.

5.2.1.8 Special marking provisions for environmentally hazardous substances

5.2.1.8.1 Packages containing environmentally hazardous substances meeting the criteria of 2.2.9.1.10 shall be durably marked with the environmentally hazardous substance mark shown in 5.2.1.8.3 with the exception of single packagings and combination packagings where such single packagings or inner packagings of such combination packagings have:

- a quantity of 5 l or less for liquids; or
- a net mass of 5 kg or less for solids.

5.2.1.8.2 The environmentally hazardous substance marks shall be located adjacent to the marks required by 5.2.1.1. The requirements of 5.2.1.2 and 5.2.1.4 shall be met.

5.2.1.8.3 The environmentally hazardous substance mark shall be as shown in Figure 5.2.1.8.3.

Figure 5.2.1.8.3



Environmentally hazardous substance mark

The marking shall be in the form of a square set at an angle of 45° (diamond-shaped). The symbol (fish and tree) shall be black on white or suitable contrasting background. The minimum dimensions shall be 100 mm x 100 mm and the minimum width of the line forming the diamond shall be 2 mm. If the size of the package so requires, the dimensions/line thickness may be reduced, provided the marking remains clearly visible. Where dimensions are not specified, all features shall be in approximate proportion to those shown above.

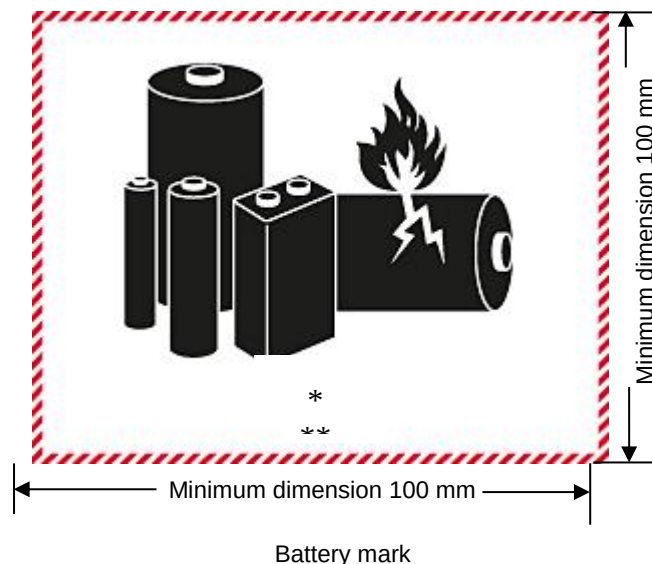
Note: The labelling provisions of 5.2.2 apply in addition to any requirement for packages to bear the environmentally hazardous substance mark.

5.2.1.9 Battery mark

5.2.1.9.1 Packages containing lithium cells or batteries or sodium ion cells or batteries prepared in accordance with special provisions 188 or 400 of Chapter 3.3 shall be marked as shown in Figure 5.2.1.9.2..

5.2.1.9.2 The mark shall indicate the UN number preceded by the letters "UN", i.e. "UN 3090" for lithium metal cells or batteries or "UN 3480" for lithium ion cells or batteries or "UN 3551" for sodium ion cells or batteries. Where the cells or batteries are contained in, or packed with, equipment, the UN number preceded by the letters "UN", i.e. "UN 3091", "UN 3481" or "UN 3552" as appropriate shall be indicated. Where a package contains lithium cells or batteries assigned to different UN numbers, all applicable UN numbers shall be indicated on one or more marks.

Figure 5.2.1.9.2



* Place for UN number(s)

The mark shall be in the form of a rectangle or a square with hatched edging. The dimensions shall be a minimum of 100 mm wide x 100 mm high and the minimum width of the hatching shall be 5 mm. The symbol (group of batteries, one damaged and emitting flame, above the UN number(s)) shall be black on white or suitable contrasting background. The hatching shall be red. If the size of the package so requires, the dimensions may be reduced to not less than 100 mm wide x 70 mm high. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

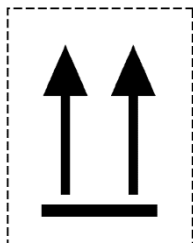
5.2.1.10 Orientation arrows

5.2.1.10.1 Except as provided in 5.2.1.10.2:

- a) combination packagings having inner packagings containing liquids;
- b) single packagings fitted with vents;
- c) closed or open cryogenic receptacles intended for the carriage of refrigerated liquefied gases, and
- d) machinery or apparatus containing liquid dangerous goods when it is required to ensure the liquid dangerous goods remain in their intended orientation (see special provision 301 of Chapter 3.3), shall be legibly marked with package orientation arrows which are similar to the illustration shown below or with those meeting the specifications of ISO 780:1997. The orientation arrows shall appear on two opposite vertical sides of the package with the arrows pointing in the correct upright direction.

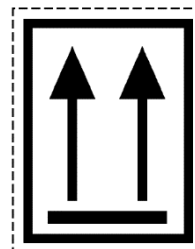
They shall be rectangular and of a size that is clearly visible commensurate with the size of the package. Depicting a rectangular border around the arrows is optional.

Figure
5.2.1.10.1.1



or

Figure
5.2.1.10.1.2



Two black or red arrows on white or suitable contrasting background
All features shall be in approximate proportion to those shown above.

- 5.2.1.10.2** Orientation arrows indicating proper package orientation are not required on:
- a) Outer packagings containing pressure receptacles except closed or open cryogenic receptacles;
 - b) Outer packagings containing dangerous goods in inner packagings each containing not more than 120 ml, with sufficient absorbent material between the inner and outer packagings to completely absorb the liquid contents;
 - c) Outer packagings containing Class 6.2 infectious substances in primary receptacles each containing not more than 50 ml;
 - d) Type IP-2, type IP-3, type A, type B(U), type B(M) or type C packages containing Class 7 radioactive material;
 - e) Outer packagings containing articles which are leak-tight in all orientations (e.g. alcohol or mercury in thermometers, aerosols, etc.); or
 - f) Outer packagings containing dangerous goods in hermetically sealed inner packagings each containing not more than 500 ml.
- 5.2.1.10.3** Arrows for purposes other than indicating proper package orientation shall not be displayed on a package marked in accordance with 5.2.1.10.

5.2.2 LABELLING OF PACKAGES

***Note:** Labelling of small containers is the same as labelling of packages.*

5.2.2.1 Labelling provisions

- 5.2.2.1.1** For each article or substance listed in Table A of Chapter 3.2, the labels shown in Column 5 shall be affixed unless otherwise provided for by a special provision in Column 6.
- 5.2.2.1.2** Indelible danger marks corresponding exactly to the prescribed models may be used instead of labels.
- 5.2.2.1.3 – 5.2.2.1.5** (Reserved)
- 5.2.2.1.6** Except as provided in 5.2.2.1.2, each label shall:
- a) be affixed to the same surface of the package, if the dimensions of the package allow; for packages of Class 1 and 7, near the mark indicating the proper shipping name;
 - b) be so placed on the package that it is not covered or obscured by any part or attachment to the packaging or any other label or mark;
 - c) be displayed next to each other when more than one label is required.

Where a package is of such an irregular shape or small size that a label cannot be satisfactorily affixed, the label may be attached to the package by a securely affixed tag or other suitable means.

- 5.2.2.1.7** Intermediate bulk containers of more than 450 litres capacity and large packagings shall be labelled on two opposite sides.

5.2.2.1.8 Special requirements for the labelling of packages containing explosive substances or articles when carried as a military consignment.

For the carriage of military consignments within the meaning of 1.5.2, as a wagon load or full load it shall not be necessary for packages to bear the danger labels prescribed in column 5 of Table A of Chapter 3.2, provided that the mixed loading requirements prescribed in 7.5.2 are observed on the basis of the information in the transport document, in accordance with 5.4.1.2.1 (f).

5.2.2.1.9 Special provisions for the labelling of self-reactive substances and organic peroxides

a) The label conforming to model No. 4.1 implies that no label conforming to model No. 3 is required. The label conforming to model No. 1 shall be applied for self-reactive substances Type B, unless the competent authority has permitted this label to be dispensed with for a specific packaging because test data have proven that the self-reactive substance in such a packaging does not exhibit explosive behaviour.

b) The label conforming to model No. 5.2 also implies that the product may be flammable and hence no label conforming to model No. 3 is required. In addition, the following labels shall be applied:

- A label conforming to model No. 1 for organic peroxides type B, unless the competent authority has permitted this label to be dispensed with for a specific packaging because test data have proven that the organic peroxide in such a packaging does not exhibit explosive behaviour;
- A label conforming to model No. 8 is required when Packing Group I or II criteria of Class 8 are met.

For self-reactive substances and organic peroxides mentioned by name, the labels to be affixed are indicated in the list found in 2.2.41.4 and 2.2.52.4 respectively.

5.2.2.1.10 Special provisions relating to danger labels of packages with infectious substances

In addition to the label conforming to model No. 6.2, infectious substances packages shall bear any other label required by the nature of the contents.

5.2.2.1.11 Special provisions for the labelling of radioactive material

5.2.2.1.11.1 Except when enlarged labels are used in accordance with 5.3.1.1.3, each package, overpack and container containing radioactive material shall bear the labels conforming to the applicable models Nos. 7A, 7B or 7C, according to the appropriate category. Labels shall be affixed to two opposite sides on the outside of the package or overpack or on the outside of all four sides of a container or tank. In addition, each package, overpack and container containing fissile material, other than fissile material excepted under the provisions of 2.2.7.2.3.5 shall bear labels conforming to model No. 7E; such labels, where applicable, shall be affixed adjacent to the labels conforming to the applicable model Nos. 7A, 7B or 7C. Labels shall not cover the markings specified in 5.2.1. Any labels which do not relate to the contents shall be removed or covered.

5.2.2.1.11.2 Each label conforming to the applicable model No. 7A, 7B or 7C shall be completed with the following information:

a) Contents:

I) except for LSA-I material, the name(s) of the radionuclide(s) as taken from Table 2.2.7.2.2.1, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides shall be listed to the extent the space on the line permits. The group of LSA or SCO shall be shown following the name(s) of the radionuclide(s). The terms "LSA-II", "LSA-III", "SCO-I" and "SCO-II" shall be used for this purpose;

II) for LSA-I material, only the term "LSA-I" is necessary; the name of the radionuclide is not necessary;

b) Activity:

The maximum activity of the radioactive contents during carriage expressed in becquerels (Bq) with the appropriate SI prefix symbol (see 1.2.2.1). For fissile material, the total mass of fissile nuclides in units of grams (g), or multiples thereof, may be used in place of activity;

c) For overpacks and containers the "contents" and "activity" entries on the label shall bear the information required in (a) and (b) above, respectively, totalled together for the entire contents of the overpack or container except that on labels for overpacks or containers containing mixed loads of packages containing different radionuclides, such entries may read "See the consignment note";

d) Transport index: The number determined in accordance with 5.1.5.3.1 and 5.1.5.3.2 (except for category I-WHITE).

5.2.2.1.12 Special provisions for the labelling of articles containing dangerous goods carried as UN Nos. 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547 and 3548.

5.2.2.1.12.1 Packages containing articles or articles carried unpackaged shall bear labels according to 5.2.2.1 reflecting the hazards established according to 2.1.5, except that for articles that in addition contain lithium batteries or sodium ion batteries, a battery mark or a label conforming to model No. 9A is not required.

5.2.2.1.12.2 When it is required to ensure articles containing liquid dangerous goods remain in their intended orientation, orientation arrows meeting 5.2.1.10.1 shall be affixed and visible on at least two opposite vertical sides of the package or of the unpackaged article where possible, with the arrows pointing in the correct upright direction.

5.2.2.1.11.3 Each label conforming to the model No. 7E shall be completed with the criticality safety index (CSI) as stated in the certificate of approval applicable in the countries through or into which the consignment is carried and issued by the competent authority or as specified in 6.4.11.2 or 6.4.11.3.

5.2.2.1.11.4 For overpacks and containers, the label conforming to model No. 7E shall bear the sum of the criticality safety indexes of all the packages contained therein.

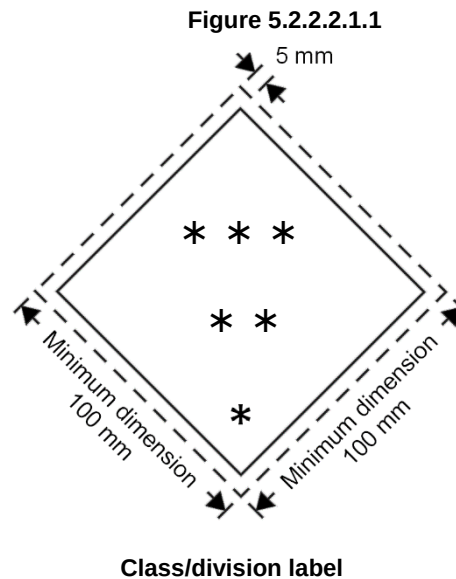
5.2.2.1.11.5 In all cases of international carriage of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, labelling shall be in accordance with the certificate of the country of origin of design.

5.2.2.2 Provisions for labels

5.2.2.2.1 Labels shall satisfy the provisions below and conform, in terms of colour, symbols and general format, to the models shown in 5.2.2.2.2. Corresponding models required for other modes of transport, with minor variations which do not affect the obvious meaning of the label, are also acceptable.

Note: Where appropriate, labels in 5.2.2.2.2 are shown with a dotted outer boundary as provided for in 5.2.2.2.1.1. This is not required when the label is applied on a background of contrasting colour.

5.2.2.2.1.1. Labels shall be configured as shown in Figure 5.2.2.2.1.1.



* The class or for Classes 4.1, 4.2 and 4.3, the figure "4" or for Classes 6.1 and 6.2, the figure "6", shall be shown in the bottom corner.

** Additional text/numbers/symbol/letters shall (if mandatory) or may (if optional) be shown in this bottom half.

*** The class symbol or, for divisions 1.4, 1.5 and 1.6, the division number and for Model No 7E the word "FISSILE" shall be shown in this top half.

5.2.2.2.1.1.1 Labels shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line.

5.2.2.2.1.1.2 The label shall be in the form of a square set at an angle of 45° (diamond-shaped). The minimum dimensions shall be 100 mm × 100 mm. There shall be a line inside the edge forming the diamond which shall be parallel and approximately 5 mm from the outside of that line to the edge of the label. The line inside the edge on the upper half of the label shall be the same colour as the symbol and the line inside the edge on the lower half of the label shall be the same colour as the class or division number in the bottom corner. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

5.2.2.2.1.1.3 If the size of the package so requires the dimensions may be reduced proportionally, provided the symbols and other elements of the label remain clearly visible. Dimensions for cylinders shall comply with 5.2.2.2.1.2.

5.2.2.2.1.2 Cylinders for Class 2 may, on account of their shape, orientation and securing mechanisms for carriage, bear labels representative of those specified in this section and the environmentally hazardous substance mark when appropriate, which have been reduced in size, according to the dimensions outlined in ISO 7225:2005, "Gas cylinders – Precautionary labels", for display on the non-cylindrical part (shoulder) of such cylinders.

Note: When the diameter of the cylinder is too small to permit the display of the reduced size labels on the non-cylindrical upper part of the cylinder, the reduced sized labels may be displayed on the cylindrical part.

Notwithstanding the provisions of 5.2.2.1.6, labels and the environmentally hazardous substance mark (see 5.2.1.8.3) may overlap to the extent provided for by ISO 7225:2005. However, in all cases, the primary hazard label and the figures appearing on any label shall remain fully visible and the symbols recognizable.

Empty uncleaned pressure receptacles for gases of Class 2 may be carried with obsolete or damaged labels for the purposes of refilling or inspection as appropriate and the application of a new label in conformity with current regulations or for the disposal of the pressure receptacle.

5.2.2.2.1.3 With the exception of labels for Divisions 1.4, 1.5 and 1.6 of Class 1, the upper half of the label shall contain the pictorial symbol and the lower half shall contain:

- a) For Classes 1, 2, 3, 5.1, 5.2, 7, 8 and 9, the class number;
- b) For Classes 4.1, 4.2 and 4.3, the figure "4";
- c) For Classes 6.1 and 6.2, the figure "6".

However for label model No. 9A, the upper half of the label shall only contain the seven vertical stripes of the symbol and the lower half shall contain the group of batteries of the symbol and the class number.

Except for label model No. 9A, the labels may include text such as the UN number or words describing the hazard (e.g. "toxic") in accordance with 5.2.2.2.1.5 provided the text does not obscure or detract from the other required label elements

5.2.2.2.1.4 In addition, except for Divisions 1.4, 1.5 and 1.6, labels for Class 1 shall show in the lower half, above the class number, the division number and the compatibility group letter for the substance or article. Labels for Divisions 1.4, 1.5 and 1.6 shall show in the upper half the division number, and in the lower half the class number and the compatibility group letter.

5.2.2.2.1.5 On labels other than those for material of Class 7, the optional insertion of any text (other than the class number) in the space below the symbol shall be confined to particulars indicating the nature of the hazard and precautions to be taken in handling.

The text indicating the nature of the hazard and precautions shall be written in the Russian, English or German languages.

5.2.2.2.1.6 The symbols, text and numbers shall be clearly legible and indelible and shall be shown in black on all labels except for:

- a) the Class 8 label, where the text (if any) and class number shall appear in white;
- b) labels with entirely green, red or blue backgrounds where they may be shown in white
- c) the Class 5.2 label, where the symbol may be shown in white
- d) labels conforming to model No. 2.1 displayed on cylinders and gas cartridges for liquefied petroleum gases, where they may be shown in the background colour of the receptacle if adequate contrast is provided.

5.2.2.2.1.7 All labels shall be able to withstand open weather exposure without a substantial reduction in effectiveness.

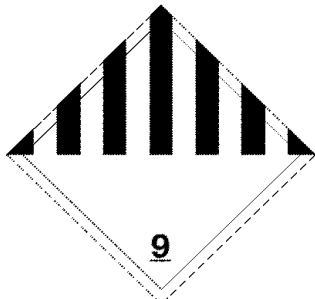
5.2.2.2.2 Specimen labels

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 1 hazard: Explosive substances or articles						
1	Divisions 1.1, 1.2, 1.3	Exploding bomb: black	Orange	1 (black)		** Place for division – to be left blank if explosive is the subsidiary hazard * Place for compatibility group – to be left blank if explosive is the subsidiary hazard
1.4	Division 1.4	1.4: black. Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm × 100 mm).	Orange	1 (black)		* - Place for compatibility group
1.5	Division 1.5	1.5: black. Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm × 100 mm).	Orange	1 (black)		* - Place for compatibility group
1.6	Division 1.6	1.6: black. Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm × 100 mm).	Orange	1 (black)		* - Place for compatibility group
Class 2 hazard: Gases						

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
2.1	Flammable gases	Flame: black or white (except as provided for in 5.2.2.2.1.6 (d))	Red	2 (black or white) (except as provided for in 5.2.2.2.1.6 (d))	 	-
2.2	Non-flammable, non-toxic gases	Gas cylinder: black or white	Green	2 (black or white)	 	-
2.3	Toxic gases	Skull and crossbones : black	White	2 (black)		-
Class 3 hazard: Flammable liquids						
3	-	Flame: black or white	Red	3 (black or white)	 	-
Class 4.1 hazard: Flammable solids, self-reactive substances, polymerizing substances and solid desensitized explosives						
4.1	-	Flame: black	White with 7 vertical red stripes	4 (black)		-
Class 4.2 hazard: Substances liable to spontaneous combustion						
4.2		Flame: black	Upper half white, lower half red	4 (black)		-
Class 4.3 hazard:						

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels		Note
Substances which, in contact with water emit flammable gases							
4.3	-	Flame: black or white	Blue	4 (black or white)			-
Class 5.1 hazard: Oxidizing substances							
5.1	-	Flame over circle: black	Yellow	5.1 (black)			-
Class 5.2 hazard: Organic peroxides							
5.2	-	Flame: black or white	Upper half red, lower half yellow	5.2 (black)			
Class 6.1 hazard: Toxic substances							
6.1	-	Skull and crossbones : black	White	6 (black)			-
Class 6.2 hazard: Infectious substances							
6.2	-	Three crescents superimposed on a circle: black	White	6 (black)			The lower half of the label may bear the inscriptions: "INFECTIOUS SUBSTANCE" and "IN THE CASE OF DAMAGE OR LEAKAGE IMMEDIATELY NOTIFY PUBLIC HEALTH AUTHORITY" in black colour
Class 7 hazard: Radioactive material							

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
7A	Category I – WHITE	Trefoil: black	White	7 (black)		Text (mandatory), black in lower half of label: "RADIOACTIVE" "CONTENTS ..." "ACTIVITY ..."; One red vertical bar shall follow the word: "RADIOACTIVE"
7B	Category II – YELLOW	Trefoil: black	Upper half yellow with white border, lower half white	7 (black)		Text (mandatory) black in lower half of label: "RADIOACTIVE" "CONTENTS ..." "ACTIVITY ..."; In a black outlined box: "TRANSPORT INDEX"; Two red vertical bars shall follow the word: "RADIOACTIVE"
7C	Category III – YELLOW	Trefoil: black	Upper half yellow with white border, lower half white	7 (black)		Text (mandatory) black in lower half of label: "RADIOACTIVE" "CONTENTS ..." "ACTIVITY ..."; In a black outlined box: "TRANSPORT INDEX". Three red vertical bars shall follow the word: "RADIOACTIVE"
7E	Fissile material	-	White	7 (black)		Text (mandatory) black in upper half of label: "FISSILE". In a black outlined box in the lower half of label: "CRITICALITY SAFETY INDEX"
Class 8 hazard: Corrosive substances						

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
8	-	Liquids, spilling from two glass vessels and attacking a hand and a metal: black	Upper half white, lower half black with white border	8 (White)		-
Class 9 hazard: Miscellaneous dangerous substances and articles, including environmentally hazardous substances						
9	-	7 vertical stripes in upper half: black	White	9 underlined (black)		-
9A	Lithium batteries and elements	7 vertical stripes in upper half: black; battery group, one broken and emitting flame in lower half: black	White	9 underlined (black)		-

CHAPTER 5.3

PLACARDING AND MARKING OF WAGONS, CONTAINERS, BULK CONTAINERS, TANK WAGONS, TANK CONTAINERS, MEGCs, PORTABLE TANKS

Note 1: As to provisions in respect of placarding and marking of containers, bulk containers, MEGCs, tank-containers and portable tanks for carriage in a transport chain including a maritime journey, see also 1.1.4.2.1.

Note 2: In accordance with the GHS, a GHS pictogram not required by Annex 2 to SMGS should only appear in carriage as part of a complete GHS label and not independently (see GHS 1.4.10.4.4).

Note 3: Removable skips not conforming to Chapter 6.11 are considered as containers under this chapter

5.3.1 PLACARDING

5.3.1.1 General provisions

5.3.1.1.1 As and when required in this section, placards shall be affixed to the exterior surface of large containers, bulk containers, MEGCs, tank-containers, portable tanks and wagons. Placards shall correspond to the labels required in Column (5) and, where appropriate, Column (6) of Table A of Chapter 3.2 for the dangerous goods contained in the large container, bulk container, MEGC, tank-container, portable tank or wagon and shall conform to the specifications given in 5.3.1.7. Placards shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line. Placards shall be weather-resistant and abrade-resistant under any weather conditions and shall ensure durable marking for a long period of time but not less than the transport period. Placards may be affixed as adhesive stickers, marking applied by paint or any other marking equivalent.

Note: For shunting model labels Nos. 13 and 15, see 5.3.4.

5.3.1.1.2 For Class 1, compatibility groups shall not be indicated on placards if the wagon or large container is carrying substances or articles belonging to two or more compatibility groups. Wagons or large containers carrying substances or articles of different divisions shall bear only placards conforming to the model of the most dangerous division in the order:

1.1 (most dangerous), 1.5, 1.2, 1.3, 1.6, 1.4 (least dangerous).

When 1.5 D substances are carried with substances or articles of Division 1.2, the wagon or large container shall be placarded as Division 1.1.

Placards are not required for the carriage of explosives of Division 1.4, compatibility group S.

Wagons and large containers in which packages are loaded to be carried as military consignments, within the meaning of 1.5.2, and which in conformity with 5.2.2.1.8 do not bear danger labels, shall, in the case of wagons, bear on both sides and, in the case of large containers, bear on all four sides, the placards in accordance with column (5) of Table A of Chapter 3.2.

5.3.1.1.3 For Class 7, the primary hazard placard shall conform to model No. 7D as specified in 5.3.1.7.2. This placard is not required for wagons or large containers carrying excepted packages.

Where both Class 7 labels and placards would be required to be affixed to wagons, large containers, MEGCs, tank-containers or portable tanks, an enlarged label corresponding to the required label of model No. 7A, 7B or 7C may be displayed instead of placard No. 7D to serve both purposes. In that case, the dimensions shall be not less than 250 mm by 250 mm.

5.3.1.1.4 For Class 9 the placard shall correspond to the label model No. 9 as in 5.2.2.2.2; label model No. 9A shall not be used for placarding purposes.

5.3.1.1.5 Large containers, MEGCs, tank-containers, portable tanks or wagons containing goods of more than one class need not bear a subsidiary hazard placard if the hazard represented by that placard is already indicated by a primary or subsidiary hazard placard.

5.3.1.1.6 Placards which do not relate to the dangerous goods being carried, or residues thereof, shall be removed or covered.

5.3.1.1.7 When the placarding is affixed to folding panels, they shall be designed and secured so that they cannot unfold or come loose from the holder during carriage (especially as a result of impacts or unintentional actions).

5.3.1.2 Placarding of containers, bulk containers, MEGCs, tank-containers and portable tanks

The placards shall be affixed to both sides and at each end of the large container, bulk container, MEGC, tank-container or portable tank and to two opposite sides in the case of flexible bulk containers.

When the tank-container or portable tank has multiple compartments and carries two or more dangerous goods, the appropriate placards shall be displayed along each side at the position of the relevant compartments and one placard of each model shown on each side at both ends. If all compartments have to bear the same placards, these placards need to be displayed only once along each side and at both ends of the tank-container or portable tank.

5.3.1.3 Placarding of wagons carrying large containers, bulk containers, MEGCs, tank-containers or portable tanks.

Note: For the placarding of carrying wagons used in piggyback transport, see 1.1.4.4.

If the placards affixed to the large containers, bulk containers, MEGCs, tank-containers or portable tanks are not visible from outside the carrying wagons, the same placards shall also be affixed to both sides of the wagon. Otherwise, no placard need be affixed on the carrying wagon.

5.3.1.4 Placarding of wagons when used for carriage in bulk, tank-wagons, battery-wagons and wagons with demountable tanks

Placards shall be affixed to both sides of the wagon.

When the tank-wagon or the demountable tank carried on the wagon has multiple compartments and carries two or more dangerous goods, the appropriate placards shall be displayed along each side at the position of the relevant compartments. However, in such case, if all compartments have to bear the same placards, these placards need be displayed only once along each side.

Where more than one placard is required for the same compartment, these placards shall be displayed adjacent to each other.

5.3.1.5 Placarding of wagons carrying packages only

Placards shall be affixed to both sides of the wagon.

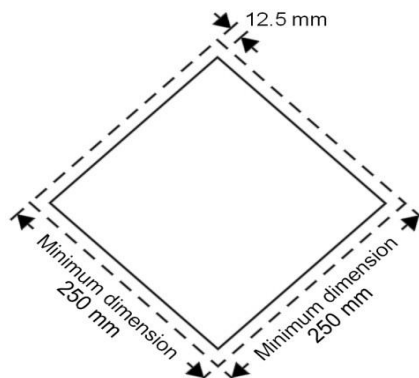
5.3.1.6 Placarding of empty tank-wagons, battery-wagons, MEGCs, tank-containers, portable tanks and empty wagons and large containers for carriage in bulk

Empty tank-wagons, wagons with demountable tanks, battery-wagons, MEGCs, tank-containers and portable tanks uncleaned and not degassed or decontaminated, and empty wagons and large containers for carriage in bulk, uncleaned or not decontaminated, shall continue to display the placards required for the previous load.

5.3.1.7 Specifications for placards affixed on wagons and containers

5.3.1.7.1 Except as provided in 5.3.1.7.2 for the Class 7 placard, and in 5.3.6.2 for the environmentally hazardous substance mark, a placard shall be configured as shown in Figure 5.3.1.7.1.

Figure 5.3.1.7.1



Placard (except for Class 7)

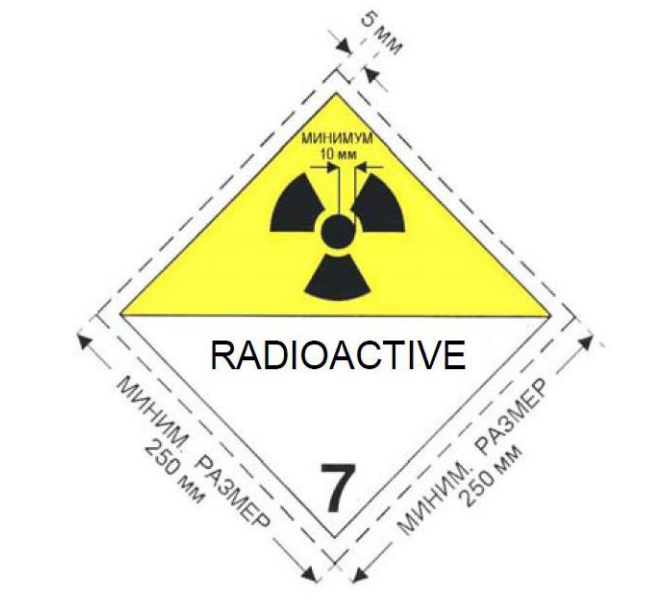
The placard shall be in the form of a square set at an angle of 45° (diamond-shaped). The minimum dimensions shall be 250 mm × 250 mm (to the edge of the placard). The line inside the edge shall be parallel and 12.5 mm from the outside of that line to the edge of the placard. The symbol and line inside the edge shall correspond in colour to the label for the class or division of the dangerous goods in question. The class or division symbol/numeral shall be positioned and sized in proportion to those prescribed in 5.2.2.2 for the corresponding class or division of the dangerous goods in question. The placard shall display the number of the class or division (and for goods in Class 1, the compatibility group letter) of the dangerous goods in question in the manner prescribed in 5.2.2.2 for the corresponding label, in digits not less than 25 mm high. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

The deviations specified in 5.2.2.2.1, second sentence, 5.2.2.2.1.3, third sentence and 5.2.2.2.1.5 for danger labels also apply to placards.

The requirements of 5.2.2.1.2 shall also apply.

- 5.3.1.7.2** The Class 7 placard shall be not less than 250 mm by 250 mm with a black line running 5 mm inside the edge and parallel with it and is otherwise as shown below (Model No. 7D). The number "7" shall not be less than 25 mm high. The background colour of the upper half of the placard shall be yellow and of the lower half white, the colour of the trefoil and the printing shall be black. The use of the word "RADIOACTIVE" in the bottom half is optional to allow the use of this placard to display the appropriate UN number for the consignment.

Placard for radioactive material of Class 7



(No.7D)

Symbol (trefoil): black; Background: upper half yellow with white border, lower half white.

The lower half shall show the word "RADIOACTIVE" or alternatively the appropriate UN Number, and the figure "7" in the bottom corner.

- 5.3.1.7.3** For tank-containers and portable tanks with a capacity of not more than 3 m³, placards may be replaced by labels conforming to 5.2.2.2. If these labels are not visible from outside the carrying wagon, placards according to 5.3.1.7.1 shall also be affixed to both sides of the wagon.
- 5.3.1.7.4** If the size and construction of the wagon are such that the available surface area is insufficient to affix the prescribed placards, their dimensions may be reduced to a minimum of 150 mm by 150 mm. In this case, the other dimensions prescribed for the symbols, lines, figures and letters do not apply.

5.3.2 Orange-coloured plate marking

5.3.2.1 General orange-coloured plate marking provisions.

Note: For the orange-coloured plate marking of carrying wagons used in piggyback transport, see 1.1.4.4.

5.3.2.1.1 If the hazard identification number is indicated in Column 20 of Table A in Chapter 3.2, then a rectangular, orange-coloured plate conforming to 5.3.2.2.1 (and so as to be clearly visible) shall be affixed on each side of a:

- tank-wagon,
- battery-wagon,
- wagon with demountable tanks,
- tank-container,
- MEGC,
- portable tank,
- wagon for carriage in bulk,
- container for carriage in bulk,
- wagon and container carrying packaged radioactive material with a single UN number required to be carried under exclusive use and no other dangerous goods.

This plate shall also be affixed on both sides of cargo transport units in which lithium batteries are installed (UN 3536).

This plate may also be affixed on both sides of full loads made up of packages containing one and the same substance or article.

5.3.2.1.2 These orange-coloured plates shall bear the hazard identification number and the UN number, in accordance with 5.3.2.2.2, prescribed respectively in columns 20 and 1 of Table A in Chapter 3.2. When a number of different substances are carried in a tank-wagon, battery-wagon, wagon with demountable tank, tank-container, MEGC or portable tank in separate tanks or separate compartments of the same tank, the consignor shall affix the orange-coloured plate as required in 5.3.2.1.1, bearing the appropriate numbers, on each side of the tanks or tank compartments, parallel to the longitudinal axis of the wagon, tank-container or portable tank. They shall be clearly visible.

5.3.2.1.3 (Reserved)

5.3.2.1.4 (Reserved)

5.3.2.1.5 If the orange-coloured plates prescribed in 5.3.2.1.1 affixed to the containers, bulk containers, tank-containers, MEGCs or portable tanks are not clearly visible from outside the carrying wagon, the same plates shall also be affixed to both sides of the wagon.

Note: This paragraph need not be applied to wagons carrying containers for carriage in bulk, tanks and MEGCs with a maximum capacity of 3 000 litres.

5.3.2.1.6 (Reserved)

5.3.2.1.7 The requirements of 5.3.2.1.1 to 5.3.2.1.5 are also applicable to empty uncleaned, not degassed or not decontaminated,

- tank-wagons;
- battery-wagons;
- wagons with demountable tanks;
- tank-containers;
- portable tanks;
- MEGCs,

as well as to empty wagons, containers for carriage in bulk, uncleaned or not decontaminated.

5.3.2.1.8 Orange-coloured plates which do not relate to dangerous goods carried, or residues thereof, shall be removed or covered. If plates are covered, the covering shall be total and remain effective after 15 minutes' engulfment in fire.

5.3.2.2 Specifications for the orange-coloured plates

5.3.2.2.1 The orange-coloured plates may be reflectorized and shall be of 40 cm base and of 30 cm high; they shall have a black border of 15 mm wide. The material used shall be weather-resistant and ensure durable marking for a long period of time but not less than the transport period. The plate shall not become detached from its mount in the event of 15 minutes' engulfment in fire. The plates shall

remain affixed irrespective of the orientation of the wagon (in case of swinging over the wagon as well).

The orange-coloured plates may be replaced by a self-adhesive sheet, by paint or by any other equivalent process. This alternative marking shall conform to the specifications set in this sub-section except for the provisions concerning resistance to fire mentioned in 5.3.2.2.1 and 5.3.2.2.2.

Note: The colour of the orange plates in conditions of normal use should have chromaticity co-ordinates lying within the area on the chromaticity diagram formed by joining the following co-ordinates:

Chromaticity co-ordinates of points at the corners of the area on the chromaticity diagram				
X	0,52	0,52	0,578	0,618
Y	0,38	0,40	0,422	0,38

Luminance factor of non-reflectorized colour: $\beta \geq 0.22$, of reflectorized colour: $\beta > 0.12$.

Reference centre E, standard illuminant C, normal incidence 45° viewed at 0° .

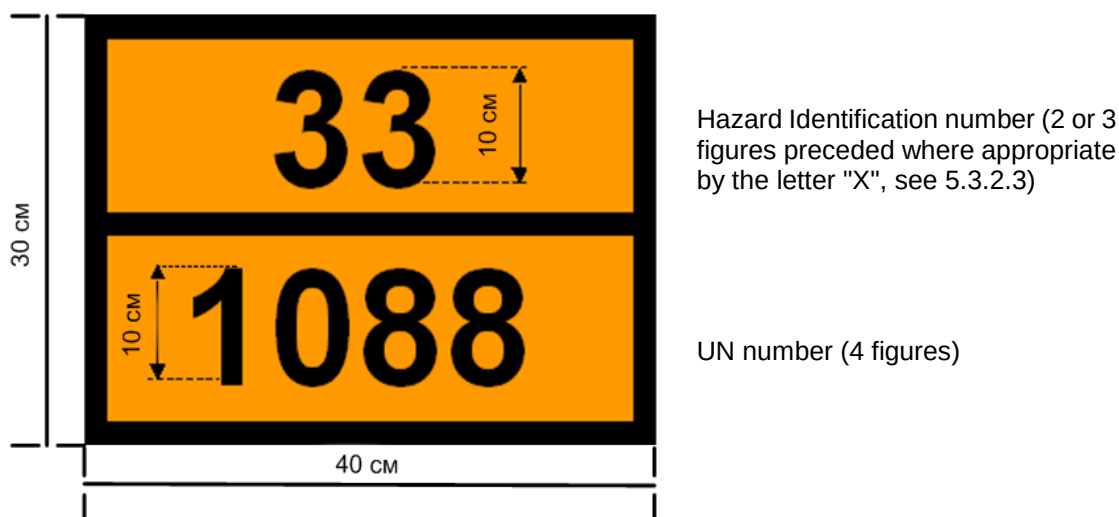
Co-efficient of reflex luminous intensity at an angle of illumination of 5° , viewed at 0.2° : not less than 20 candelas per lux per one m^2 .

5.3.2.2.2 The hazard identification number and the UN number shall consist of black digits 100 mm high and of 15 mm stroke thickness. The hazard-identification number shall be inscribed in the upper part of the plate and the UN number in the lower part. They shall be separated by a horizontal black line, 15 mm in stroke width, extending from side to side of the plate at mid-height (see 5.3.2.2.3).

The hazard identification number and the UN number shall be indelible and shall remain legible after 15 minutes' engulfment in fire.

Interchangeable numbers and letters on plates of composing type presenting the hazard identification number and the UN number shall remain in place during carriage and irrespective of the orientation of the wagon (in case of swinging over the wagon as well).

5.3.2.2.3 Example of orange-coloured plate with hazard identification number and UN number.



Background orange

Border, horizontal line and figures black, 15 mm thickness

5.3.2.2.4 The permitted tolerances for dimensions specified in this sub-section are $\pm 10\%$.

5.3.2.2.5 When the orange-coloured plate or the alternative marking referred to in 5.3.2.2.1 is affixed to folding panels, they shall be designed and secured so that they cannot unfold or come loose from the holder during carriage (especially as a result of impacts or unintentional actions).

5.3.2.3 Meaning of hazard identification numbers

5.3.2.3.1 For substances of classes 2 to 9 the hazard identification number consists of two or three figures.

In general, the figures indicate the following hazards:

- 2 Emission of gas due to pressure or to chemical reaction
- 3 Flammability of liquids (vapours) and gases or self-heating liquid
- 4 Flammability of solids or self-heating solid
- 5 Oxidizing (fire-intensifying) effect
- 6 Toxicity or risk of infection
- 7 Radioactivity
- 8 Corrosivity
- 9 Risk of spontaneous violent reaction

Note: *The risk of spontaneous violent reaction within the meaning of figure 9 include the possibility following from the nature of a substance of a risk of explosion, disintegration and polymerization reaction following the release of considerable heat or flammable and/or toxic gases.*

Doubling of a figure indicates an intensification of that particular hazard.

Where the hazard associated with a substance can be adequately indicated by a single figure, this is followed by zero.

The following combinations of figures, however, have a special meaning: 22, 323, 333, 362, 382, 423, 44, 446, 462, 482, 539, 606, 623, 642, 823, 842, 90 and 99 (see 5.3.2.3.2 below).

If a hazard identification number is prefixed by the letter "X", this indicates that the substance will react dangerously with water. For such substances, water may only be used by approval of experts.

For substances and articles of Class 1, the classification code in accordance with column (3b) of Table A of Chapter 3.2 shall be used as the hazard identification number. The classification code consists of the division number in accordance with 2.2.1.1.5 and the compatibility group letter in accordance with 2.2.1.1.6.

5.3.2.3.2 The hazard identification numbers listed in Column 20 of table A in Chapter 3.2 have the following meanings:

- 20 asphyxiant gas or gas with no subsidiary hazard
- 22 refrigerated liquefied gas, asphyxiant
- 223 refrigerated liquefied gas, flammable
- 225 refrigerated liquefied gas, oxidizing (fire-intensifying)
- 23 flammable gas
- 238 gas, flammable corrosive
- 239 flammable gas, which can spontaneously lead to violent reaction
- 25 oxidizing (fire-intensifying) gas
- 26 toxic gas
- 263 toxic gas, flammable
- 265 toxic gas, oxidizing (fire-intensifying)
- 268 toxic gas, corrosive
- 28 gas, corrosive
- 285 gas, corrosive, oxidizing (fire-intensifying)
- 30 flammable liquid (flash-point between 23 °C and 60 °C, including the value limits) or flammable liquid or solid in the molten state with a flash-point above 60 °C, heated to a temperature equal to or above its flash-point, or self-heating liquid
- 323 flammable liquid which reacts with water, emitting flammable gases

- X323 flammable liquid which reacts dangerously with water, emitting flammable gases ³
- 33 highly flammable liquid (flash-point below 23 °C)
- 333 pyrophoric liquid
- X333 pyrophoric liquid which reacts dangerously with water ³
- 336 highly flammable liquid, toxic
- 338 highly flammable liquid, corrosive
- X338 highly flammable liquid, corrosive, which reacts dangerously with water³
- 339 highly flammable liquid which can spontaneously lead to violent reaction
- 36 flammable liquid (flash-point between 23 °C and 60 °C, including the value limits), slightly toxic, or self-heating liquid, toxic
- 362 flammable liquid, toxic, which reacts with water, emitting flammable gases
- X362 flammable liquid toxic, which reacts dangerously with water, emitting flammable gases³
- 368 flammable liquid, toxic, corrosive
- 38 flammable liquid (flash-point between 23°C and 60°C, including the value limits), slightly corrosive or self-heating liquid, corrosive
- 382 flammable liquid, corrosive, which reacts with water, emitting flammable gases
- X382 flammable liquid, corrosive, which reacts dangerously with water, emitting flammable gases³
- 39 flammable liquid, which can spontaneously lead to violent reaction
- 40 flammable solid, or self-reactive substance, or self-heating substance, or polymerizing substance
- 423 solid which reacts with water, emitting flammable gases, or flammable solid which reacts with water, emitting flammable gases, or self-heating solid which reacts with water, emitting flammable gases
- X423 spontaneously flammable (pyrophoric) solid which reacts dangerously with water, emitting flammable gases ³
- 43 spontaneously flammable (pyrophoric) solid
- X432 spontaneously flammable (pyrophoric) solid which reacts dangerously with water, emitting flammable gases ³
- 44 flammable solid, in the molten state at an high temperature
- 446 flammable solid, toxic, in the molten state, at an high temperature
- 46 flammable or self-heating solid, toxic
- 462 toxic solid which reacts with water, emitting flammable gases
- X462 solid which reacts dangerously with water, emitting toxic gases³
- 48 flammable or self-heating solid, corrosive
- 482 corrosive solid which reacts with water, emitting flammable gases
- X482 solid which reacts dangerously with water, emitting corrosive gases³
- 50 oxidizing (fire-intensifying) substance
- 539 flammable organic peroxide
- 55 strongly oxidizing (fire-intensifying) substance
- 556 strongly oxidizing (fire-intensifying) substance, toxic
- 558 strongly oxidizing (fire-intensifying) substance, corrosive
- 559 strongly oxidizing (fire-intensifying) substance, which can spontaneously lead to violent reaction
- 56 oxidizing substance (fire-intensifying), toxic
- 568 oxidizing substance (fire-intensifying), toxic, corrosive
- 58 oxidizing substance (fire-intensifying), corrosive
- 59 oxidizing substance (fire-intensifying) which can spontaneously lead to violent reaction
- 60 toxic or slightly toxic substance
- 606 infectious substance
- 623 toxic liquid, which reacts with water, emitting flammable gases
- 63 toxic substance, flammable (flash-point between 23°C and 60°C, including the value limits)
- 638 toxic substance, flammable (flash-point between 23°C and 60°C, including the value limits), corrosive
- 639 toxic substance, flammable (flash-point not above 60°C) which can spontaneously lead to violent reaction
- 64 toxic solid, flammable or self-heating
- 642 toxic solid, which reacts with water, emitting flammable gases
- 65 toxic substance, oxidizing (fire-intensifying)

³ Water not to be used except by approval of experts

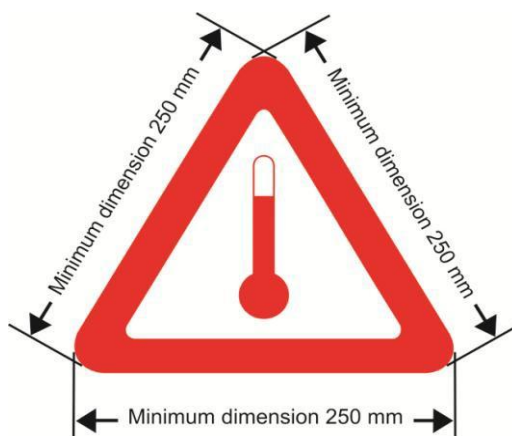
- 66 highly toxic substance
- 663 highly toxic substance, flammable (flash-point not above 60°C)
- 664 highly toxic solid, flammable or self-heating
- 665 highly toxic substance, oxidizing (fire-intensifying)
- 668 highly toxic substance, corrosive
- X668 highly toxic substance, corrosive, which reacts dangerously with water³
- 669 highly toxic substance which can spontaneously lead to violent reaction
- 68 toxic substance, corrosive
- 687 toxic substance, corrosive, radioactive
- 69 toxic or slightly toxic substance, which can spontaneously lead to violent reaction
- 70 radioactive material
- 768 radioactive material, toxic, corrosive
- 78 radioactive material, corrosive
- 80 corrosive or slightly corrosive substance
- X80 corrosive or slightly corrosive substance, which reacts dangerously with water³
- 823 corrosive liquid which reacts with water, emitting flammable gases
- 83 corrosive or slightly corrosive substance, flammable (flash-point between 23°C and 60°C, including the value limits)
- X83 corrosive or slightly corrosive substance, flammable (flash-point between 23°C and 60°C, including the value limits), which reacts dangerously with water³
- 836 Corrosive or slightly corrosive substance, flammable (flash-point between 23 °C and 60 °C, inclusive) and toxic
- 839 corrosive or slightly corrosive substance, flammable (flash-point between 23°C and 60°C including the value limits) which can spontaneously lead to violent reaction
- X839 corrosive or slightly corrosive substance, flammable (flash-point between 23°C and 60°C including the value limits), which can spontaneously lead to violent reaction and which reacts dangerously with water³
- 84 corrosive solid, flammable or self-heating)
- 842 corrosive solid which reacts with water, emitting flammable gases
- 85 corrosive or slightly corrosive substance, oxidizing (fire-intensifying)
- 856 corrosive or slightly corrosive substance, oxidizing (fire-intensifying) and toxic
- 86 corrosive or slightly corrosive substance, toxic
- 87 corrosive substance, radioactive
- 88 highly corrosive substance
- X88 highly corrosive substance, which reacts dangerously with water³
- 883 highly corrosive substance, flammable (flash-point between 23°C and 60°C, including the value limits)
- 884 highly corrosive solid, flammable or self-heating
- 885 highly corrosive substance, oxidizing (fire-intensifying)
- 886 highly corrosive substance, toxic
- X886 highly corrosive substance, toxic, which reacts dangerously with water³
- 89 corrosive or slightly corrosive substance, which can spontaneously lead to violent reaction
- 90 environmentally hazardous substance; miscellaneous dangerous substances
- 99 miscellaneous dangerous substance carried at an high temperature.

5.3.3 HIGH TEMPERATURE SUBSTANCE MARK

Tank-wagons, tank-containers, portable tanks, special wagons or large containers or specially equipped wagons or large containers containing a substance that is carried or handed over for carriage in a liquid state at or above 100 °C or in a solid state at or above 240 °C shall bear on both sides for wagons, and on both sides and at each end for large containers, tank-containers and portable tanks, the mark shown in Figure 5.3.3.

³ Water not to be used except by approval of experts

Figure 5.3.3



Mark for carriage at high temperature

The mark shall be an equilateral triangle. The colour of the mark shall be red. The minimum dimension of the sides shall be 250 mm. For tank-containers and portable tanks with a capacity of not more than 3 000 litres and with an available surface area insufficient to affix the prescribed marks, the minimum dimensions of the sides may be reduced to 100 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown. The mark shall be weather-resistant and shall ensure durable marking throughout the entire journey.

5.3.4 SHUNTING LABELS CONFORMING TO MODELS 13 AND 15.

5.3.4.1 General provisions

The general provisions of 5.3.1.1.1 and 5.3.1.1.6 and of 5.3.1.3 to 5.3.1.6 shall also apply to the shunting labels conforming to models Nos. 13 and 15.

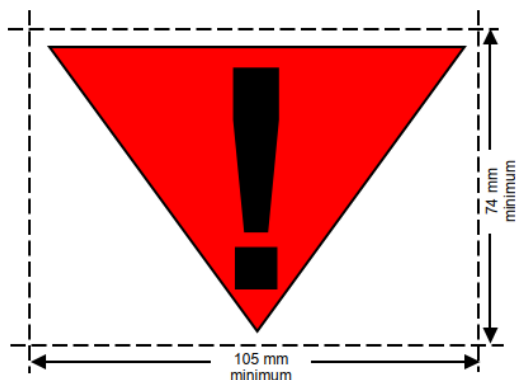
Instead of the shunting labels, indelible shunting marks corresponding exactly to the prescribed models may be affixed. These may simply consist of the red triangle with a black exclamation mark (at least 100 mm base by 70 mm height).

5.3.4.2 Description of shunting labels conforming to Models 13 and 15.

The shunting labels conforming to Models 13 and 15 shall have the shape of a rectangle not smaller than A7 format (74 mm x 105 mm).

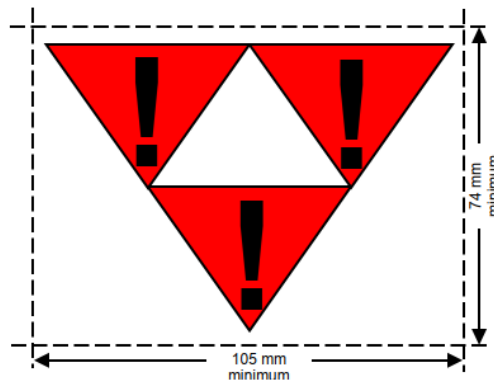
No. 13

Shunt with care



No. 15

Loose shunting or hump shunting forbidden. The wagon shall be accompanied by a motive power unit. The wagon shall not bump, or be bumped by, other wagons.



Red triangle with an exclamation mark in black on white background

Three triangles, red, with black exclamation mark

5.3.5 Identification bands

5.3.5.1 Tank-wagons which are registered by railways of 1520 mm track gauge shall be marked with a 300 mm-wide band at mid-height of the barrel for the carriage of the following liquefied gases: yellow colour is for ammonia 1005; khaki colour (deep-green) is for chlorine 1017; red colour is for flammable gases with the identification code 2F, 3F and 4F.

Tank-wagons which are registered by railways of 1435 mm track gauge and intended for the carriage of liquefied, refrigerated or dissolved under pressure gases shall be marked with an unbroken and orange colour band of 300 mm width⁴, encircling the shell at mid-height.

5.3.5.2 (Reserved)

5.3.6 ENVIRONMENTALLY HAZARDOUS SUBSTANCE MARK

5.3.6.1 When a placard is required to be displayed in accordance with the provisions of 5.3.1, large containers, bulk containers, MEGCs, tank-containers, portable tanks and wagons containing environmentally hazardous substances meeting the criteria of 2.2.9.1.10 shall be marked with the environmentally hazardous substance mark shown in 5.2.1.8.3. This does not apply to the exceptions listed in 5.2.1.8.1.

5.3.6.2 The environmentally hazardous substance mark for large containers, bulk containers, MEGCs, tank-containers, portable tanks and wagons shall be as described in 5.2.1.8.3 and Figure 5.2.1.8.3, except that the minimum dimensions shall be 250 mm × 250 mm. For tank-containers and portable tanks with a capacity of not more than 3 000 litres and with an available surface area insufficient to affix the prescribed marks, the minimum dimensions may be reduced to 100 mm × 100 mm. The other provisions of section 5.3.1 concerning placards shall apply mutatis mutandis to the mark.

5.3.7 MARKING THE NUMBER OF THE EMERGENCY CARD (EC)⁵.

5.3.7.1 The emergency card number shall be indicated:

- a) on wagons, tank-wagons and battery-wagons:
 - on the hazard identification mark indicating the main or the only hazard of goods – between the Class number and the hazard sign, or
 - on a separate plate of white colour as big as 400 x 200 mm with a border of black colour, 10 mm wide.

Note: When goods are consigned to the countries of the European Union or in transit on their territories (except for consignments to/from the Kaliningrad Oblast of the Russian Federation), the emergency card number on the wagons shall be painted on a separate plate of white colour.

- b) on large containers, portable tanks, tank-containers and MEGCs – on a separate plate of white colour as big as 400 x 200 mm with a border of black colour, 10 mm wide.

5.3.7.2 The letters “EC” shall be indicated ahead of the emergency card number. The emergency card number and the letters “EC” shall be at least 70 mm high.

5.3.7.3 The white plate with the emergency card number shall be placed near or under the hazard sign. The white-colour plate shall be weather-resistant and abrade-resistant under any weather conditions and shall ensure durable marking for a long period of time but not less than the transport period. The white-colour plate shall not become detached from its mount.

The white-colour plate may be affixed as adhesive stickers, marking applied by paint or any other marking equivalent.

5.3.7.4 Samples of marking the emergency card number:

⁴ The provision shall not be applicable in the People's Republic of China.

⁵ When goods are consigned from Hungary, Republic of Poland and Slovak Republic, the provisions of this section shall not apply.



or



CHAPTER 5.4

TRANSPORT DOCUMENTATION

5.4.0 General provisions

- 5.4.0.1** Unless otherwise specified, any carriage of goods governed by Annex 2 to SMGS shall be accompanied by the documentation prescribed in this Chapter. Therefore, the carrier shall present for each consignment of dangerous goods the SMGS consignment note completed in accordance with requirements of Section II "Consignment Note" of Annex 1 to SMGS "Rules for the carriage of goods" and provisions of this Chapter.

The information prescribed in this Chapter related to the dangerous goods carried shall be available during carriage in such a way that the goods per wagon and the wagon can be identified in the documentation.

Furthermore, where dangerous goods are carried in large containers, tank-containers, portable tanks or road vehicles, these shall also be identified in the transport document and the information related to the goods shall be provided per large container, tank-container, portable tank or road vehicle, as appropriate.

- 5.4.0.2** The use of electronic data processing (EDP) or electronic data interchange (EDI) techniques as an aid to or instead of paper documentation is permitted, provided that the procedures used for the capture, storage and processing of electronics data meet the legal requirements as regards the evidential value and availability of data during transport in a manner at least equivalent to that of paper documentation.
- 5.4.0.3** When the dangerous goods transport information is given to the carrier by EDP or EDI techniques, the consignor shall be able to give the information to the carrier as a paper document, with the information in the sequence required by this Chapter.

5.4.1 CONSIGNMENT NOTE FOR DANGEROUS SUBSTANCES AND RELATED INFORMATION

Note 1: *Entries in the consignment note shall, unless otherwise specified in Section II "Consignment Note" of Annex 1 to SMGS "Rules for the carriage of goods" and provisions of Chapter 5.4, be made in box 15 "Description of the goods".*

Note 2: *Regarding the information in the consignment note, during transport of goods packaged in excepted numbers as well as during transport of fumigated freight transport units, see 3.5.6 and Chapter 5.5 respectively.*

5.4.1.1 General information required in the consignment note

- 5.4.1.1.1** The transport document(s) shall contain the following information for each dangerous substance, material or article offered for carriage:

- a) the UN number preceded by the letters "UN" (Column 1 of Table A in Chapter 3.2);
- b) the proper shipping name supplemented, when applicable (see 3.1.2.8.1) with the technical name in brackets (see 3.1.2.8.1.1), as determined in accordance with 3.1.2 (Column 2 of Table A in Chapter 3.2);
- c) - for substances and articles of Class 1: the classification code given in Column (3 b) of Table A in Chapter 3.2. When, in Column (5) of Table A in Chapter 3.2, label model numbers other than 1, 1.4, 1.5, 1.6, 13 or 15 are given, these label model numbers, in brackets, shall follow the classification code.
 - for radioactive material of Class 7: the Class number "7";

Note: *For radioactive material with a subsidiary hazard, see also special provision 172 in Chapter 3.3.*

- for lithium batteries of UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552 as well as for battery powered vehicles of UN Nos. 3556, 3557 and 3558: the Class number "9";
- for other substances and articles: the label model numbers, apart from the shunting label conforming to model numbers 13 and 15, given in Column (5) or applicable according to a special

provision referred to in Column (6) of Table A in Chapter 3.2. When more than one label model numbers are given, the numbers following the first one shall be given in brackets. For substances and articles for which no label model is given in Column (5) of Table A in Chapter 3.2, their class according to Column (3a) shall be given instead;

- d) the packing group for the substance or article, when such a group is assigned (column 4 of Table A in Chapter 3.2);

Note: For radioactive material of Class 7 with subsidiary hazard, see special provision 172 (d) in Chapter 3.3.

- e) the number and a description of the packages when applicable (see also Section II "Consignment Note" of Annex 1 to SMGS "Rules for the carriage of goods"). UN packaging codes may only be used to supplement the description of the kind of package (e.g. one box (4G));

Note: The number, type and capacity of each inner packaging within the outer packaging of a combination packaging are not required to be indicated.

- f) the total quantity of each type of dangerous goods bearing a different UN number, proper shipping name or packing group, when such a group is assigned (as a volume or as a gross mass, or as a net mass as appropriate) (see also Section II "Consignment Note" of Annex 1 to SMGS "Rules for the carriage of goods");

Note 1: (Reserved)

Note 2: For dangerous goods in machinery or equipment specified in Annex 2 to SMGS, the quantity indicated shall be the total quantity of dangerous goods contained therein in kilogrammes or litres as appropriate.

- g) the name and address of the consignor (see also Section II "Consignment Note" of Annex 1 to SMGS "Rules for the carriage of goods");
- h) the name and address of the consignee (see also Section II "Consignment Note" of Annex 1 to SMGS "Rules for the carriage of goods");
- i) a declaration as required by the terms of any special agreement, if given transport is implemented under the agreement (e.g. in case of multimodal transportation);
- j) when a marking of goods with an orange-coloured plate in accordance with 5.3.2.1 is prescribed, the hazard identification number (Column 20 of Table A in Chapter 3.2) shall be inscribed before the letters "UN" preceding the UN number (see paragraph (a)). The hazard identification number shall also be shown where full loads made up of packages containing one and the same substance or article are marked in accordance with 5.3.2.1;
- k) The emergency card number (see 5.4.3.12) preceded by the letters "EC" (EC ...) (column 21a of Table A in Chapter 3.2); when the emergency card number for any substance is missing in column 21a, the consignor shall develop and attach an emergency card number for the substance and attach it to the goods and make an entry "EC attached"6.
- l) Information on minimum barrier wagon rules (see column 21(b) of Table A in Chapter 3.2) and a description of column 21b of 3.2.1). When a decimal is available in the column, then:
- the minimum barrier wagon rules for the carriage of dangerous goods in packages or in bulk shall be indicated in the numerator;
 - the minimum barrier wagon rules for the carriage of dangerous goods in tank wagons shall be indicated in the denominator.

The sign "-"(dash) presented in column 21b shall mean that no barrier wagon rules shall be applied during the carriage of the given dangerous goods. Information missing in column 21b shall mean that minimum barrier wagon rules have not been developed for the carriage of the given goods⁶;

- m) Information on hump shunting conditions of wagons (see column 21b) of Table A in Chapter 3.2 and a description of column 21b in Chapter 3.2.1). When any position in column 21b of Table A in Chapter 3.2 indicates a code beginning with the letter "M", the following entry shall be made:

“Hump shunting forbidden” – for the M 1 code;
 “Hump shunting with care” – for the M 2 code;
 “Hump shunting with care” – for the M 3 code (it is only when the cargo packaging is glassware).
 When a decimal is available in the column, then:

- the hump shunting conditions for the carriage of dangerous goods in packages or in bulk shall be indicated in the numerator;
- the hump shunting conditions for the carriage of dangerous goods in tank wagons shall be indicated in the denominator.

The “-“(dash) put down in column 21b shall mean that no hump shunting limitations shall be applied during the carriage of dangerous goods.

Information missing in column 21b shall mean that hump shunting conditions have not been developed for the carriage of the given dangerous goods ⁶.

- n) Label information of substance (type of hazard) shall be indicated in the consignment note, depending on the label information in column 5 of Table A in Chapter 3.2 (see Table 5.4.1.1)⁶;

⁶ The provisions of (k), (l), (m), (n) shall not be mandatory when dangerous goods are consigned or transferred from Hungary, Republic of Poland and Slovak Republic.

Table 5.4.1.1 Label information (stamp) (type of hazard)

Label model numbers (column 5 of Table A in chapter 3.2).	Label information of substance (type of hazard).
1, 1.4, 1.5, 1.6	Explosive
2.1	Flammable gas
2.2	Non-flammable, non-toxic gas
2.3	Toxic gas
3, 4.1	Flammable
4.2	Liable to spontaneous combustion
4.3	In contact with water, the substance emits flammable gases
5.1	Oxidizing substance
5.2	Organic peroxides
6.1	Toxic
6.2	Infectious substances
7A, 7B, 7C	Radioactive
7E	Fissile material
8	Corrosive or toxic
9, 9A	Miscellaneous dangerous substances

Information indicated in (a), (b), (c), (d), (j), (k), (l), (m) and (n) shall be indicated in box 15 of the consignment note “The name of goods” in addition to the data required by section II “The consignment note” of Annex 1 to SMGS “Rules for the carriage of goods”.

The arrangement of information elements and the sequence in which information must be indicated shall be optional, however, the information indicated in (a), (b), (c), (d) and (j) shall be indicated in the following sequence: (j), (a), (b), (c), (d) (the code of hazard shall be preceded by the UN number through a decimal), e.g.:

"663/UN1098 ALLYL ALCOHOL, 6.1(3), I, EC 607

"Barrier wagon rule" 3/1-1*-1-1", "TOXIC", "FLAMMAMBLE", "NO HUMP SHUNTING"

"336/UN1230 METHANOL, 3(6.1), II, EC 319, "Barrier wagon rule" 3/0-0-1-0»
 "FLAMMAMBLE", "TOXIC", "NO HUMP SHUNTING"

5.4.1.1.2 The information required on a transport document shall be legible. Although upper case is used in Chapter 3.1 and in Table A in Chapter 3.2 to indicate the elements which shall be part of the proper shipping name, and although upper and lower case are used in this Chapter to indicate the information required in the transport document, the use of upper or of lower case for entering the information in the transport document is left optional.

5.4.1.1.3 Special provisions for wastes

5.4.1.1.3.1 If waste containing dangerous goods (other than radioactive wastes) is being carried, the proper shipping name shall be preceded by the word "WASTE", unless this term is part of the proper shipping name, e.g.

"336/UN1230 WASTE METHANOL, 6.1, II, AK 319, "Barrier wagon rule" 0-0-1 "FLAMMAMBLE" "TOXIC" "NO HUMP SHUNTING"

or

"33/UN1993 METHANOL, WASTE FLAMMABLE LIQUID, N.O.S. (toluene and ethyl alcohol), 3, II, AK 328 "Barrier wagon rule" 0-0-1 "FLAMMAMBLE"

The technical name, as prescribed in Chapter 3.3, special provision 274, need not be added.

If the provision for waste as set out in 2.1.3.5.5 is applied, the following shall be added to the dangerous goods description required in 5.4.1.1.1 a) to d):

"WASTE IN ACCORDANCE WITH 2.1.3.5.5" (e.g. "UN 3264, CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S., 8, II, WASTE IN ACCORDANCE WITH 2.1.3.5.5").

If the provision for waste as set out in 2.1.3.5.5 is applied, the technical name, as prescribed in Chapter 3.3, special provision 274, need not be added.

5.4.1.1.3.2 If it is not possible to measure the exact quantity of the waste at the place of loading, the quantity according to 5.4.1.1.1 (f) may be estimated for the following cases under the following conditions:

- a) For packagings, a list of packagings including the type and the nominal volume is added to the transport document;
- b) For containers, the estimation is based on their nominal volume and other available information (e.g. type of waste, average density, degree of filling);
- c) For vacuum-operated waste tanks, the estimation is justified (e.g. by means of an estimation provided by the consigner or by wagon equipment).

Such estimation of the quantity is not allowed for:

- Exemptions for which the exact quantity is essential (e.g. 1.1.3.6);
- Waste containing substances mentioned in 2.1.3.5.3 (with the exception of UN 3291 clinical waste, unspecified, n.o.s. or (bio)medical waste, n.o.s. or regulated medical waste, n.o.s. in packaging conforming to packing instruction P 621) or substances of Class 4.3;
- Tanks other than vacuum-operated waste tanks.

A statement shall be included in the transport document, as follows:

"QUANTITY ESTIMATED IN ACCORDANCE WITH 5.4.1.1.3.2".

5.4.1.1.3.3 Special provisions for the carriage of waste in inner packagings packed together in an outer packaging

For carriage in accordance with 4.1.1.5.3, a statement shall be included in the transport document as follows:

"CARRIAGE IN ACCORDANCE WITH 4.1.1.5.3".

The additional statement prescribed in 5.4.1.1.3.2 is not necessary.

For example:

"UN 1993 WASTE FLAMMABLE LIQUID, N.O.S., 3, III, (E); CARRIAGE IN ACCORDANCE WITH 4.1.1.5.3".

Information in the transport document in accordance with 5.4.1.1, shall be based on the entry or entries assigned to the outer packaging in accordance with 4.1.1.5.3 (d). The technical name, as prescribed in Chapter 3.3, special provision 274, need not be added.

5.4.1.1.4 Special provisions for wastes contaminated with free asbestos (UN Nos. 2212 and 2590)

When special provision 678 of Chapter 3.3 is applied, the following statement shall be included in the transport document:

"CARRIAGE UNDER SPECIAL PROVISION 678".

The description of wastes carried in accordance with special provision 678 (b) of Chapter 3.3 shall be added to the description of dangerous goods required in 5.4.1.1.1 (a) to (d) and (j). The transport document shall also be accompanied by the following documents:

- a) A copy of the technical data sheet for the type of container-bag used, on the manufacturer's or distributor's letterhead, giving the dimensions of the packaging and its maximum mass;
- b) A copy of the unloading procedure in accordance with special provision CW 38 of 7.5.11, if applicable.

5.4.1.1.5 Special provisions for salvage packagings including large salvage packagings and salvage pressure receptacles.

When dangerous goods are carried in salvage packagings in accordance with 4.1.1.19, including large salvage packagings, larger size packagings or large packagings of appropriate type and performance level to be used as a salvage packaging, the words "**SALVAGE PACKAGING**" shall be added after the description of the goods in the transport document. When dangerous goods are carried in salvage pressure receptacles in accordance with 4.1.1.20, the words "**SALVAGE PRESSURE RECEPTACLE**" shall be added after the description of the goods in the transport document.

5.4.1.1.6 Special provisions for empty means of containment, uncleaned (empty uncleaned packaging and empty uncleaned wagon, containers, tank-wagons, battery-wagons and MEGCs etc.).

5.4.1.1.6.1 For empty means of containment, uncleaned, which contain the residue of dangerous goods of classes other than Class 7, the completion of the consignment note⁷ shall meet the requirements as those for the carriage of dangerous goods. In addition, the words "EMPTY, UNCLEANNED, RESIDUE, LAST CONTAINED" shall be indicated before or after the dangerous goods description (if required) specified in 5.4.1.1.1 j) and the UN number specified in a). Moreover, 5.4.1.1.1 f) does not apply.

5.4.1.1.6.2 The special provision of 5.4.1.1.6.1 may be replaced with the provisions of 5.4.1.1.6.2.1 or 5.4.1.1.6.2.2, as appropriate.

5.4.1.1.6.2.1 For empty packagings, uncleaned, which contain the residue of dangerous goods of classes other than Class 7, including empty uncleaned receptacles for gases with a capacity of not more than 1000 litres, the particulars according to 5.4.1.1.1 (a), (b), (c), (d), (e), (f) and (j) are replaced with "EMPTY PACKAGING", "EMPTY RECEPTACLE", "EMPTY IBC" or "EMPTY LARGE PACKAGING", as appropriate, followed by the information of the goods last loaded, as described in 5.4.1.1.1 (c).

See example as follows: "EMPTY PACKAGING, 6.1 (3)".

In addition, in such a case:

- a) if the dangerous goods last loaded are goods of Class 2, the information prescribed in 5.4.1.1.1 (c) may be replaced by the number of the class "2";
- b) if the dangerous goods last loaded are goods of classes 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 8 or 9, the information of the goods last loaded, as described in 5.4.1.1.1 (c) may be replaced by the words "WITH RESIDUES OF [...]" followed by the class(es) and subsidiary hazard(s) corresponding to the different residues, in the class numbering order.

Example: Empty packagings, uncleaned, having contained goods of Class 3 carried together with empty packagings, uncleaned, having contained goods of Class 8 with a Class 6.1 subsidiary hazard may be referred to in the transport document as:

⁷ When empty tank-wagons, uncleaned, are returned except for the wagons not belonging to the carrier, the use of an alternate document is permitted, which is agreed upon by the respective agreement between the transport chain parties.

"EMPTY PACKAGINGS, WITH RESIDUES OF 3, 6.1, 8"

Information prescribed in 5.4.1.1.1 (k), (l), (m) may not be indicated when empty packagings, uncleaned, having contained different dangerous goods, are carried together.

- 5.4.1.1.6.2.2** For empty means of containment other than packagings, uncleaned, which contain the residue of dangerous goods of classes other than Class 7 and for empty uncleaned receptacles for gases with a capacity of more than 1000 litres, the particulars in the consignment note shall include the following words: "EMPTY TANK-WAGON", "EMPTY TANK-VEHICLE", "EMPTY DEMOUNTABLE TANK", "EMPTY BATTERY-WAGON", "EMPTY BATTERY-VEHICLE", "EMPTY PORTABLE TANK", "EMPTY TANK-CONTAINER", "EMPTY MEGC", "EMPTY WAGON", "EMPTY VEHICLE", "EMPTY CONTAINER" or "EMPTY RECEPTACLE", as appropriate, followed by the words "LAST LOAD" with the information on the last load carried as provided for in 5.4.1.1.1 (a) to (d) and (j) to (n) in the prescribed sequence. Moreover, paragraph 5.4.1.1.1 (f) does not apply.

Example:

"EMPTY TANK-WAGON, LAST LOAD:

663/UN1098 ALLYL ALCOHOL, 6.1(3), I, EC 607, "Barrier wagon rule" 3/1-1-1-1" "TOXIC" "FLAMMABLE" "NO HUMP SHUNTING"*

- 5.4.1.1.6.2.3** (Reserved)

- 5.4.1.1.6.3** (a) If empty tanks, battery-wagons, MEGCs and battery-vehicles (for piggyback traffic), uncleaned, are carried to the nearest place where cleaning or repair can be carried out in accordance with the provisions of 4.3.2.4.3, the following additional entry shall be made in the consignment note:

"CARRIAGE IN ACCORDANCE WITH 4.3.2.4.3"

(b) If empty tanks, containers, vehicles (for piggyback traffic), uncleaned, are carried to the nearest place where cleaning or repair can be carried out in accordance with the provisions of 7.5.8.1, the following additional entry shall be made in the consignment note:

"CARRIAGE IN ACCORDANCE WITH 7.5.8.1"

- 5.4.1.1.6.4** For the carriage of tank-wagons, demountable tanks, battery-wagons, tank-containers and MEGCs under the conditions of 4.3.2.4.4, the following entry shall be included in the consignment note:

"CARRIAGE IN ACCORDANCE WITH 4.3.2.4.4"

- 5.4.1.1.7** Special provisions relating to carriage in a transport chain including maritime or air carriage⁸.

For the multimodal carriage in accordance with 1.1.4.2.1, a statement shall be included in the consignment note, as follows: "CARRIAGE IN ACCORDANCE WITH 1.1.4.2.1".

- 5.4.1.1.8** (Reserved)

- 5.4.1.1.9** **Special provisions relating to piggyback transport**

***Note:** For the information in the consignment note, see 1.1.4.4.5.*

- 5.4.1.1.10** (Reserved)

- 5.4.1.1.11** **Special provisions for the carriage of IBCs or portable tanks after the date of expiry of the last periodic test or inspection**

For carriage in accordance with 4.1.2.2 (b), 4.3.2.3.7 (b), 6.7.2.19.6.1 (b), 6.7.3.15.6.1 (b) or 6.7.4.14.6.1 (b), a statement to this effect shall be included in the transport document, as follows:

"CARRIAGE IN ACCORDANCE WITH 4.1.2.2 (b)",

"CARRIAGE IN ACCORDANCE WITH 4.3.2.3.7 (b)",

"CARRIAGE IN ACCORDANCE WITH 6.7.2.19.6.1 (b)",

"CARRIAGE IN ACCORDANCE WITH 6.7.3.15.6.1 (b)" or

"CARRIAGE IN ACCORDANCE WITH 6.7.4.14.6.1 (b)"

- 5.4.1.1.12** **Special provisions for carriage under transactional measures**

⁸ For carriage in a transport chain including maritime or air carriage, a copy of the documentation (e.g. form for the multimodal transport of dangerous goods in accordance with 5.4.5) prescribed for maritime or air carriage may be attached to the consignment note.

In the transitional period in accordance with 1.6.1.1 a statement shall be included in the consignment note, as follows CARRIAGE IN ACCORDANCE WITH ANNEX 2 to SMGS IN FORCE BEFORE 1 JULY 2025".

5.4.1.1.13 Special provisions for the carriage of substances stabilized by chemical stabilization

Unless already part of the proper shipping name the word "STABILIZED" shall be added to the proper shipping name if stabilization is by chemical stabilization alone (see 3.1.2.6).

5.4.1.1.14 **Special provisions for the carriage of substances carried under high temperature.**

If the proper shipping name of a substance which is carried or offered for carriage in a liquid state at a temperature equal to or exceeding 100 °C, or in a solid state at a temperature equal to or exceeding 240 °C, does not convey the high temperature condition (for example, by using the term "MOLTEN" or "HIGH TEMPERATURE" as part of the proper shipping name), the word "HOT" shall immediately precede the proper shipping name.

5.4.1.1.15 Special provisions for the carriage of substances stabilized by chemical stabilization

Unless already part of the proper shipping name the word "STABILIZED" shall be added to the proper shipping name if stabilization is by chemical stabilization alone (see 3.1.2.6).

5.4.1.1.16 (Reserved)

5.4.1.1.17 **Special provisions for the carriage of solids in bulk containers conforming to 6.11.4**

When solid substances are carried in bulk containers conforming to 6.11.4, the following statement shall be shown in the consignment note (see Note at the beginning of 6.11.4): "BULK CONTAINER BK(X)⁹ APPROVED BY THE COMPETENT AUTHORITY OF ..."

5.4.1.1.18 **Special provisions for carriage of environmentally hazardous substances (aquatic environment)**

When a substance belonging to any class of dangerous goods meets the classification criteria of 2.2.9.1.10, the consignment note shall bear the additional inscription "ENVIRONMENTALLY HAZARDOUS" or "MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS". This additional requirement does not apply to UN Nos. 3077 and 3082 or for the exceptions listed in 5.2.1.8.1.

The inscription "MARINE POLLUTANT" (according to 5.4.1.4.3 of the IMDG Code) is acceptable for carriage in a transport chain including maritime carriage.

5.4.1.1.19 **Special provisions relating to carriage of packagings, discarded, empty, uncleaned (UN 3509)**

For packagings, discarded, empty, uncleaned, the proper shipping name specified in 5.4.1.1.1 (b) shall be complemented with the words in brackets "(WITH RESIDUES OF [...])" followed by the class(es) and subsidiary hazard(s) corresponding to the residues, in the class numbering order.

Provisions of 5.4.1.1.1(f) do not apply.

Example: Packagings, discarded, empty, uncleaned having contained goods of Class 4.1 packed together with packagings, discarded, empty, uncleaned having contained goods of Class 3 with a Class 6.1 subsidiary hazard should be referred to in the consignment note as: "UN 3509 TAPA "UN 3509 PACKAGINGS, DISCARDED, EMPTY, UNCLEARED (WITH RESIDUES OF 3, 4.1, 6.1), 9".

5.4.1.1.20 **Special provisions for the carriage of substances classified in accordance with 2.1.2.8**

For carriage in accordance with 2.1.2.8, a statement shall be included in the transport document, as follows: "Classified in accordance with 2.1.2.8".

5.4.1.1.21 **Information required in specific cases defined in other parts of Annex 2 to SMGS**

Where, in accordance with provisions in chapters 3.3, 3.5, 4.1, 4.2, 4.3 and 5.5 information is necessary, this information shall be included in the transport consignment note.

5.4.1.1.22 (Reserved)

5.4.1.1.23 **Special provisions for the carriage of substances carried in molten state**

When a substance, which is solid in accordance with the definition in 1.2.1, is offered for carriage in the molten state, the qualifying word "MOLTEN" shall be added as part of the proper shipping name, unless it is already part of the proper shipping name (see 3.1.2.5)

5.4.1.1.24 (Reserved)

5.4.1.2 Additional or special information required for certain classes

5.4.1.2.1 Special provisions for the carriage of dangerous goods of Class 1

a) The consignment note shall indicate, in addition to the requirements in 5.4.1.1.1 (f):

- the total net mass, in kg, of explosive contents¹⁰ for each substance or article bearing a different UN number;
- the total net mass, in kg, of explosive contents¹⁰ for all substances and articles covered by the consignment note.

⁹ (x) shall be replaced with "1" or "2" as appropriate.

¹⁰ For articles, "explosive contents" means the explosive substance contained in the article.

b) For mixed packing of two different goods, the description of the goods in the consignment note shall include the UN numbers and names printed in capitals in Columns (1) and (2) of Table A of Chapter 3.2 of both substances or articles. If more than two different goods are contained in the same package in conformity with the mixed packing provisions given in 4.1.10 (in accordance with alphanumeric codes) special provisions MP1, MP2 and MP20 to MP24, the consignment note shall indicate under the description of the goods the UN numbers of all the substances and articles contained in the package, in the form, "GOODS with UN Numbers ...";

c) For the carriage of substances and articles assigned to an n.o.s. entry or the entry "0190 SAMPLES, EXPLOSIVE" or packed conforming to packing instruction P101 of 4.1.4.1, a copy of the competent authority approval with the conditions of carriage shall be attached to the consignment note. This document shall be drafted in an official language of the forwarding country and also, if that language is not Russian or Chinese, unless any agreements (if available) concluded between the countries concerned in the transport operation provide otherwise;

d) If packages containing substances and articles of compatibility groups B and D are loaded together in the same wagon in accordance with the requirements of 7.5.2.2, a copy of the competent authority approval of the protective compartment or containment system in accordance with 7.5.2.2, footnote a) under the table, shall be attached to the consignment note. This document shall be drafted in an official language of the forwarding country and also, if that language is not Russian or

e) When explosive substances or articles are carried in packagings conforming to packing instruction P101, the consignment note shall bear the inscription "PACKAGING APPROVED BY THE COMPETENT AUTHORITY OF... (Distinguishing sign of the State¹¹ of registration used on motor vehicles and trailers in international road traffic)", see 4.1.4.1, packing instruction P101).

f) In the case of military consignments within the meaning of 1.5.2, the descriptions prescribed by the competent military authority may be used in place of the descriptions in accordance with Table A of Chapter 3.2.

For the carriage of military consignments to which the derogations in accordance with 5.2.1.5, 5.2.2.1.8 and 5.3.1.1.2 and in 7.2.4, special provision W2, the following shall be entered in the consignment note: "MILITARY CONSIGNMENT".

g) When fireworks of UN Nos. 0333, 0334, 0335, 0336 and 0337 are carried, the consignment note shall bear the inscription:

"Classification of fireworks approved by the competent authority of X country with the firework reference X/Y Z"

The classification approval certificate need not be carried with the consignment. But it shall be made available by the consignor to the carrier or the competent authorities for control purposes. The

classification approval certificate or a copy of it shall be in an official language of the forwarding country, and also, if that language is not Russian, English or German, in Russian, English or German.

Note 1: The commercial or technical name of the goods may be entered additionally to the proper ship- ping name in the consignment note.

Note 2: The classification reference shall consist of the SMGS, RID or ADR Contracting States in which the classification code according to special provision 645 of 3.3.1 was approved in the form of letters indicating the State of approval¹² (X), the competent authority identification (Y) and a unique serial reference (Z). Examples of such classification references are as follows:

RUS/NZHK123456
D/BAM1234

5.4.1.2.2 Additional provisions for the carriage of dangerous goods of Class 2

- a) For the carriage of mixtures (see 2.2.2.1.1) in tank-wagons, battery-wagons, wagons with demountable tanks, portable tanks, tank-containers or elements of battery-wagons or MEGCs, the composition of the mixture as a percentage of the volume or as a percentage of the mass shall be given. Constituents below 1% need not be indicated (see also 3.1.2.8.1.2). The composition of the mixture need not be given when the technical names authorized by special provisions 581, 582 or 583 are used to supplement the proper shipping name;
- b) For the carriage of cylinders, tubes, pressure drums, cryogenic receptacles and bundles of cylinders under the conditions of 4.1.6.10, the following entry shall be included in the consignment note:
"CARRIAGE IN ACCORDANCE WITH 4.1.6.10"
- c) Where tank-wagons have been refilled without having been previously cleaned out, the consignment note shall show, as total weight of goods carried, the sum of the weight of the new load and of the residual load, which will be the same as the gross weight of the tank-wagon, less its registered unladen weight. In addition, the words "MASS OF NEW LOAD ... KG" may also be added".
- d) In the case of the words "tank-wagons, tank-containers or portable tanks carrying refrigerated liquefied gases the consignor shall enter in the transport document the date at which the actual holding time ends, in the following format: "END OF HOLDING TIME: (DD/MM/YYYY)".
- e) For carriage of UN No. 1012, the transport document shall contain the name of the specific gas carried (see special provision 398 of Chapter 3.3) in brackets after the proper shipping name.
- f) For the carriage of empty tank-wagons which have been used for liquefied gasses with classification codes of 2A, 2O, 2F, 2T, 2TF, 2TC, 2TO, 2TFC, 2TOC, the consignment note shall indicate the residual pressure in the boiler after it has been discharged (in Mpa or bar).

5.4.1.2.3 Additional provisions for self-reactive substances of Class 4.1 and organic peroxides of Class 5.2

5.4.1.2.3.1 (Reserved)

5.4.1.2.3.2 When for certain self-reactive substances of Class 4.1 and certain organic peroxides of Class 5.2 the competent authority has permitted the label conforming to model No.1 (see 5.2.2.1.9), a statement to this effect shall be included in the consignment note, as follows: "THE LABEL CONFORMING TO MODEL NO.1 IS NOT REQUIRED".

5.4.1.2.3.3 When organic peroxides and self-reactive substances are carried under conditions where approval is required (for organic peroxides see 2.2.52.1.8, 4.1.7.2.2 and special provision TA2 of 6.8.4 or

¹¹ Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968

¹² Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968

6.20.4; for self-reactive substances see 2.2.41.1.13 and 4.1.7.2.2), a statement to this effect shall be included in the consignment note, e.g.:

"CARRIAGE IN ACCORDANCE WITH 2.2.52.1.8"

A copy of the competent authority approval with the conditions of carriage shall be attached to the consignment note. This document shall be drafted in an official language of the forwarding country and also, if that language is not Russian, in Russian, unless any agreements (if available) concluded between the countries concerned in the transport operation provide otherwise.

- 5.4.1.2.3.4** When a sample of an organic peroxide (see 2.2.52.1.9) or a self-reactive substance (see 2.2.41.1.15) is carried, a statement to this effect shall be included in the consignment note, e.g.:

"CARRIAGE IN ACCORDANCE WITH 2.2.52.1.9"

- 5.4.1.2.3.5** When self-reactive substances type G (see Manual of Tests and Criteria, Part II, paragraph 20.4.2 (g)) are carried, the following statement shall be given in the consignment note:

"NOT A SELF-REACTIVE SUBSTANCE OF CLASS 4.1"

When organic peroxides type G (see Manual of Tests and Criteria, Part II, paragraph 20.4.3 (g)) are carried, the following statement may be given in the consignment note:

"NOT A SUBSTANCE OF CLASS 5.2"

5.4.1.2.4 Additional provisions for the carriage of dangerous goods of Class 6.2

In addition to the information concerning the consignee (see 5.4.1.1.1 (h)), the name and telephone number of a responsible person shall be indicated in the consignment note.

5.4.1.2.5 Additional provisions for the carriage of dangerous goods of Class 7.

- 5.4.1.2.5.1** The following information shall be inserted in the consignment note for each consignment of Class 7 material, as applicable, in the order given and immediately after the information required under 5.4.1.1.1 (a) to (c):

- a) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;
- b) A description of the physical and chemical form of the material, or a notation that the material is special form radioactive material or low dispersible radioactive material. A generic chemical description is acceptable for chemical form. For radioactive material with a subsidiary risk, see paragraph (c) of special provision 172 of Chapter 3.3;
- c) The maximum activity of the radioactive contents during carriage expressed in becquerels (Bq) with an appropriate SI prefix symbol (see 1.2.2.1). For fissile material, the mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) in grams (g), or appropriate multiples thereof, may be used in place of activity;
- d) The category of the package, overpack or container, as assigned per 5.1.5.3.4, i.e. I-WHITE, II-YELLOW, III-YELLOW;
- e) The TI as determined per 5.1.5.3.1 and 5.1.5.3.2 (except for category I-WHITE);
- f) For fissile material:
 - 1) Shipped under one exception of 2.2.7.2.3.5 (a) to (f), reference to that paragraph;
 - 2) Shipped under 2.2.7.2.3.5 (c) to (e), the total mass of fissile nuclides;
 - 3) Contained in a package for which one of 6.4.11.2 (a) to (c) or 6.4.11.3 is applied, reference to that paragraph;
 - 4) The criticality safety index, where applicable;
- g) The identification mark for each competent authority certificate of approval (special form radioactive material, low dispersible radioactive material, fissile material excepted under 2.2.7.2.3.5 (f), special arrangement, package design, or shipment) applicable to the consignment;
- h) For consignments of more than one package, the information required in 5.4.1.1.1 and in (a) to g) above shall be given for each package. For packages in an overpack, container or wagon, a detailed statement of the contents of each package within the overpack, container or wagon and,

where appropriate, of each overpack, container or wagon shall be included. If packages are to be removed from the overpack, container or wagon at a point of intermediate unloading, an individual consignment note shall be made available for each package or each consignment of packages;

- i) Where a consignment is required to be shipped under exclusive use, the statement "EXCLUSIVE USE SHIPMENT"; and
- j) For the materials LSA-II and LSA-III, SCO-I, SCO-II and SCO-III, the total activity of the consignment as a multiple of A2. For radioactive material for which the A2 value is unlimited, the multiple of A2 shall be zero.

5.4.1.2.5.2 The consignor shall provide in the transport document a statement regarding actions, if any, that are required to be taken by the carrier. The statement shall be in the languages deemed necessary by the carrier or the authorities concerned, and shall include at least the following information:

- a) Supplementary requirements for loading, stowage, carriage, handling and unloading of the package, overpack or container including any special stowage provisions for the safe dissipation of heat (see special provision CW33 (3.2) of 7.5.11), or a statement that no such requirements are necessary;
- b) Restrictions on the mode of carriage or wagon and any necessary routing instructions;
- c) Emergency arrangements appropriate to the consignment.

5.4.1.2.5.3 In all cases of international carriage of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the UN number and proper shipping name required in 5.4.1.1.1 shall be in accordance with the certificate of the country of origin of design.

5.4.1.2.5.4 The applicable competent authority certificates need not necessarily accompany the consignment. The consignor shall make them available to the carrier(s) before loading and unloading.

5.4.1.3 (Reserved)

5.4.1.4 **Format and language to be used**

5.4.1.4.1 The consignment note shall be filled out in accordance with the provisions of Article 12 "Consignment Note" of SMGS.

In addition to the information required in 5.4.1.1 and 5.4.1.2, a cross shall be entered in the appropriate box if the consignment note to be used provides for this.

5.4.1.4.2 In all cases, separate consignment notes shall be made out for consignments which, because of the prohibitions in 7.5.2, may not be loaded together in the same wagon or container.

In addition to the consignment note, for the multimodal carriage of dangerous goods¹³, the use of documents corresponding to the example shown in 5.4.5 of RID is considered advisable.

5.4.1.5 **Non-dangerous goods**

When goods mentioned by name in Table A of Chapter 3.2, are not subject to Annex 2 of SMGS because they are considered as non-dangerous according to Part 2, the consignor may enter in the consignment note a statement to that effect, e.g.:

"Not goods of class..."

Note: This provision may be used in particular when the consignor considers that, due to the chemical nature of the goods (e.g. solutions and mixtures) carried or to the fact that such goods are deemed dangerous for other regulatory purposes the consignment might be subject to control during the journey.

5.4.2 Large container or wagon packing certificate

¹³ If used, the relevant recommendations of the UNECE United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) may be consulted, in particular Recommendation No. 1 (United Nations Layout Key for Trade Documents) (ECE/TRADE/137, edition 81.3), UN Layout Key for Trade Documents – Guidelines for Applications (ECE/TRADE/270, edition 2002), Recommendation No. 11 (Documentary Aspects of the International Transport of Dangerous Goods) (ECE/TRADE/204, edition 96.1 – currently under revision) and Recommendation No. 22 (Layout Key for Standard Consignment Instructions) (ECE/TRADE/168, edition 1989). Refer also to the UN/CEFACT Summary of Trade Facilitation Recommendations (ECE/TRADE/346, edition 2006) and the United Nations Trade Data Elements Directory (UNTD) (ECE/TRADE/362, edition 2005).

If the carriage of dangerous goods in a container precedes a voyage by sea, a container/vehicle packing certificate conforming to section 5.4.2 of the IMDG Code^{14;15} shall be provided to the maritime carrier by those responsible for packing the container with the transport document.

The transport document required under 5.4.1 and the container/vehicle packing certificate as provided above may be incorporated into a single document (see for example 5.4.5). If not, these documents shall be attached. If these documents are incorporated into a single document, the inclusion in the transport document of a statement that the loading of the container has been carried out in accordance with the applicable modal regulations together with the identification of the person responsible for the container/vehicle packing certificate shall be sufficient.

If the carriage of dangerous goods in a vehicle precedes a voyage by sea, a container/vehicle packing certificate conforming to section 5.4.2 of the IMDG Code^{14;15} may be provided with the transport document.

Note: The term "Vehicle" in this section also includes wagon".

¹⁴ Guidelines for use in practice and in training for loading goods in transport units have also been drawn up by the International Maritime Organization (IMO), the International Labour Organization (ILO) and the United Nations Economic Commission for Europe (UNECE) and have been published by IMO ("IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code)").

¹⁵Section 5.4.2 of the IMDG Code (Amendment 40-20) requires the following:

5.4.2 Container/vehicle packing certificate

5.4.2.1 When dangerous goods are packed or loaded into any container or vehicle, those responsible for packing the container or vehicle shall provide a "container/vehicle packing certificate" specifying the container/vehicle identification number(s) and certifying that the operation has been carried out in accordance with the following conditions:

1. The container/vehicle was clean, dry and apparently fit to receive the goods;
2. Packages, which need to be segregated in accordance with applicable segregation requirements, have not been packed together onto or in the container/vehicle [unless approved by the competent authority concerned in accordance with 7.3.4.1 (of the IMDG Code)];
3. All packages have been externally inspected for damage, and only sound packages have been loaded;
4. Drums have been stowed in an upright position, unless otherwise authorized by the competent authority, and all goods have been properly loaded, and, where necessary, adequately braced with securing material to suit the mode(s) of transport for the intended journey;
5. Goods loaded in bulk have been evenly distributed within the container/vehicle;
6. For consignments including goods of class 1, other than division 1.4, the container/vehicle is structurally serviceable in conformity with 7.1.2 (of the IMDG Code);
7. The container/vehicle and packages are properly marked, labelled, and placarded, as appropriate;
8. When substances presenting a risk of asphyxiation are used for cooling or conditioning purposes (such as dry ice (UN 1845) or nitrogen, refrigerated liquid (UN 1977) or argon, refrigerated liquid (UN 1951)), the container/vehicle is externally marked in accordance with 5.5.3.6 (of the IMDG Code); and
9. A dangerous goods transport document, as indicated in 5.4.1 (of the IMDG Code) has been received for each dangerous goods consignment loaded in the container/vehicle.

Note: The container/vehicle packing certificate is not required for portable tanks.

5.4.2.2 The information required in the dangerous goods transport document and the container/vehicle packing certificate may be incorporated into a single document; if not, these documents shall be attached one to the other. If the information is incorporated into a single document, the document shall include a signed declaration such as "It is declared that the packing of the goods into the container/vehicle has been carried out in accordance with the applicable provisions". This declaration shall be dated and the person signing this declaration shall be identified on the document. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.

5.4.2.3 If the container/vehicle packing certificate is presented to the carrier by means of EDP or EDI transmission techniques, the signature(s) may be electronic signature(s) or may be replaced by the name(s) (in capitals) of the person authorized to sign.

5.4.2.4 When the container/vehicle packing certificate is given to a carrier by EDP or EDI techniques and subsequently the dangerous goods are transferred to a carrier that requires a paper container/vehicle packing certificate, the carrier shall ensure that the paper document indicates "Original received electronically" and the name of the signatory shall be shown in capital letters."

5.4.3 INSTRUCTIONS IN WRITING AND EMERGENCY CARDS

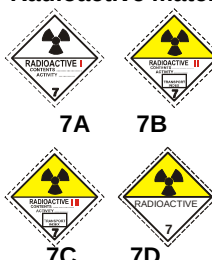
Instructions in writing*

* Requirements for instructions in writing shall be applied only when the National legislation stipulates this.

- 5.4.3.1 As an aid during an emergency situation that may occur during carriage, instructions in writing in the form specified in 5.4.3.4 shall be carried in the driver's cab and shall be readily available.
- 5.4.3.2. Before the start of the journey, these instructions shall be provided by the carrier to the driver(s) in (a) language(s) that he (they) can read and understand. The carrier shall ensure that the driver understands the instructions and is capable of carrying them out properly.
- 5.4.3.3 Before the start of the journey, the carrier shall inform the members of the locomotive crew of the dangerous goods loaded. The locomotive crew shall consult the instructions in writing for details on actions to be taken in the event of an accident or incident.
- 5.4.3.4 The instructions in writing should correspond to the following four page model as regards their contents.

INSTRUCTIONS IN WRITING ACCORDING TO ANNEX 2 TO SMGS	
<u>Actions to be taken in the event of an accident or incident</u> <u>(when the accident involves or is likely to involve dangerous goods)</u> In the event of an accident or incident that may occur or arise during carriage, the drivers shall take the following actions where safe and practicable to do so*: - Having agreed upon actions in accordance with the applicable procedure with the railway infrastructure manager, bring the train/shunting movement to a stop in a suitable place. bearing in mind the type of hazard (e.g. fire, loss of load), the local conditions (e.g. tunnel, viaduct, built-up area) and possible actions by the emergency services (accessibility, evacuation); - Bring the train/shunting movement to a stop, if in accordance with the operating instructions it is necessary to switch off the locomotive, enable the hand brake and put brake shoes in place; - Avoid sources of ignition, sparks, in particular, do not smoke, use electronic cigarettes, use open flame and switch on any electrical equipment; - Observe the additional guidance assigned to the hazards of all concerned goods in the following table. The hazards correspond to the number of the danger label model and the mark assigned to the goods during carriage; - In accordance with the established procedure, inform the railway infrastructure manager or the emergency services, giving as much information as possible about the accident or incident and dangerous goods involved; - Keep transport documents and any other information on the dangerous goods being carried, readily available for the emergency services on arrival, or have these made available by means of electronic data interchange; - When leaving the locomotive, put on the prescribed warning clothing; - If necessary, use other protective equipment; - Do not walk into or touch spilled substances. Avoid inhalation of fumes, smoke, dusts and vapours by staying up wind; - Follow the advice of the officers-in-charge from railway authorities and rescue services, move away from the affected zone, advise other persons to move away from the affected zone and not to approach it; - When in safety, remove any contaminated clothing and individual protective equipment for further disinfection, decontamination and disposal in accordance with the applicable procedure. * <i>Specifications contained in railway regulations or railway operations shall be also observed.</i>	

Additional guidance to members of locomotive crews depending on the dangerous label of dangerous goods		
Danger labels and placards, description of the hazards	Hazard characteristics	Additional guidance
(1)	(2)	(3)
Explosive substances and articles  1 1.5 1.6	May have a range of properties and effects such as mass detonation; projection of fragments; intense fire/heat flux; formation of bright light, loud noise or smoke. Sensitive to shocks and/or impacts and/or heat.	Take cover but stay away from windows.
Explosive substances and articles  1.4	Slight risk of explosion and fire.	Take cover immediately.
Flammable gases  2.1 2	Risk of fire. Risk of explosion. May be under pressure. Risk of asphyxiation. May cause burns and/or frostbite. Containments may explode when heated.	Take cover immediately. Keep out of low areas.
Non-flammable, non-toxic gases  2.2 2	Risk of asphyxiation. May be under pressure. May cause frostbite. Containments may explode when heated.	Take cover immediately. Keep out of low areas.
Toxic gases  2.3	Risk of intoxication. May be under pressure. May cause burns and/or frostbite. Containments may explode when heated.	Take cover immediately. Keep out of low areas.
Flammable liquids  3 3	Risk of fire. Risk of explosion. Containments may explode when heated.	Stop a leak, if possible, when it is allowed by the operating instructions. Take cover immediately. Keep out of low areas.
Flammable solids, self-reactive substances and solid desensitized explosives  4.1	Risk of fire. Flammable or combustible, may be ignited by heat, sparks or flames. Self-reactive substances that are liable to exothermic decomposition in the case of heat supply, contact with other substances (such as acids, heavy-metal compounds or amines), friction or shock. This may result in the evolution of harmful and flammable gases or vapours or self-ignition. Containments may explode when heated. Risk of explosion of desensitized explosives after loss of desensitizer.	
Substances liable to spontaneous combustion  4.2	Risk of fire by spontaneous combustion if packages are damaged or contents spilled. May react vigorously with water.	
Substances which, in contact with water, emit flammable gases  4.3 4	Risk of fire and explosion in contact with water.	

Danger label (1)	Hazard characteristics (2)	Additional guidance (3)
Oxidizing substances  5.1	Risk of vigorous reaction, ignition and explosion in contact with combustible or flammable substances.	
Organic peroxides  5.2	Risk of exothermic decomposition at elevated temperatures, contact with other substances (such as acids, heavy-metal compounds or amines), friction or shock. This may result in the evolution of harmful and flammable gases or vapours or self-ignition.	
Toxic substances  6.1	Risk of intoxication by inhalation, skin contact or ingestion. Risk to the aquatic environment or the sewage system.	
Infectious substances  6.2	Risk of infection. May cause serious disease in humans or animals. Risk to the aquatic environment or the sewage system.	
Radioactive material  7A 7B 7C 7D	Risk of intake and external radiation.	Limit time of exposure.
Fissile material  7E	Risk of nuclear chain reaction.	
Corrosive material  8	Risk of burns by corrosion. May react vigorously with each other, with water and with other substances. Spilled substance may evolve corrosive vapours. Risk to the aquatic environment or the sewage system.	
Miscellaneous dangerous substances and articles  9	Risk of fire. Risk of explosion. Risk to the aquatic environment or the sewage system.	To do away with it, if possible, when it is allowed by the operating instructions.

Note 1: For dangerous goods with two or more danger labels and for mixed loads of different dangerous goods перевозке разных опасных грузов, each applicable entry indicated in the table shall be observed.

Note 2: Additional guidance shown above may be adapted to reflect the classes of dangerous goods to be carried and their means of transport according to existing national specifications.

Additional guidance to members of locomotive crews depending on the dangerous label of dangerous goods		
Mark (1)	Hazard characteristics (2)	Additional guidance (3)
Environmentally hazardous substances 	Risk to the aquatic environment or the sewage system.	
High temperature substances 	Risk of burns by heat.	Avoid contact with hot parts of the wagon or container and the spilled substance.

Equipment for personal protection to be carried in the driver's cab

The following equipment* shall be carried in the driver's cab:

- portable lighting apparatus;

For each member of the locomotive crew:

- suitable special warning clothing (e.g. waistcoat).

* The list of equipment to be kept available shall, if necessary, be supplemented according to existing national specifications.

5.4.3.5 – 5.4.3.10 (Reserved)

Emergency cards*

* Requirements for emergency cards shall not be mandatory in Hungary, Republic of Poland and Slovak Republic.

5.4.3.11 To provide timely actions on accident management, which happened during the journey, loading or unloading, it shall be required to follow instructions included in the emergency cards the number of which is indicated in the consignment note (see 5.4.1.1). The emergency card contains information goods characteristics, individual protective equipment and instructions for actions to be taken in an emergency situation.

5.4.3.12. Emergency cards are available in the document "Emergency cards for dangerous goods carried on the railways of the CIS countries, Republic of Latvia, Republic of Lithuania, Republic of Estonia" 2009, the search for which is implemented according to the respective UN number or the name of goods according to alphabetical order. When a substance lacks its emergency card, the consignor shall develop and attach an emergence card for the substance and attach it to the consignment note.

Note: Emergency cards may be published in accordance with the national legislation.

5.4.4 RETENTION OF INFORMATION RELATING TO DANGEROUS GOODS TRANSPORT

5.4.4.1 The consignor and the carrier shall retain a copy of the dangerous goods transport document and additional information and documentation as specified in Annex 2 to SMGS, for a minimum period of three months.

5.4.4.2 When the documents are kept in the electronic form, the consignor and the carrier shall be able to reproduce them in the paper-based form.

5.4.5 EXAMPLE OF DOCUMENT FORM FOR DANGEROUS GOODS DURING MULTIMODAL TRANSPORT

Example of a document form which may be used as a combined dangerous goods declaration and container packing certificate for multimodal carriage of dangerous goods, is provided for in 5.4.5 of Annex 2 to SMGS.

CHAPTER 5.5 SPECIAL PROVISIONS

5.5.1 (Reserved)

5.5.2 SPECIAL PROVISIONS APPLICABLE TO FUMIGATED CARGO TRANSPORT UNITS (UN 359)

5.5.2.1 General.

5.5.2.1.1 Fumigated cargo transport units (UN 3359) containing no other dangerous goods are not subject to any provisions of Annex 2 to SMGS other than those of this section.

5.5.2.1.2 When the fumigated cargo transport unit is loaded with dangerous goods in addition to the fumigant, any provision of Annex 2 to SMGS relevant to these goods (including placarding, marking and documentation) applies in addition to the provisions of this section.

5.5.2.1.3 Only cargo transport units that can be closed in such a way that the escape of gas is reduced to a minimum shall be used for the carriage of cargo under fumigation.

5.5.2.2 *Training of staff*

Persons engaged in the handling of fumigated cargo transport units shall be trained commensurate with their responsibilities.

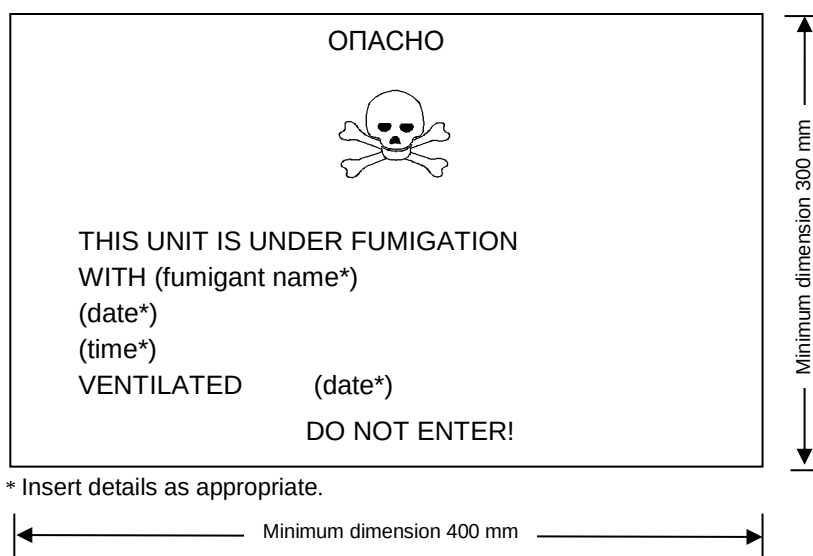
5.5.2.3 *Marking and placarding*

5.5.2.3.1 A fumigated cargo transport unit shall be marked with a warning mark, as specified in 5.5.2.3.2, affixed at each access point in a location where it will be easily seen by persons opening or entering the cargo transport unit. This mark shall remain on the cargo transport unit until the following provisions are met:

- a) The fumigated cargo transport unit has been ventilated to remove harmful concentrations of fumigant gas; and
- b) The fumigated goods or materials have been unloaded.

5.5.2.3.2 The fumigation warning mark shall be as shown in Figure 5.5.2.3.2.

Figure 5.5.2.3.2



* Insert details as appropriate.

Fumigation warning mark

The mark shall be a rectangle. The minimum dimensions shall be 400 mm wide × 300 mm high and the minimum width of the outer line shall be 2 mm.

The mark shall be in black print on a white background with lettering not less than 25 mm high. Where dimensions are not specified, all features shall be in approximate proportion to those shown above.

5.5.2.3.3 If the fumigated cargo transport unit has been completely ventilated either by opening the doors of the unit or by mechanical ventilation after fumigation, the date of ventilation shall be marked on the fumigation warning mark.

5.5.2.3.4 When the fumigated cargo transport unit has been ventilated and unloaded, the fumigation warning mark shall be removed.

5.5.2.3.5 Placards conforming to model No. 9 (see 5.2.2.2.2) shall not be affixed to a fumigated cargo transport unit except as required for other Class 9 substances or articles packed in the fumigated cargo transport unit.

5.5.2.4 Documentation

5.5.2.4.1 Box 15 "Description of goods" of the consignment note for the carriage of cargo transport units that have been fumigated and have not been completely ventilated before carriage shall include the following information:

- a) "UN 3359 fumigated cargo transport unit, 9", or "UN 3359 fumigated cargo transport unit, Class 9";
- b) The date and time of fumigation; and
- c) The type and amount of the fumigant used..

5.5.2.4.2 Entries in the consignment note with this information shall be easy to identify, legible and durable.

5.5.2.4.3 Instructions for disposal of any residual fumigant including fumigation devices (if used) shall be attached to the consignment note.

5.5.2.4.4 It is not required to have information available when the fumigated cargo transport unit has been completely ventilated and the date of ventilation has been marked on the warning mark (see 5.5.2.3.3 and 5.5.2.3.4).

5.5.3 SPECIAL PROVISIONS APPLICABLE TO THE CARRIAGE OF DRY ICE (UN 1845) AND TO PACKAGES AND WAGONS AND CONTAINERS CONTAINING SUBSTANCES PRESENTING A RISK OF ASPHYXIATION WHEN USED FOR COOLING OR CONDITIONING PURPOSES (SUCH AS DRY ICE (UN 1845) OR NITROGEN, REFRIGERATED LIQUID (UN 1977) OR ARGON, REFRIGERATED LIQUID (UN 1951) OR NITROGEN)

***Note:** In the context of this section the term "conditioning" may be used in a broader scope and includes protection.*

5.5.3.1 Scope of application

5.5.3.1.1 This section is not applicable to substances which may be used for cooling or conditioning purposes when carried as a consignment of dangerous goods, except for the carriage of dry ice (UN No. 1845). When they are carried as a consignment, these substances shall be carried under the relevant entry of Table A of Chapter 3.2 in accordance with the associated conditions of carriage.

For UN No. 1845, the conditions of carriage specified in this section, except 5.5.3.3.1, apply for all kinds of carriage, as a coolant, conditioner, or as a consignment. For the carriage of UN No. 1845, no other provisions of Annex 2 to SMGS apply.

5.5.3.1.2 This section is not applicable to gases in cooling cycles.

5.5.3.1.3 Dangerous goods used for cooling or conditioning tanks or MEGCs during carriage are not subject to this section.

5.5.3.1.4 Wagons and containers containing substances used for cooling or conditioning purposes include wagons and containers containing substances used for cooling or conditioning purposes inside packages as well as wagons and containers with unpackaged substances used for cooling or conditioning purposes.

5.5.3.1.5 Sub-sections 5.5.3.6 and 5.5.3.7 only apply when there is an actual risk of asphyxiation in the wagon or container. It is for the participants concerned to assess this risk, taking into consideration the hazards presented by the substances being used for cooling or conditioning,

the amount of substance to be carried, the duration of the journey, the types of containment to be used and the gas concentration limits given in the Note to 5.5.3.3.3.

5.5.3.2 General

5.5.3.2.1 Wagons and containers in which dry ice (UN 1845) is carried or containing substances used for cooling or conditioning purposes (other than fumigation) during carriage are not subject to any provisions of Annex 2 to SMGS than those of this section.

5.5.3.2.2 When dangerous goods are loaded in wagons or containers containing substances used for cooling or conditioning purposes any provisions of Annex 2 to SMGS relevant to these dangerous goods apply in addition to the provisions of this section.

5.5.3.2.3 (Reserved)

5.5.3.2.4 Persons engaged in the loading and unloading, handling or carriage of wagons and containers in which dry ice (UN 1845) is carried or containing substances used for cooling or conditioning purposes shall be trained commensurate with their responsibilities.

5.5.3.3 Packages containing dry ice (UN 1845) or carried or a coolant or conditioner

5.5.3.3.1 Packaged dangerous goods requiring cooling or conditioning assigned to packing instructions P 203, P 620, P 650 or P 800 of 4.1.4.1 shall meet the appropriate requirements of that packing instruction.

5.5.3.3.2 For packaged dangerous goods requiring cooling or conditioning assigned to other packing instructions, the packages shall be capable of withstanding very low temperatures and shall not be affected or significantly weakened by the coolant or conditioner. Packages shall be designed and constructed to permit the release of gas to prevent a build-up of pressure that could rupture the packaging. The dangerous goods shall be packed in such a way as to prevent movement after the dissipation of any coolant or conditioner.

5.5.3.3.3 Packages containing dry ice (UN 1845) or a coolant or conditioner shall be carried in well ventilated wagons and containers. Marking according to 5.5.3.6 is not required in this case.

Ventilation is not required, and marking according to 5.5.3.6 is required, if:

- gas exchange between the load compartment and accessible compartments during carriage is prevented; or
- the load compartment is insulated, refrigerated or mechanically refrigerated equipment, for example as defined in the Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be Used for such Carriage (ATP) and separated from accessible compartments during carriage.

Note: In this context "well ventilated" means there is an atmosphere where the carbon dioxide concentration is below 0.5% by volume and the oxygen concentration is above 19.5% by volume.

5.5.3.4 Marking of packages containing dry ice (UN 1845) or a coolant or conditioner

5.5.3.4.1 Packages containing dry ice (UN 1845) as a consignment shall be marked "CARBON DIOXIDE, SOLID" or "DRY ICE"; packages containing dangerous goods used for cooling or conditioning shall be marked with the name indicated in Column (2) of Table A of Chapter 3.2 of these dangerous goods followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate in an official language of the country of origin and also,

if that language is not English, French, German or Italian, in English, French, German or Italian, unless agreements concluded between the countries concerned in the transport operation provide otherwise.

5.5.3.4.2 The marks shall be durable, legible and placed in such a location and of such a size relative to the package as to be readily visible.

5.5.3.5 Wagons and containers containing unpackaged dry ice

5.5.3.5.1 If dry ice in unpackaged form is used, it shall not come into direct contact with the metal structure of a wagon or container. Measures shall be taken to provide adequate insulation between the dry ice and the wagon or container by providing a minimum of 30 mm separation (e.g. by using suitable low heat conducting materials such as timber planks, pallets etc).

5.5.3.5.2 Where dry ice is placed around packages, measures shall be taken to ensure that packages remain in the original position during carriage after the dry ice has dissipated.

5.5.3.6 Marking of wagons and containers

5.5.3.6.1 Wagons and containers containing dry ice (UN 1845) or dangerous goods used for cooling or conditioning purposes that are not well ventilated shall be marked with a warning mark, as specified in 5.5.3.6.2, affixed at each access point in a location where it will be easily seen by persons opening or entering the wagon or container. This mark shall remain on the wagon or container until the following provisions are met:

- The wagon or container has been well ventilated to remove harmful concentrations of dry ice (UN 1845) or coolant or conditioner; and
- The dry ice (UN 1845) or cooled or conditioned goods have been unloaded.

As long as the wagon or container is marked, the necessary precautions have to be taken before entering it. The necessity of ventilating through the cargo doors or other means (e.g. forced ventilation) has to be evaluated and included in training of the involved persons.

5.5.3.6.2 Asphyxiation warning mark for wagons and containers shall be as shown in Figure 5.5.3.6.2.

Figure 5.5.3.6.2



Asphyxiation warning mark for wagons and containers

* Insert the name indicated in Column 2 of Table A of Chapter 3.2 or the name of the asphyxiant gas used as the coolant/conditioner. The lettering shall be in capitals, all be on one line and shall be at least 25 mm high. If the length of the proper shipping name is too long to fit in the space provided, the lettering may be reduced to the maximum size possible to fit. For example: "CARBON DIOXIDE, SOLID". Additional information such as "AS COOLANT" or "AS CONDITIONER" may be added.

The mark shall be a rectangle. The minimum dimensions shall be 150 mm wide and × 250 mm high. The word "WARNING" shall be in red or white and be at least 25 mm high. Where dimensions are not specified, all features shall be in approximate proportion to those shown above.

The word "WARNING" and the words "AS COOLANT" or "AS CONDITIONER", as appropriate, shall be in an official language of the country of origin and also, if that language is not Russian or Chinese, in Russian and Chinese, unless agreements concluded between the countries participating in the transport operation provide otherwise.

5.5.3.7 Documentation

5.5.3.7.1 Documents such as a consignment note issued for the carriage of wagons or containers containing or having contained dry ice (UN 1845) or substances used for cooling or conditioning purposes and have not been completely ventilated before carriage shall include the following information:

- a) The UN number preceded by the letters "UN"; and
- b) The name indicated in Column 2 of Table A of Chapter 3.2 followed, where appropriate, by the words "AS COOLANT" or "AS CONDITIONER" as appropriate in an official language of the country of origin and also, if that language is not Russian or Chinese, in Russian and Chinese, unless agreements concluded between the countries participating in the transport operation provide otherwise.

5.5.3.7.2 (Reserved).

5.5.4 DANGEROUS GOODS CONTAINED IN EQUIPMENT IN USE OR INTENDED FOR USE DURING CARRIAGE, ATTACHED TO OR PLACED IN PACKAGES, OVERPACKS, CONTAINERS OR LOAD COMPARTMENTS

5.5.4.1 Dangerous goods (e.g. lithium batteries, fuel cell cartridges) contained in equipment such as data loggers and cargo tracking devices, attached to or placed in packages, overpacks, containers or load compartments are not subject to any provisions of Annex 2 to SMGS other than the following:

- a) the equipment shall be in use or intended for use during carriage;
- b) the contained dangerous goods (e.g. lithium batteries, fuel cell cartridges) shall meet the applicable construction and test requirements specified in Annex 2 to SMGS; and
- c) the equipment shall be capable of withstanding the shocks and loadings normally encountered during carriage.

5.5.4.2 When such equipment containing dangerous goods is carried as a consignment, the relevant entry of Table A of Chapter 3.2 shall be used and all applicable provisions of Annex 2 to SMGS shall apply.

PART 6

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PACKAGINGS, INTERMEDIATE BULK CONTAINERS (IBC), LARGE PACKAGINGS AND TANKS

CHAPTER 6.1

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PACKAGINGS

6.1.1 GENERAL

6.1.1.1 The requirements of this Chapter do not apply to:

- a) Packages containing radioactive material of Class 7, unless otherwise provided (see 4.1.9);
- b) Packages containing infectious substances of Class 6.2, unless otherwise provided (see Note under the heading of Chapter 6.3 and packing instructions P621 and P622 of 4.1.4.1);
- c) Pressure receptacles containing gases of Class 2;
- d) Packages whose net mass exceeds 400 kg;
- e) Packagings for liquids, other than combination packagings, with a capacity exceeding 450 litres.

6.1.1.2 The requirements for packagings in 6.1.4 are based on packagings currently used. In order to take into account progress in science and technology, there is no objection to the use of packagings having specifications different from those in 6.1.4, provided that they are equally effective and meet the requirements described in 6.1.1.3 and 6.1.5. Methods of testing other than those described in this Chapter are acceptable, provided they are equivalent, and are recognized by the competent authority.

6.1.1.3 Every packaging intended to contain liquids shall successfully undergo a suitable leakproofness test. This test is part of a quality assurance programme as stipulated in 6.1.1.4 which shows the capability of meeting the appropriate test level indicated in 6.1.5.4.3:

- a) before it is first used for carriage;
- b) after remanufacturing or reconditioning, before it is re-used for carriage.

For this test, packagings need not have their own closures fitted. The inner receptacle of composite packagings may be tested without the outer packaging provided the test results are not affected.

This test is not necessary for:

- inner packagings of combination packagings;
- inner receptacles of composite packagings (glass, porcelain or stoneware), marked with the symbol “SMGS”, “RID/ADR”, “SMGS/ RID/ ADR” in accordance with the second paragraph of 6.1.3.1a);
- light gauge metal packagings, marked with the symbol “SMGS”, “RID/ADR”, “SMGS/RID/ ADR” in accordance with the second paragraph of 6.1.3.1a).

6.1.1.4 Packagings shall be manufactured, reconditioned and tested under a quality assurance programme which satisfies the competent authority in order to ensure that each packaging meets the requirements of this Chapter.

Note: *Standard ISO 16106:2020 “Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001” provides acceptable guidance on procedures which may be followed.*

6.1.1.5 Manufacturers and subsequent distributors of packagings shall provide information regarding procedures to be followed and a description of the types and dimensions of closures (including required gaskets) and any other components needed to ensure that packages as presented for carriage are capable of passing the applicable performance tests of this Chapter.

6.1.2 CODE FOR DESIGNATING TYPES OF PACKAGINGS

6.1.2.1 The code consists of: an Arabic numeral indicating the kind of packaging (e.g. drum, jerrican, etc.) followed by;

a capital letter(s) in Latin characters indicating the nature of the material, e.g. steel, wood, etc., followed where necessary by;

an Arabic numeral indicating the category of packaging within the kind to which the packaging belongs..

6.1.2.2 In the case of composite packagings, two capital letters in Latin characters are used in sequence in the second position of the code. The first indicates the material of the inner receptacle and the second that of the outer packaging.

6.1.2.3 In the case of combination packagings only the code number for the outer packaging is used.

6.1.2.4 The letters "T", "V" or "W" may follow the packaging code. The letter "T" signifies a salvage packaging conforming to the requirements of 6.1.5.1.11. The letter "V" signifies a special packaging conforming to the requirements of 6.1.5.1.7. The letter "W" signifies that the packaging, although of the same type indicated, by the code, is manufactured to a specification different to that in 6.1.4 and is considered equivalent under the requirements of 6.1.1.2.

6.1.2.5 The following numerals shall be used for the kinds of packaging:

- 1 – Drum
- 2 – (Reserved)
- 3 – Jerrican
- 4 – Box
- 5 – Bag
- 6 – Composite packaging
- 7 – (Reserved)
- 0 – Light gauge metal packagings

6.1.2.6 The following capital letters shall be used for the types of material:

- A – Steel
- B – Aluminium
- C – Natural wood
- D – Plywood
- F – Reconstituted wood
- G – Fibreboard
- H – Plastics material
- L – Textile
- M – Paper, multiwal
- N – Metal (other than steel or aluminium)
- P – Glass, porcelain or stoneware

Note: *Plastics materials, is taken to include other polymeric materials such as rubber.*

6.1.2.7 The following table indicates the codes to be used for designating types of packagings depending on the kind of packagings, the material used for their construction and their category; it also refers to the sub-sections to be consulted for the appropriate requirements:

Kind	Material	Category	Code	Sub-section
1. Drums	A. Steel	non-removable head	1A1	6.1.4.1
		removable head	1A2	
	B. Aluminium	non-removable head	1B1	6.1.4.2
		removable head	1B2	
	D. Plywood		1D	6.1.4.5
	G. Fibre		1G	6.1.4.7
	H. Plastics	non-removable head	1H1	6.1.4.8
		removable head	1H2	
	N. Metal, other than steel or aluminium	non-removable head	1N1	6.1.4.3
		removable head	1N2	
2. (Reserved)				
3. Jerricans	A. Steel	non-removable head	3A1	6.1.4.4
		removable head	3A2	
	B. Aluminium	non-removable head	3B1	6.1.4.4
		removable head	3B2	
	H. Plastics	non-removable head	3H1	6.1.4.8
		removable head	3H2	
4. Boxes	A. Steel		4A	6.1.4.14
	B. Aluminium		4B	6.1.4.14
	C. Natural wood	ordinary	4C1	6.1.4.9
		with sift-proof walls	4C2	
	D. Plywood		4D	6.1.4.10
	F. Reconstituted wood		4F	6.1.4.11
	G. Fibreboard		4G	6.1.4.12
	H. Plastics	expanded	4H1	6.1.4.13
		solid	4H2	
	N. Metal, other than steel or aluminium		4N	6.1.4.14
5. Bags	H. Woven plastics	without inner liner or coating	5H1	6.1.4.16
		sift-proof	5H2	
		water resistant	5H3	
	H. Plastics film		5H4	6.1.4.17
	L. Textile	without inner liner or coating	5L1	6.1.4.15
		sift-proof	5L2	
		water resistant	5L3	
	M. Paper	multiwall	5M1	6.1.4.18
		multiwall, water resistant	5M2	
6. Composite packagings	H. Plastics receptacle	with outer steel drum	6HA 1	6.1.4.19
		with outer steel crate or box	6HA 2	6.1.4.19
		with outer aluminium drum	6HB 1	6.1.4.19
		with outer aluminium crate or box	6HB 2	6.1.4.19
		with outer wooden box	6HC	6.1.4.19
		with outer plywood drum	6HD 1	6.1.4.19
		with outer plywood box	6HD 2	6.1.4.19

Kind	Material	Category	Code	Sub-section
		with outer fibre drum	6HG 1	6.1.4.19
		with outer fibreboard box	6HG 2	6.1.4.19
		with outer plastics drum	6HH 1	6.1.4.19
		with outer solid plastics box	6HH 2	6.1.4.19
	P. Glass, porcelain or stoneware receptacle	with outer steel drum	6PA 1	6.1.4.20
		with outer steel crate or box	6PA 2	6.1.4.20
		with outer aluminium drum	6PB 1	6.1.4.20
		with outer aluminium crate or box	6PB 2	6.1.4.20
		with outer wooden box	6PC	6.1.4.20
		with outer plywood drum	6PD 1	6.1.4.20
		with outer wickerwork hamper	6PD 2	6.1.4.20
		with outer fibre drum	6PG 1	6.1.4.20
		with outer fibreboard box	6PG 2	6.1.4.20
		with outer expanded plastics packaging	6PH 1	6.1.4.20
		with outer solid plastics packaging	6PH 2	6.1.4.20
7 (Reserved)				
0. Light gauge metal packagings	A. Steel	non-removable head	0A1	6.1.4.22
		removable head	0A2	

6.1.3 MARKING

Note 1: The marks indicate that the packaging which bears them correspond to a successfully tested design type and that it complies with the requirements of this Chapter which are related to the manufacture, but not to the use, of the packaging. In itself, therefore, the marks do not necessarily confirm that the packaging may be used for any substance: generally the type of packaging (e.g. steel drum), its maximum capacity and/or mass, and any special requirements are specified for each substance in Table A of Chapter 3.2.

Note 2: The marks are intended to be of assistance to packaging manufacturers, reconditioners, packaging users, carriers and regulatory authorities. In relation to the use of a new packaging, the original marks are a means for its manufacturer(s) to identify the type and to indicate those performance test regulations that have been met.

Note 3: The marks do not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, to test reports or to a register of successfully tested packagings. For example, a packaging having an X or Y mark may be used for substances to which a packing group having a lesser degree of danger has been assigned with the relevant maximum permissible value of the relative density determined by taking into account the factor 1.5 or 2.25 indicated in the packaging test requirements in 6.1.5 as appropriate, i.e. packing group I packaging tested for products of relative density 1.2 could be used as a packing group II packaging for products of relative density 1.8 or a packing group III packaging for products of relative density 2.7, provided of course that all the performance criteria can still be met with the higher relative density product.

6.1.3.1 Each packaging intended for use according to the ANNEX 2 TO SMGS shall bear marks on a non-removable component which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. For packages with a gross mass of more than 30 kg, the marks or a duplicate thereof shall appear on the top or on a side of the packaging. Letters, numerals and symbols shall be at least 12 mm high, except for packagings of 30 litres capacity or less or of 30 kg maximum net mass, when they shall be at least 6 mm in height and except for packagings of 5 litres capacity or less or of 5 kg maximum net mass when they shall be of an appropriate size. The marks shall show:



- a) - the United Nations packaging symbol . This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.11. This symbol shall not be used for packagings which comply with the simplified conditions of 6.1.1.3, 6.1.5.3.1 e), 6.1.5.3.5 c), 6.1.5.4, 6.1.5.5.1 and 6.1.5.6 (see also next paragraph). For embossed metal packagings, the capital letters "UN" may be applied instead of the symbol;

or

- the symbols: "SMGS", "SMGS/RID/ADR", "RID/ADR" for composite packagings (glass, porcelain or stoneware) and light gauge metal packagings conforming to simplified conditions (see 6.1.1.3, 6.1.5.3.1 e), 6.1.5.3.5 c), 6.1.5.4, 6.1.5.5.1 and 6.1.5.6).

Note: Packagings bearing this symbol are approved for rail, road and inland waterways transport operations which are subject to the provisions of transport of dangerous goods (Annex 2 to SMGS) and the rules of RID, ADR and ADN. They are not necessarily accepted for carriage by other modes of transport;

- b) The code designating the type of packaging according to 6.1.2;
- c) A code composed of two parts:
- a letter designating the packing group(s) for which the design type has been successfully tested:
 - X for packing groups I, II and III;
 - Y for packing groups II and III;
 - Z – for packing group III only;
 - the relative density in kg/m³, divided by 1000 kg/m³ and rounded off to the first decimal, for which the design type has been tested for packagings without inner packagings intended to contain liquids; this may be omitted when the relative density does not exceed 1200 kg/m³.

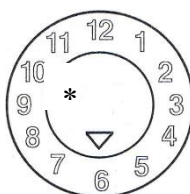
For packagings intended to contain solids or inner packagings, the maximum gross mass in kilograms.

For light-gauge metal packagings, marked with the symbol "SMGS/RID/ADR " according to 6.1.3.1 a) intended to contain liquids having a viscosity at 23 °C exceeding 200 mm²/c, the maximum gross mass in kg;

- d) Either the letter "S" denoting that the packaging is intended for the carriage of solids or inner packagings or, for packagings (other than combination packagings) intended to contain liquids, the hydraulic test pressure which the packaging was shown to withstand in kPa rounded down to the nearest 10 kPa.

For light-gauge metal packagings, marked with the symbol "RID/ADR, according to 6.1.3.1(a) (ii) intended to contain liquids having a viscosity at 23 °C exceeding 200 mm²/s, the letter "S";

- e) The last two digits of the year during which the packaging was manufactured. Packagings of types 1H and 3H shall also be appropriately marked with the month of manufacture; this may be marked on the packaging in a different place from the remainder of the marks. An appropriate method is:



- * The last two digits of the year of manufacture may be displayed at that place. In such a case and when the clock is placed adjacent to the UN design type mark, the indication of the year in the mark may be waived. However, when the clock is not placed adjacent to the UN design type mark, the two digits of the year in the mark and in the clock shall be identical.

Note: Other methods that provide the minimum required information in a durable, visible and legible form are also acceptable.

- f) The State authorizing the allocation of the mark, indicated by the distinguishing sign used on vehicles in international road traffic¹;
- g) The name of the manufacturer or other identification of the packaging specified by the competent authority.

6.1.3.2 In addition to the durable markings prescribed in 6.1.3.1, every new metal drum of a capacity greater than 100 litres shall bear the marks described in 6.1.3.1 (a) to (e) on the bottom, with an indication of the nominal thickness of at least the metal used in the body (in mm, to 0.1 mm), in permanent form (e.g. embossed). When the nominal thickness of either head of a metal drum is thinner than that of the body, the nominal thickness of the top head, body, and bottom head shall be marked on the bottom in permanent form (e.g. embossed), for example "1.0-1.2-1.0" or "0.9-1.0-1.0". Nominal thickness of metal shall be determined according to the appropriate ISO standard, for example ISO 3574:1999 for steel. The marks indicated in 6.1.3.1 (f) and (g) shall not be applied in a permanent form except as provided in 6.1.3.5.

6.1.3.3 Every packaging other than those referred to in 6.1.3.2 liable to undergo a reconditioning process shall bear the marks indicated in 6.1.3.1 (a) to (e) in a permanent form. Marks are permanent if they are able to withstand the reconditioning process (e.g. embossed). For packagings other than metal drums of a capacity greater than 100 litres, these permanent marks may replace the corresponding durable marks prescribed in 6.1.3.1.

6.1.3.4 For remanufactured metal drums, if there is no change to the packaging type and no replacement or removal of integral structural components, the required marks need not be permanent. Every other remanufactured metal drum shall bear the marks in 6.1.3.1 (a) to (e) in a permanent form (e.g. embossed) on the top head or side.

6.1.3.5 Metal drums made from materials (e.g. stainless steel) designed to be reused repeatedly may bear the marks indicated in 6.1.3.1 (f) and (g) in a permanent form (e.g. embossed).

6.1.3.6 The marks in accordance with 6.1.3.1 are valid for only one design type or series of design types. Different surface treatments may fall within the same design type.

A "series of design types" means packagings of the same structural design, wall thickness, material and cross-section, which differ only in their lesser design heights from the design type approved.

¹ Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

The closures of receptacles shall be identifiable as those referred to in the test report.

6.1.3.7 Marks shall be applied in the sequence of the sub-paragraphs in 6.1.3.1; each mark required in these subparagraphs and when appropriate sub-paragraphs (h) to (j) of 6.1.3.8 shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable. For examples, see 6.1.3.11. Any additional marks authorized by a competent authority shall still enable the other marks required in 6.1.3.1 to be correctly identified.

6.1.3.8 After reconditioning a packaging, the reconditioner shall apply to it, in sequence, durable marks showing:

- h) The State in which the reconditioning was carried out, indicated by the distinguishing sign used on vehicles in international road traffic²;
- i) The name of the reconditioner or other identification of the packaging specified by the competent authority;
- j) The year of reconditioning; the letter "R"; and, for every packaging successfully passing the leakproofness test in 6.1.1.3, the additional letter "L".

6.1.3.9 When, after reconditioning, the marks required by 6.1.3.1 (a) to (d) no longer appear on the top head or the side of a metal drum, the reconditioner also shall apply them in a durable form followed by 6.1.3.8 (h), (i) and (j). These marks shall not identify a greater performance capability than that for which the original design type had been tested and marked.

6.1.3.10 Packagings manufactured with recycled plastics material as defined in 1.2.1 shall be marked "REC". This mark shall be placed near the marks prescribed in 6.1.3.1.

6.1.3.11 Examples of markings for new packagings:

	4G/Y145/S/02 BY/MAZ	As in 6.1.3.1 (a), (b), (c), (d), (e) As in 6.1.3.1 (f) and (g)	For a new fibreboard box
	1A1/Y1.4/150/0 1 RUS/NZHK	As in 6.1.3.1 (a), (b), (c), (d), (e) As in 6.1.3.1 (f) and (g)	For a new steel drum to contain liquids
	1A2/Y150/S/03 SK/TATRA	As in 6.1.3.1 (a), (b), (c), (d), (e) As in 6.1.3.1 (f) and (g)	For a new steel drum to contain solids, or inner packagings
	4HW/Y136/S/0 2 LT/VL826	As in 6.1.3.1 (a), (b), (c), (d), (e) As in 6.1.3.1 (f) and (g)	For a new plastics box of equivalent specification
	1A2/Y/100/05 UA/AZOVMA S H	As in 6.1.3.1 (a), (b), (c), (d), (e) As in 6.1.3.1 (f) and (g)	For a remanufactured steel drum to contain liquids
	SMGS/RID/ADR//0A1 /Y100/05 PL/VL123	As in 6.1.3.1 (a), (b), (c), (d), (e) As in 6.1.3.1 (f) and (g)	For a new light gauge metal packaging, non-removable head
	RID/ADR/ 0A2/Y20/S/01 PL/VL124	As in 6.1.3.1 (a), (b), (c), (d), (e) As in 6.1.3.1 (f) and (g)	For a new light gauge metal packaging, removable head, intended to contain solids, or liquids with a viscosity at 23°C exceeding 200 mm ² /s

6.1.3.12 Examples of markings for reconditioned packagings:

	1A1/Y1.4/150/97 NL/RB/05 RL	As in 6.1.3.1 (a), (b), (c), (d) and (e) As in 6.1.3.8 (h), (i), (j).
	1A2/Y150/S/99 UA/KMZ/04 R	As in 6.1.3.1 (a), (b), (c), (d) and (e) As in 6.1.3.8 (h), (i), (j).

² Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

6.1.3.13 Example of marking for SALVAGE packagings:



1A2T/Y300/S/02
UA/UMZ

As in 6.1.3.1 (a), (b), (c), (d), (e)

As in 6.1.3.1 (f) and (g)

Note: The markings, for which examples are given in 6.1.3.11, 6.1.3.12 and 6.1.3.13, may be applied in a single line or in multiple lines provided the correct sequence is respected.

6.1.3.14 Where a packaging conforms to one or more than one tested packaging design type, including one or more than one tested IBC or large packaging design type, the packaging may bear more than one mark to indicate the relevant performance test requirements that have been met. Where more than one mark appears on a packaging, the marks shall appear in close proximity to one another and each mark shall appear in its entirety.

6.1.3.15 Certification

By affixing marks in accordance with 6.1.3.1, it is certified that mass-produced packagings correspond to the approved design type and that the requirements referred to in the approval have been met.

6.1.4 REQUIREMENTS FOR PACKAGINGS

6.1.4.0 General requirement

Any permeation of the substance contained in the packaging shall not constitute a danger under normal conditions of carriage.

6.1.4.1 Steel drums

1A1 non-removable head

1A2 removable head

6.1.4.1.1 Body and heads shall be constructed of steel sheet of a suitable type and of adequate thickness in relation to the capacity of the drum and to its intended use.

Note: In the case of carbon steel drums, "suitable" steels are identified in ISO 3573:1999 "Hot rolled carbon steel sheet of commercial and drawing qualities" and ISO 3574:1999 "Cold-reduced carbon steel sheet of commercial and drawing qualities". For carbon steel drums below 100 litres "suitable" steels in addition to the above standards are also identified in ISO 11949:1995 "Cold-reduced electrolytic tinplate", ISO 11950:1995 "Cold-reduced electrolytic chromium/chromium oxide-coated steel" and ISO 11951:1995 "Cold-reduced blackplate in coil form for the production of tinplate or electrolytic chromium/chromium oxide-coated steel".

6.1.4.1.2 Body seams shall be welded on drums intended to contain more than 40 litres of liquid. Body seams shall be mechanically seamed or welded on drums intended to contain solids or 40 litres or less of liquids.

6.1.4.1.3 Chimes shall be mechanically seamed or welded. Separate reinforcing rings may be applied.

6.1.4.1.4 Drums may have rolling hoops, either expanded or separate. If there are separate rolling hoops they shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.

6.1.4.1.5 Openings for filling, emptying and venting in the bodies or heads of non-removable head (1A1) drums shall not exceed 70 mm in diameter. Drums with larger openings are considered to be of the removable head type (1A2). Closures for openings in the bodies and heads of drums shall be so designed and applied that they will remain secure and leakproof under normal conditions of carriage. Closure flanges may be mechanically seamed or welded in place. Gaskets or other sealing elements shall be used with closures, unless the closure is inherently leakproof.

6.1.4.1.6 Closure devices for removable head (1A2) drums shall be so designed and applied that they will remain secure and drums will remain leakproof under normal conditions of carriage. Gaskets or other sealing elements shall be used with all removable heads.

6.1.4.1.7 If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be carried, suitable internal protective coatings or treatments shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of carriage.

6.1.4.1.8 Maximum capacity of drum: 450 litres.

- 6.1.4.1.9** Maximum net mass: 400 kg.
- 6.1.4.2 Aluminium drums**
- 1B1 non-removable head
1B2 removable head
- 6.1.4.2.1** Body and heads shall be constructed of aluminium at least 99% pure or of an aluminium base alloy. Material shall be of a suitable type and of adequate thickness in relation to the capacity of the drum and to its intended use.
- 6.1.4.2.2** All seams shall be welded. Chime seams, if any, shall be reinforced by the application of separate reinforcing rings.
- 6.1.4.2.3** The body of a drum of a capacity greater than 60 litres shall, in general, have at least two expanded rolling hoops or, alternatively, at least two separate rolling hoops. If there are separate rolling hoops they shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.
- 6.1.4.2.4** Openings for filling, emptying and venting in the bodies or heads of non-removable head (1B1) drums shall not exceed 70 mm in diameter. Drums with larger openings are considered to be of the removable head type (1B2). Closures for openings in the bodies and heads of drums shall be so designed and applied that they will remain secure and leakproof under normal conditions of carriage. Closure flanges shall be welded in place so that the weld provides a leakproof seam. Gaskets or other sealing elements shall be used with closures, unless the closure is inherently leakproof.
- 6.1.4.2.5** Closure devices for removable head (1B2) drums shall be so designed and applied that they will remain secure and drums will remain leakproof under normal conditions of carriage. Gaskets or other sealing elements shall be used with all removable heads.
- 6.1.4.2.6** If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be carried, suitable internal protective coatings or treatments shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of carriage.
- 6.1.4.2.7** Maximum capacity of drum: 450 litres.
- 6.1.4.2.8** Maximum net mass: 400 kg.
- 6.1.4.3 Drums of metal other than aluminium or steel**
- 1N1 non-removable head
1N2 removable head
- 6.1.4.3.1** The body and heads shall be constructed of a metal or of a metal alloy other than steel or aluminium. Material shall be of a suitable type and of adequate thickness in relation to the capacity of the drum and to its intended use.
- 6.1.4.3.2** Chime seams, if any, shall be reinforced by the application of separate reinforcing rings. All seams, if any, shall be joined (welded, soldered, etc.) in accordance with the technical state of the art for the used metal or metal alloy.
- 6.1.4.3.3** Drums may have rolling hoops, either expanded or separate. If there are separate rolling hoops they shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.
- 6.1.4.3.4** Openings for filling, emptying and venting in the bodies or heads of non-removable head (1N1) drums shall not exceed 70 mm in diameter. Drums with larger openings are considered to be of the removable head type (1N2). Closures for openings in the bodies and heads of drums shall be so designed and applied that they will remain secure and leakproof under normal conditions of carriage. Closure flanges shall be joined in place (welded, soldered, etc.) in accordance with the technical state of the art for the used metal or metal alloy so that the seam join is leakproof. Gaskets or other sealing elements shall be used with closures, unless the closure is inherently leakproof.
- 6.1.4.3.5** Closure devices for removable head (1N2) drums shall be so designed and applied that they will remain secure and drums will remain leakproof under normal conditions of carriage. Gaskets or other sealing elements shall be used with all removable heads.
- 6.1.4.3.6** If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be carried, suitable internal protective coatings or treatments shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of carriage.

- 6.1.4.3.7** Maximum capacity of drum: 450 litres.
- 6.1.4.3.8** Maximum net mass: 400 kg.
- 6.1.4.4 Steel or aluminium jerricans**
- 3A1 steel, non-removable head
 3A2 steel, removable head
 3B1 aluminium, non-removable head
 3B2 aluminium, removable head
- 6.1.4.4.1** Body and heads shall be constructed of steel sheet, of aluminium at least 99% pure or of an aluminium base alloy. Material shall be of a suitable type and of adequate thickness in relation to the capacity of the jerrican and to its intended use.
- 6.1.4.4.2** Chimes of steel jerricans shall be mechanically seamed or welded. Body seams of steel jerricans intended to contain more than 40 litres of liquid shall be welded. Body seams of steel jerricans intended to contain 40 litres or less shall be mechanically seamed or welded. For aluminium jerricans, all seams shall be welded. Chime seams, if any, shall be reinforced by the application of a separate reinforcing ring.
- 6.1.4.4.3** Openings in non-removable head jerricans (3A1 and 3B1) shall not exceed 70 mm in diameter. Jerricans with larger openings are considered to be of the removable head type (3A2 and 3B2). Closures shall be so designed that they will remain secure and leakproof under normal conditions of carriage. Gaskets or other sealing elements shall be used with closures, unless the closure is inherently leakproof.
- 6.1.4.4.4** If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be carried, suitable internal protective coatings or treatments shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of carriage.
- 6.1.4.4.5** Maximum capacity of jerrican: 60 litres.
- 6.1.4.4.6** Maximum net mass: 120 kg.
- 6.1.4.5 Plywood drums**
- 1D
- 6.1.4.5.1** The wood used shall be well seasoned, commercially dry and free from any defect likely to lessen the effectiveness of the drum for the purpose intended. If a material other than plywood is used for the manufacture of the heads, it shall be of a quality equivalent to the plywood.
- 6.1.4.5.2** At least two-ply plywood shall be used for the body and at least three-ply plywood for the heads; the plies shall be firmly glued together by a water resistant adhesive with their grain crosswise.
- 6.1.4.5.3** The body and heads of the drum and their joins shall be of a design appropriate to the capacity of the drum and to its intended use.
- 6.1.4.5.4** In order to prevent sifting of the contents, lids shall be lined with kraft paper or some other equivalent material which shall be securely fastened to the lid and extend to the outside along its full circumference.
- 6.1.4.5.5** Maximum capacity of drum: 250 litres.
- 6.1.4.5.6** Maximum net mass: 400 kg.
- 6.1.4.6** (Reserved)
- 6.1.4.7 Fibre drums**
- 1G
- 6.1.4.7.1** The body of the drum shall consist of multiple plies of heavy paper or fibreboard (without corrugations) firmly glued or laminated together and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastics material, etc.
- 6.1.4.7.2** Heads shall be of natural wood, fibreboard, metal, plywood, plastics or other suitable material and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastics material, etc.

- 6.1.4.7.3** Heads shall be of natural wood, fibreboard, metal, plywood, plastics or other suitable material and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastics material, etc.
- 6.1.4.7.4** The assembled packaging shall be sufficiently water resistant so as not to delaminate under normal conditions of carriage.
- 6.1.4.7.5** Maximum capacity of drum: 450 litres
- 6.1.4.7.6** Maximum net mass: 400 kg.
- 6.1.4.8** **Plastics drums and jerricans**
 1H1 drums, non-removable head
 1H2 drums, removable head
 3H1 jerricans, non-removable head
 3H2 jerricans, removable head
- 6.1.4.8.1** The packaging shall be manufactured from suitable plastics material and be of adequate strength in relation to its capacity and intended use. Except for recycled plastics material as defined in 1.2.1, no used material other than production residues or regrind from the same manufacturing process may be used. The packaging shall be adequately resistant to ageing and to degradation caused either by the substance contained or by ultra-violet radiation. Any permeation of the substance contained in the package, or recycled plastics material used to produce new packaging, shall not constitute a danger under normal conditions of carriage.
- 6.1.4.8.2** If protection against ultra-violet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the packaging. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the tested design type, retesting may be waived if the carbon black content does not exceed 2% by mass or if the pigment content does not exceed 3% by mass; the content of inhibitors of ultra-violet radiation is not limited.
- 6.1.4.8.3** Additives serving purposes other than protection against ultra-violet radiation may be included in the composition of the plastics material provided that they do not adversely affect the chemical and physical properties of the material of the packaging. In such circumstances, retesting may be waived.
- 6.1.4.8.4** The wall thickness at every point of the packaging shall be appropriate to its capacity and intended use, taking into account the stresses to which each point is liable to be exposed.
- 6.1.4.8.5** Openings for filling, emptying and venting in the bodies or heads of non-removable head drums (1H1) and jerricans (3H1) shall not exceed 70 mm in diameter. Drums and jerricans with larger openings are considered to be of the removable head type (1H2 and 3H2). Closures for openings in the bodies or heads of drums and jerricans shall be so designed and applied that they will remain secure and leakproof under normal conditions of carriage. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.
- 6.1.4.8.6** Closure devices for removable head drums and jerricans (1H2 and 3H2) shall be so designed and applied that they will remain secure and leakproof under normal conditions of carriage. Gaskets shall be used with all removable heads unless the drum or jerrican design is such that, where the removable head is properly secured, the drum or jerrican is inherently leakproof.
- 6.1.4.8.7** The maximum permissible permeability for flammable liquids shall be 0.008 g/(l·h) at 23 °C (see 6.1.5.7).
- 6.1.4.8.8** (reserved)
- 6.1.4.8.9** Maximum capacity of drums 1H1, 1H2 – 450 litres and jerricans 3H1, 3H2 – 60 litres.
- 6.1.4.8.10** Maximum net mass 1H1, 1H2 – 400 kg; 3H1, 3H2 – 120 kg
- 6.1.4.9** **Boxes of natural wood**
 4C1 ordinary
 4C2 with sift-proof walls
- 6.1.4.9.1** The wood used shall be well seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the box. The strength of the material used and the method of construction shall be appropriate to the capacity and intended use of the box. The tops and bottoms may be made of water resistant reconstituted wood such as hardboard, particle board or other suitable type.

- 6.1.4.9.2** Fastenings shall be resistant to vibration experienced under normal conditions of carriage. End grain nailing shall be avoided whenever practicable. Joins which are likely to be highly stressed shall be made using clenched or annular ring nails or equivalent fastenings.
- 6.1.4.9.3** Box 4C2: each part shall consist of one piece or be equivalent thereto. Parts are considered equivalent to one piece when one of the following methods of glued assembly is used: dovetail joint, tongue and groove joint, ship lap or rabbet joint or butt joint with at least two corrugated metal fasteners at each joint.
- 6.1.4.9.4** Maximum net mass: 400 kg.
- 6.1.4.10 Plywood boxes**
- 4D
- 6.1.4.10.1** Plywood used shall be at least 3-ply. It shall be made from well seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the box. The strength of the material used and the method of construction shall be appropriate to the capacity and intended use of the box. All adjacent plies shall be glued with water resistant adhesive. Other suitable materials may be used together with plywood in the construction of boxes. Boxes shall be firmly nailed or secured to corner posts or ends or be assembled by equally suitable devices.
- 6.1.4.10.2** Maximum net mass: 400 kg.
- 6.1.4.11 Reconstituted wood boxes**
- 4F
- 6.1.4.11.1** The walls of boxes shall be made of water resistant reconstituted wood such as hardboard, particle board or other suitable type. The strength of the material used and the method of construction shall be appropriate to the capacity of the boxes and to their intended use.
- 6.1.4.11.2** Other parts of the boxes may be made of other suitable material.
- 6.1.4.11.3** Boxes shall be securely assembled by means of suitable devices.
- 6.1.4.11.4** Maximum net mass: 400 kg.
- 6.1.4.12 Fibreboard boxes (including corrugated fibreboard boxes)**
- 4G
- 6.1.4.12.1** Strong and good quality solid or double-faced corrugated fibreboard (single or multiwall) shall be used, appropriate to the capacity of the box and to its intended use. The water resistance of the outer surface shall be such that the increase in mass, as determined in a test carried out over a period of 30 minutes by the Cobb method of determining water absorption, is not greater than 155 g/m² - see ISO 535:2014. It shall have proper bending qualities. Fibreboard shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting of corrugated fibreboard shall be firmly glued to the facings.
- 6.1.4.12.2** The ends of boxes may have a wooden frame or be entirely of wood or other suitable material. Reinforcements of wooden battens or other suitable material may be used.
- 6.1.4.12.3** Manufacturing joins in the body of boxes shall be taped, lapped and glued, or lapped and stitched with metal staples. Lapped joins shall have an appropriate overlap.
- 6.1.4.12.4** Where closing is effected by gluing or taping, a water resistant adhesive shall be used.
- 6.1.4.12.5** Boxes shall be designed so as to provide a good fit to the contents.
- 6.1.4.12.6** Maximum net mass: 400 kg.
- 6.1.4.13 Plastics boxes**
- 4H1 expanded plastics boxes
4H2 solid plastics boxes
- 6.1.4.13.1** The box shall be manufactured from suitable plastics material and be of adequate strength in relation to its capacity and intended use. Except for recycled plastics material as defined in 1.2.1, no used material other than production residues or regrind from the same manufacturing process may be used. The box shall be adequately resistant to ageing and to degradation caused either by the substance contained or by ultra-violet radiation.
- 6.1.4.13.2** An expanded plastics box shall comprise two parts made of a moulded expanded plastics material, a bottom section containing cavities for the inner packagings and a top section covering and interlocking with the bottom section. The top and bottom sections shall be designed so that the inner

packagings fit snugly. The closure cap for any inner packaging shall not be in contact with the inside of the top section of this box.

- 6.1.4.13.3** For dispatch, an expanded plastics box shall be closed with a self-adhesive tape having sufficient tensile strength to prevent the box from opening. The adhesive tape shall be weather resistant and its adhesive compatible with the expanded plastics material of the box. Other closing devices at least equally effective may be used.
- 6.1.4.13.4** For solid plastics boxes, protection against ultra-violet radiation, if required, shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the box. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the tested design type, retesting may be waived if the carbon black content does not exceed 2% by mass or if the pigment content does not exceed 3% by mass; the content of inhibitors of ultra-violet radiation is not limited.
- 6.1.4.13.5** Additives serving purposes other than protection against ultra-violet radiation may be included in the composition of the plastics material provided that they do not adversely affect the chemical or physical properties of the material of the box. In such circumstances, retesting may be waived.
- 6.1.4.13.6** Solid plastics boxes shall have closure devices made of a suitable material of adequate strength and so designed as to prevent the box from unintentional opening.
- 6.1.4.13.7** (reserved)
- 6.1.4.13.8** Maximum net mass 4H1 – 60 kg; 4H2 – 400 kg.
- 6.1.4.14 Steel, aluminium or other metal boxes**
4A steel boxes
4B aluminium boxes
4N metal, other than steel or aluminium, boxes.
- 6.1.4.14.1** The strength of the metal and the construction of the box shall be appropriate to the capacity of the box and to its intended use.
- 6.1.4.14.2** Boxes shall be lined with fibreboard or felt packing pieces or shall have an inner liner or coating of suitable material, as required. If a double seamed metal liner is used, steps shall be taken to prevent the ingress of substances, particularly explosives, into the recesses of the seams.
- 6.1.4.14.3** Closures may be of any suitable type; they shall remain secured under normal conditions of carriage.
- 6.1.4.14.4** Maximum net mass: 400 kg.
- 6.1.4.15 Textile bags**
5L1 without inner liner or coating
5L2 sift-proof
5L3 water resistant
- 6.1.4.15.1** The textiles used shall be of good quality. The strength of the fabric and the construction of the bag shall be appropriate to the capacity of the bag and to its intended use.
- 6.1.4.15.2** Bags, sift-proof, 5L2. The bag shall be made sift-proof, for example by the use of:
a) paper bonded to the inner surface of the bag by a water resistant adhesive such as bitumen; or
b) plastics film bonded to the inner surface of the bag; or
c) one or more inner liners made of paper or plastics material.
- 6.1.4.15.3** Bags, water resistant, 5L3. To prevent the entry of moisture the bag shall be made waterproof, for example by the use of:
a) separate inner liners of water resistant paper (e.g. waxed kraft paper, tarred paper or plastics-coated kraft paper); or
b) plastics film bonded to the inner surface of the bag; or
c) one or more inner liners made of plastics material.
- 6.1.4.15.4** Maximum net mass: 50 kg.
- 6.1.4.16 Woven plastics bags**
5H1 without inner liner or coating
5H2 sift-proof
5H3 water resistant

- 6.1.4.16.1** Bags shall be made from stretched tapes or monofilaments of a suitable plastics material. The strength of the material used and the construction of the bag shall be appropriate to the capacity of the bag and to its intended use.
- 6.1.4.16.2** If the fabric is woven flat, the bags shall be made by sewing or some other method ensuring closure of the bottom and one side. If the fabric is tubular, the bag shall be closed by sewing, weaving or some other equally strong method of closure.
- 6.1.4.16.3** Bags, sift-proof, 5H2. The bag shall be made sift-proof, for example by means of:
- a) paper or a plastics film bonded to the inner surface of the bag; or
 - b) one or more separate inner liners made of paper or plastics material.
- 6.1.4.16.4** Bags, water resistant, 5H3. To prevent the entry of moisture, the bag shall be made waterproof, for example by means of:
- a) separate inner liners of water resistant paper (e.g. waxed kraft paper, double-tarred kraft paper or plastics-coated kraft paper); or
 - b) plastics film bonded to the inner or outer surface of the bag; or
 - c) one or more inner plastics liners.
- 6.1.4.16.5** Maximum net mass: 50 kg.
- 6.1.4.17 Plastics film bags**
- 5H4
- 6.1.4.17.1** Bags shall be made of a suitable plastics material. The strength of the material used and the construction of the bag shall be appropriate to the capacity of the bag and to its intended use. Joins and closures shall withstand pressures and impacts liable to occur under normal conditions of carriage.
- 6.1.4.17.2** Maximum net mass: 50 kg.
- 6.1.4.18 Paper bags**
- 5M1 multiwall
5M2 multiwall, water resistant
- 6.1.4.18.1** Bags shall be made of a suitable kraft paper or of an equivalent paper with at least three plies, the middle ply of which may be net-cloth and adhesive bonding to the outer paper plies. The strength of the paper and the construction of the bags shall be appropriate to the capacity of the bag and to its intended use. Joins and closures shall be sift-proof.
- 6.1.4.18.2** Bags 5M2. To prevent the entry of moisture, a bag of four plies or more shall be made waterproof by the use of either a water resistant ply as one of the two outermost plies or a water resistant barrier made of a suitable protective material between the two outermost plies; a bag of three plies shall be made waterproof by the use of a water resistant ply as the outermost ply. Where there is a danger of the substance contained reacting with moisture or where it is packed damp, a waterproof ply or barrier, such as double-tarred kraft paper, plastics-coated kraft paper, plastics film bonded to the inner surface of the bag, or one or more inner plastics liners, shall also be placed next to the substance. Joins and closures shall be waterproof.
- 6.1.4.18.3** Maximum net mass: 50 kg.
- 6.1.4.19 Composite packagings (plastics material)**
- 6HA1 plastics receptacle with outer steel drum
 - 6HA2 plastics receptacle with outer steel crate or box
 - 6HB1 plastics receptacle with outer aluminium drum
 - 6HB2 plastics receptacle with outer aluminium crate or box
 - 6HC plastics receptacle with outer wooden box
 - 6HD1 plastics receptacle with outer plywood drum
 - 6HD2 plastics receptacle with outer plywood box
 - 6HG1 plastics receptacle with outer fibre drum
 - 6HG2 plastics receptacle with outer fibreboard box
 - 6HH1 plastics receptacle with outer plastics drum
 - 6HH2 plastics receptacle with outer solid plastics box
- 6.1.4.19.1 Inner receptacle**
- 6.1.4.19.1.1** The requirements of 6.1.4.8.1 and 6.1.4.8.4 to 6.1.4.8.7 apply to plastics inner receptacles.

- 6.1.4.19.1.2** The plastics inner receptacle shall fit snugly inside the outer packaging, which shall be free of any projection that might abrade the plastics material.
- 6.1.4.19.1.3** Maximum capacity of inner receptacle:
- | | |
|------------------------------------|------------|
| 6HA1, 6HB1, 6HD1, 6HG1, 6HH1: | 250 litres |
| 6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2: | 60 litres. |
- 6.1.4.19.1.4** Maximum net mass:
- | | |
|------------------------------------|--------|
| 6HA1, 6HB1, 6HD1, 6HG1, 6HH1: | 400 kg |
| 6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2: | 75 kg. |
- 6.1.4.19.2 Outer packaging**
- 6.1.4.19.2.1** Plastics receptacle with outer steel or aluminium drum 6HA1 or 6HB1; the relevant requirements of 6.1.4.1 or 6.1.4.2, as appropriate, apply to the construction of the outer packaging.
- 6.1.4.19.2.2** Plastics receptacle with outer steel or aluminium crate or box 6HA2 or 6HB2. The relevant requirements of 6.1.4.14 apply to the construction of the outer packaging.
- 6.1.4.19.2.3** Plastics receptacle with outer wooden box 6HC. The relevant requirements of 6.1.4.9 apply to the construction of the outer packaging.
- 6.1.4.19.2.4** Plastics receptacle with outer plywood drum 6HD1. The relevant requirements of 6.1.4.5 apply to the construction of the outer packaging.
- 6.1.4.19.2.5** Plastics receptacle with outer plywood box 6HD2. The relevant requirements of 6.1.4.10 apply to the construction of the outer packaging.
- 6.1.4.19.2.6** Plastics receptacle with outer fibre drum 6HG1. The requirements of 6.1.4.7.1 to 6.1.4.7.4 apply to the construction of the outer packaging.
- 6.1.4.19.2.7** Plastics receptacle with outer fibreboard box 6HG2. The relevant requirements of 6.1.4.12 apply to the construction of the outer packaging.
- 6.1.4.19.2.8** Plastics receptacle with outer plastics drum 6HH1. The requirements of 6.1.4.8.1 to 6.1.4.8.6 apply to the construction of the outer packaging.
- 6.1.4.19.2.9** Plastics receptacles with outer solid plastics box (including corrugated plastics material) 6HH2. The requirements of 6.1.4.13.1 and 6.1.4.13.4 to 6.1.4.13.6 apply to the construction of the outer packaging.
- 6.1.4.20 Composite packagings (glass, porcelain or stoneware)**
- 6PA1 receptacle with outer steel drum
- 6PA2 receptacle with outer steel crate or box
- 6PB1 receptacle with outer aluminium drum
- 6PB2 receptacle with outer aluminium crate or box
- 6PC receptacle with outer wooden box
- 6PD1 receptacle with outer plywood drum
- 6PD2 receptacle with outer wickerwork hamper
- 6PG1 receptacle with outer fibre drum
- 6PG2 receptacle with outer fibreboard box
- 6PH1 receptacle with outer expanded plastics packaging
- 6PH2 receptacle with outer solid plastics packaging
- 6.1.4.20.1 Inner receptacle**
- 6.1.4.20.1.1** Receptacles shall be of a suitable form (cylindrical or pear-shaped) and be made of good quality material free from any defect that could impair their strength. The walls shall be sufficiently thick at every point and free from internal stresses.
- 6.1.4.20.1.2** Screw-threaded plastics closures, ground glass stoppers or closures at least equally effective shall be used as closures for receptacles. Any part of the closure likely to come into contact with the contents of the receptacle shall be resistant to those contents. Care shall be taken to ensure that the closures are so fitted as to be leakproof and are suitably secured to prevent any loosening during carriage. If vented closures are necessary, they shall comply with 4.1.1.8.
- 6.1.4.20.1.3** The receptacle shall be firmly secured in the outer packaging by means of cushioning and/or absorbent materials.
- 6.1.4.20.1.4** Maximum capacity of receptacle: 60 litres.
- 6.1.4.20.1.5** Maximum net mass: 75 kg.
- 6.1.4.20.2 Outer packaging**
- 6.1.4.20.2.1** Receptacle with outer steel drum 6PA1. The relevant requirements of 6.1.4.1 apply to the construction of the outer packaging. The removable lid required for this type of packaging may nevertheless be in the form of a cap.

- 6.1.4.20.2.2** Receptacle with outer steel crate or box 6PA2. The relevant requirements of 6.1.4.14 apply to the construction of the outer packaging. For cylindrical receptacles the outer packaging shall, when upright, rise above the receptacle and its closure. If the crate surrounds a pear-shaped receptacle and is of matching shape, the outer packaging shall be fitted with a protective cover (cap).
- 6.1.4.20.2.3** Receptacle with outer aluminium drum 6PB1. The relevant requirements of 6.1.4.2 apply to the construction of the outer packaging.
- 6.1.4.20.2.4** Receptacle with outer aluminium crate or box 6PB2. The relevant requirements of 6.1.4.14 apply to the construction of the outer packaging.
- 6.1.4.20.2.5** Receptacle with outer wooden box 6PC. The relevant requirements of 6.1.4.9 apply to the construction of the outer packaging.
- 6.1.4.20.2.6** Receptacle with outer plywood drum 6PD1. The relevant requirements of 6.1.4.5 apply to the construction of the outer packaging.
- 6.1.4.20.2.7** Receptacle with outer wickerwork hamper 6PD2. The wickerwork hamper shall be properly made with material of good quality. It shall be fitted with a protective cover (cap) so as to prevent damage to the receptacle.
- 6.1.4.20.2.8** Receptacle with outer fibre drum 6PG1. The relevant requirements of 6.1.4.7.1 to 6.1.4.7.4 apply to the construction of the outer packaging.
- 6.1.4.20.2.9** Receptacle with outer fibreboard box 6PG2. The relevant requirements of 6.1.4.12 apply to the construction of the outer packaging.
- 6.1.4.20.2.10** Receptacle with outer expanded plastics or solid plastics packaging (6PH1 or 6PH2). The materials of both outer packagings shall meet the relevant requirements of 6.1.4.13. Outer solid plastics packaging shall be manufactured from high density polyethylene or some other comparable plastics material. The removable lid for this type of packaging may nevertheless be in the form of a cap.

6.1.4.21 Combination packagings

The relevant requirements of section 6.1.4 for the outer packagings to be used are applicable.

Note: For the inner and outer packagings to be used, see the relevant packing instructions in Chapter 4.1.

6.1.4.22 Light gauge metal packagings

0A1 non-removable-head

0A2 non-removable-head

- 6.1.4.22.1** The sheet metal for the body and ends shall be of suitable steel, and of a gauge appropriate to the capacity and intended use of the packaging.
- 6.1.4.22.2** The joints shall be welded, at least double-seamed by welting or produced by a method ensuring a similar degree of strength and leakproofness.
- 6.1.4.22.3** Inner coatings of zinc, tin, lacquer, etc. shall be tough and shall adhere to the steel at every point, including the closures.
- 6.1.4.22.4** Openings for filling, emptying and venting in the bodies or heads of non-removable head (0A1) packagings shall not exceed 70 mm in diameter. Packagings with larger openings shall be considered to be of the removable-head type (0A2).
- 6.1.4.22.5** The closures of non-removable-head packagings (0A1) shall either be of the screw-threaded type or be capable of being secured by a screwable device or a device at least equally effective. The closures of removable-head packagings (0A2) shall be so designed and fitted that they stay firmly closed and the packagings remain leakproof in normal conditions of carriage.
- 6.1.4.22.6** Maximum capacity of packagings: 40 litres.
- 6.1.4.22.7** Maximum net mass: 50 kg.

6.1.5 TEST REQUIREMENTS FOR PACKAGINGS

6.1.5.1 Performance and frequency of tests

- 6.1.5.1.1** The design type of each packaging shall be tested as provided in 6.1.5 in accordance with procedures established by the competent authority allowing the allocation of the mark and shall be approved by this competent authority.

- 6.1.5.1.2** Each packaging design type shall successfully pass the tests prescribed in this Chapter before being used. A packaging design type is defined by the design, size, material and thickness, manner of construction and packing, but may include various surface treatments. It also includes packagings which differ from the design type only in their lesser design height.
- 6.1.5.1.3** Tests shall be repeated on production samples at intervals established by the competent authority. For such tests on paper or fibreboard packagings, preparation at ambient conditions is considered equivalent to the requirements of 6.1.5.2.3.
- 6.1.5.1.4** Tests shall also be repeated after each modification which alters the design, material or manner of construction of a packaging.
- 6.1.5.1.5** The competent authority may permit the selective testing of packagings that differ only in minor respects from a tested type, e.g. smaller sizes of inner packagings or inner packagings of lower net mass; and packagings such as drums, bags and boxes which are produced with small reductions in external dimension(s).
- 6.1.5.1.6** (Reserved)
Note: *For the conditions for using different inner packagings in an outer packaging and permissible variations in inner packagings, see 4.1.1.5.1. These conditions do not limit the use of inner packagings when applying 6.1.5.1.7.*
- 6.1.5.1.7** Articles or inner packagings of any type for solids or liquids may be assembled and carried without testing in an outer packaging under the following conditions:
- a) The outer packaging shall have been successfully tested in accordance with 6.1.5.3 with fragile (e.g. glass) inner packagings containing liquids using the packing group I drop height;
 - b) The total combined gross mass of inner packagings shall not exceed one half the gross mass of inner packagings used for the drop test in (a) above;
 - c) The thickness of cushioning material between inner packagings and between inner packagings and the outside of the packaging shall not be reduced below the corresponding thicknesses in the originally tested packaging; and if a single inner packaging was used in the original test, the thicknesses of cushioning between inner packagings shall not be less than the thickness of cushioning between the outside of the packaging and the inner packaging in the original test. If either fewer or smaller inner packagings are used (as compared to the inner packagings used in the drop test), sufficient additional cushioning material shall be used to take up void spaces;
 - d) The outer packaging shall have passed successfully the stacking test in 6.1.5.6 while empty. The total mass of identical packages shall be based on the combined mass of inner packagings used for the drop test in (a) above;
 - e) Inner packagings containing liquids shall be completely surrounded with a sufficient quantity of absorbent material to absorb the entire liquid contents of the inner packagings;
 - f) If the outer packaging is intended to contain inner packagings for liquids and is not leakproof, or is intended to contain inner packagings for solids and is not sift-proof, a means of containing any liquid or solid contents in the event of leakage shall be provided in the form of a leakproof liner, plastics bag or other equally efficient means of containment. For packagings containing liquids, the absorbent material required in (e) above shall be placed inside the means of containing the liquid contents;
 - g) Packagings shall be marked in accordance with 6.1.3 as having been tested to packing group I performance for combination packagings. The marked gross mass in kilograms shall be the sum of the mass of the outer packaging plus one half of the mass of the inner packaging(s) as used for the drop test referred to in (a) above. Such a package mark shall also contain a letter "V" as described in 6.1.2.4.
- 6.1.5.1.8** The competent authority may at any time require proof, by tests in accordance with this section, that serially produced packagings meet the requirements of the design type tests. For verification purposes records of such tests shall be maintained.
- 6.1.5.1.9** If an inner treatment or coating is required for safety reasons, it shall retain its protective properties even after the tests.
- 6.1.5.1.10** Provided the validity of the test results is not affected and with the approval of the competent authority, several tests may be made on one sample.
- 6.1.5.1.11 Salvage packagings**

Salvage packagings (see 1.2.1) shall be tested and marked in accordance with the requirements applicable to packing group II packagings intended for the carriage of solids or inner packagings, except as follows:

- a) The test substance used in performing the tests shall be water, and the packagings shall be filled to not less than 98% of their maximum capacity. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total package mass so long as they are placed so that the test results are not affected. Alternatively, in performing the drop test, the drop height may be varied in accordance with 6.1.5.3.5 b);
- b) Packagings shall, in addition, have been successfully subjected to the leakproofness test at 30 kPa, with the results of this test reflected in the test report required by 6.1.5.8; and
- c) Packagings shall be marked with the letter "T" as described in 6.1.2.4.

6.1.5.2 Preparation of packagings for testing

6.1.5.2.1 Tests shall be carried out on packagings prepared as for carriage including, with respect to combination packagings, the inner packagings used. Inner or single receptacles or packagings shall be filled to not less than 98% of their maximum capacity for liquids or 95% for solids. For combination packagings other than bags where the inner packaging is designed to carry liquids and solids, separate testing is required for both liquid and solid contents. Bags shall be filled to the maximum mass at which they may be used. The substances or articles to be carried in the packagings may be replaced by other substances or articles except where this would invalidate the results of the tests. For solids, when another substance is used it shall have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total package mass, so long as they are placed so that the test results are not affected.

6.1.5.2.2 In the drop tests for liquids, when another substance is used, it shall be of similar relative density and viscosity to those of the substance being carried. Water may also be used for the liquid drop test under the conditions in 6.1.5.3.5.

6.1.5.2.3 Paper or fibreboard packagings shall be conditioned for at least 24 hours in an atmosphere having a controlled temperature and relative humidity. There are three options, one of which shall be chosen. The preferred atmosphere is $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ with relative humidity of $50\% \pm 2\%$. The two other options are $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ with relative humidity $65\% \pm 2\%$ or $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ with relative humidity $65\% \pm 2\%$.

***Note:** Average values shall fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to $\pm 5\%$ relative humidity without significant impairment of test reproducibility.*

6.1.5.2.4 (Reserved)

6.1.5.2.5 To check that their chemical compatibility with the liquids is sufficient, plastics drums and jerricans in accordance with 6.1.4.8 and if necessary composite packagings (plastics material) in accordance with 6.1.4.19 shall be subjected to storage at ambient temperature for six months, during which time the test samples shall be kept filled with the goods they are intended to carry. For the first and last 24 hours of storage, the test samples shall be placed with the closure downwards. However, packagings fitted with a vent shall be so placed on each occasion for five minutes only. After this storage the test samples shall undergo the tests prescribed in 6.1.5.3 to 6.1.5.6.

When it is known that the strength properties of the plastics material of the inner receptacles of composite packagings (plastics material) are not significantly altered by the action of the filling substance, it shall not be necessary to check that the chemical compatibility is sufficient. A significant alteration in strength properties means:

- a) distinct embrittlement;
- b) a considerable decrease in elasticity, unless related to a not less than proportionate increase in the elongation under load. Where the behaviour of the plastics material has been established by other means, the above compatibility test may be dispensed with. Such procedures shall be at least equivalent to the above compatibility test and be recognized by the competent authority.

***Note:** For plastics drums and jerricans and composite packagings (plastics material) made of polyethylene, see also 6.1.5.2.6 below.*

6.1.5.2.6 For polyethylene drums and jerricans in accordance with 6.1.4.8 and if necessary, polyethylene composite packagings in accordance with 6.1.4.19, chemical compatibility with filling liquids assimilated in accordance with 4.1.1.21 may be verified as follows with standard liquids (see 6.1.6).

The standard liquids are representative for the processes of deterioration on polyethylene, as there are softening through swelling, cracking under stress, molecular degradation and combinations thereof. The sufficient chemical compatibility of the packagings may be verified by storage of the required test samples for three weeks at 40 °C with the appropriate standard liquid(s); where this standard liquid is water, storage in accordance with this procedure is not required. Storage is not required either for test samples which are used for the stacking test in case of the standard liquids "wetting solution" and "acetic acid".

For the first and last 24 hours of storage, the test samples shall be placed with the closure downwards. However, packagings fitted with a vent shall be so placed on each occasion for five minutes only. After this storage, the test samples shall undergo the tests prescribed in 6.1.5.3 to 6.1.5.6.

The compatibility test for tert-Butyl hydroperoxide with more than 40% peroxide content and peroxyacetic acids of Class 5.2 shall not be carried out using standard liquids. For these substances, sufficient chemical compatibility of the test samples shall be verified during a storage period of 180 days at ambient temperature with the substances they are intended to carry.

Results of the procedure in accordance with this paragraph from polyethylene packagings can be approved for an equal design type, the internal surface of which is fluorinated.

6.1.5.2.7 For packagings made of polyethylene, as specified in 6.1.5.2.6, which have passed the test in 6.1.5.2.6, filling substances other than those assimilated in accordance with 4.1.1.21 may also be approved. Such approval shall be based on laboratory tests verifying that the effect of such filling substances on the test specimens is less than that of the appropriate standard liquid(s) taking into account the relevant processes of deterioration. The same conditions as those set out in 4.1.1.21.2 shall apply with respect to relative density and vapour pressure.

6.1.5.2.8 Provided that the strength properties of the plastics inner packagings of a combination packaging are not significantly altered by the action of the filling substance, proof of chemical compatibility is not necessary. A significant alteration in strength properties means:

- a) distinct embrittlement;
- b) a considerable decrease in elasticity, unless related to a not less than proportionate increase in elastic elongation.

6.1.5.3 Drop test³

6.1.5.3.1 Where more than one orientation is possible for a given drop test, the orientation most likely to result in failure of the packaging shall be used.

Number of test samples (per design type and manufacturer) and drop orientation are shown below in the table:

Packaging	Number of test samples	Drop orientation
(a) Steel drums Aluminium drums Drums of metal other than steel or aluminium Steel jerricans Aluminium jerricans Plywood drums Fibre drums Plastics drums and jerricans Composite packagings which are in the shape of a drum Light gauge metal packagings	Six (three for each drop)	First drop (using three samples): packaging shall strike the target diagonally on the chime or, if the packaging has no chime, on a circumferential seam or an edge Second drop (using the other three samples): the packaging shall strike the target on the weakest part not tested by the first drop, for example a closure or, for some cylindrical drums, the welded longitudinal seam of the drum body

³ See Standard ISO 2248.

(b) Boxes of natural wood Plywood boxes Reconstituted wood boxes Fibreboard boxes Plastics boxes Steel or aluminium boxes Composite packagings which are in the shape of a box	Five (one for each drop)	First drop: flat on the bottom Second drop: flat on the top Third drop: flat on the long side Fourth drop: flat on the short side Fifth drop: on a corner
(c) Bags – single-ply with a side seam	Three (three drops per bag)	First drop: flat on a wide face Second drop: flat on a narrow face Third drop: on an end of the bag
(d) Bags – single-ply without a side seam, or multi-ply	Three (two drops per bag)	First drop: flat on a wide face Second drop: on an end of the bag
(e) Composite packagings (glass, stoneware or porcelain), marked with the symbol "SMGS/RID/ADR" according to 6.1.3.1 (a) and which are in the shape of a drum or box	Three (one for each drop)	Diagonally on the bottom chime, or, if there is no chime, on a circumferential seam or the bottom edge

6.1.5.3.2 Special preparation of test samples for the drop test

The temperature of the test sample and its contents shall be reduced to –18 °C or lower for the following packagings⁴:

- a) plastics drums (see 6.1.4.8);
- b) plastics jerricans (see 6.1.4.8);
- c) plastics boxes other than expanded plastics boxes (see 6.1.4.13);
- d) composite packagings made of plastics material (see 6.1.4.19);
- e) combination packagings with plastics inner packagings, other than plastics bags intended to contain solids or articles.

Where test samples are prepared in this way, the conditioning in 6.1.5.2.3 may be waived. Test liquids shall be kept in the liquid state by the addition of anti-freeze if necessary.

6.1.5.3.3 Removable head packagings for liquids shall not be dropped until at least 24 hours after filling and closing to allow for any possible gasket relaxation

6.1.5.3.4 Test area

The test area shall be as follows:

- non-resilient;
- horizontal;
- integral;
- massive enough to be immovable;
- flat;
- with a surface kept free from local defects capable of influencing the test results;
- rigid enough to be non-deformable under test conditions and not liable to become damaged by the tests;
- sufficiently large to ensure that the test package falls entirely upon the surface.

6.1.5.3.5 Drop height

For solids and liquids, if the test is performed with the solid or liquid to be carried or with another substance having essentially the same physical characteristics:

Packing Group I	Packing Group II	Packing Group III
1.8 m	1.2 m	0.8 m

⁴ For carriage to the Republic of Kazakhstan, Russian Federation or transit through the territories of these states in the period of 01.11-01.04, the minimum temperature of the test sample and its contents shall be – 50°C.

For liquids in single packagings and for inner packagings of combination packagings, if the test is performed with water. The term water includes water/antifreeze solutions with the minimum relative density of 950 kg/m³:

- a) where the substances to be carried have the relative density not exceeding 1200 kg/m³:

Packing Group I	Packing Group II	Packing Group III
1.8 m	1.2 m	0.8 m

- b) where the substances to be carried have a relative density exceeding 1200 kg/m³, the drop height shall be calculated on the basis of the relative density (d) of the substance to be carried as follows:

Packing Group I	Packing Group II	Packing Group III
$d \times 10^{-3} \times 1.5$ (m)	$d \times 10^{-3} \times 1.0$ (m)	$d \times 10^{-3} \times 0.67$ (m)

- c) for light-gauge metal packagings, marked with the symbol "SMGS/RID/ADR " according to 6.1.3.1 (a) intended for the carriage of substances having a viscosity at 23 °C greater than 200 mm²/s (corresponding to a flow time of 30 seconds with an ISO flow cup having a jet orifice of 6 mm diameter in accordance with ISO Standard 2431:1993),

- if the relative density does not exceed 1200 kg/m³:

Packing Group II	Packing Group III
0.6 m	0.4 m

- where the substances to be carried have a relative density (d) exceeding 1200 kg/m³, the drop height shall be calculated on the basis of the relative density (d) of the substance to be carried as follows:

Packing Group II	Packing Group III
$d \times 10^{-3} \times 0.5$ m	$d \times 10^{-3} \times 0.33$ m

6.1.5.3.6 Criteria for assessing the test results

6.1.5.3.6.1 Each packaging containing liquid shall be leakproof when equilibrium has been reached between the internal and external pressures, however for inner packagings of combination packagings and except for inner receptacles of composite packagings (glass, porcelain or stoneware), marked with the symbol "SMGS/RID/ADR" according to 6.1.3.1 (a) it is not necessary that the pressures be equalized.

6.1.5.3.6.2 Where a combination or composite packaging for solids undergoes a drop test and its upper face strikes the test area, the test sample passes the test if the entire contents are retained by an inner packaging or inner receptacle (e.g. a plastics bag), even if the closure while retaining its containment function, is no longer sift-proof.

6.1.5.3.6.3 The packaging or outer packaging of a composite or combination packaging shall not exhibit any damage liable to affect safety during carriage. Inner receptacles, inner packagings, or articles shall remain completely within the outer packaging and there shall be no leakage of the filling substance from the inner receptacle(s) or inner packaging(s).

6.1.5.3.6.4 Neither the outermost ply of a bag nor an outer packaging may exhibit any damage liable to affect safety during carriage.

6.1.5.3.6.5 A slight discharge from the closure(s) upon impact is not considered to be a failure of the packaging provided that no further leakage occurs.

6.1.5.3.6.6 No rupture is permitted in packagings for goods of Class 1 which would permit the spillage of loose explosive substances or articles from the outer packaging.

6.1.5.4 Leakproofness test

The leakproofness test shall be performed on all design types of packagings intended to contain liquids; however, this test is not required for:

- inner packagings of combination packagings;

- inner receptacles of composite packagings (glass, porcelain or stoneware), marked with the symbol "SMGS/RID/ADR" according to 6.1.3.1 (a);
- light gauge metal packagings, marked with the symbol "SMGS/RID/ADR" according to 6.1.3.1 (a) and intended for substances with a viscosity at 23 °C exceeding 200 mm²/s.

6.1.5.4.1 *Number of test samples:* three test samples per design type and manufacturer.

6.1.5.4.2 *Special preparation of test samples for the test:* either vented closures shall be replaced by similar non-vented closures or the vent shall be sealed.

6.1.5.4.3 *Test method and pressure to be applied:* the packagings including their closures shall be restrained under water for 5 minutes while an internal air pressure is applied, the method of restraint shall not affect the results of the test. The air pressure (gauge) to be applied shall be not less than:

Packing Group I	Packing Group II, III
30 kPa (0.3 bar)	20 kPa (0.2 bar)

Other methods at least equally effective may be used.

6.1.5.4.4 *Criterion for passing the test:* there shall be no leakage.

6.1.5.5 Hydraulic test

6.1.5.5.1 Packagings to be tested

The hydraulic test shall be carried out on all design types of metal, plastics and composite packagings intended to contain liquids. This test is not required for:

- inner packagings of combination packagings;
- inner receptacles of composite packagings (glass, porcelain or stoneware), marked with the symbols: "SMGS", "RID/ADR", "SMGS/RID/ADR" according to 6.1.3.1 (a);
- light gauge metal packagings, marked with the symbols: "SMGS", "RID/ADR", "SMGS/RID/ADR" according to 6.1.3.1 (a) and intended for substances with a viscosity at 23 °C exceeding 200 mm²/s.

6.1.5.5.2 *Number of test samples:* three test samples per design type and manufacturer.

6.1.5.5.3 *Special preparation of packagings for testing:* either vented closures shall be replaced by similar non-vented closures or the vent shall be sealed.

6.1.5.5.4 *Test method and pressure to be applied.* Metal packagings and composite packagings (glass, porcelain or stoneware), including their closures, shall be subjected to the test pressure for 5 minutes. Plastics packagings and composite packagings (plastics material) including their closures shall be subjected to the test pressure for 30 minutes. This pressure is the one to be included in the mark required by 6.1.3.1 (d). The manner in which the packagings are supported shall not invalidate the test. The test pressure shall be applied continuously and evenly; it shall be kept constant throughout the test period. The hydraulic pressure (gauge) applied, as determined by any one of the following methods, shall be:

- a) not less than the total gauge pressure measured in the packaging (i.e. the vapour pressure of the filling liquid and the partial pressure of the air or other inert gases, minus 100 kPa) at 55 °C, multiplied by a safety factor of 1.5; this total gauge pressure shall be determined on the basis of a maximum degree of filling in accordance with 4.1.1.4 and a filling temperature of 15 °C; or
- b) not less than 1.75 times the vapour pressure at 50 °C of the liquid to be carried, minus 100 kPa but with a minimum test pressure of 100 kPa; or
- c) not less than 1.5 times the vapour pressure at 55 °C of the liquid to be carried, minus 100 kPa but with a minimum test pressure of 100 kPa.

6.1.5.5.5 Packagings intended to contain liquids of packing group I shall be tested to a minimum test pressure of 250 kPa (gauge) for a test period of 5 or 30 minutes depending upon the material of construction of the packaging.

6.1.5.5.6 *Criterion for passing the test:* No packaging may leak.

6.1.5.6 Stacking test

All design types of packagings other than bags and other than non-stackable composite packagings (glass, porcelain, or stoneware), marked with the symbol "SMGS/RID/ADR" according to 6.1.3.1 (a).

6.1.5.6.1 *Number of test samples:* three test samples per design type and manufacturer.

6.1.5.6.2 *Test method:* the test sample shall be subjected to a force applied to the top surface of the test sample equivalent to the total weight of identical packages which might be stacked on it during

carriage; where the contents of the test sample are liquids with relative density different from that of the liquid to be carried, the force shall be calculated in relation to the latter. The minimum height of the stack including the test sample shall be 3 metres. The duration of the test shall be 24 hours except that plastics drums, jerricans, and composite packagings 6HH1 and 6HH2 intended for liquids shall be subjected to the stacking test for a period of 28 days at a temperature of not less than 40 °C. For the test in accordance with 6.1.5.2.5, the original filling substance shall be used. For the test in accordance with 6.1.5.2.6, a stacking test shall be carried out with a standard liquid.

6.1.5.6.3 *Criteria for passing the test:* No test sample shall leak. In composite packagings or combination packagings, there shall be no leakage of the filling substance from the inner receptacle or inner packaging. No test sample shall show any deterioration which could adversely affect transport safety or any distortion liable to reduce its strength or cause instability in stacks of packages. Plastics packagings shall be cooled to ambient temperature before the assessment.

6.1.5.7 Supplementary permeability test for plastics drums and jerricans in accordance with 6.1.4.8 and for composite packagings (plastics material) in accordance with 6.1.4.19 intended for the carriage of liquids having a flash-point ≤ 60 °C, other than 6HA1 packagings.

Polyethylene packagings need be subjected to this test only if they are to be approved for the carriage of benzene, toluene, xylene or mixtures and preparations containing those substances.

6.1.5.7.1 *Number of test samples:* three packagings per design type and manufacturer.

6.1.5.7.2 *Special preparation of the test sample for the test:* The test samples are to be pre-stored with the original filling substance in accordance with 6.1.5.2.5, or, for polyethylene packagings, with the standard liquid mixture of hydrocarbons (white spirit) in accordance with 6.1.5.2.6.

6.1.5.7.3 *Test method:* The test samples filled with the substance for which the packaging is to be approved shall be weighed before and after storage for 28 days at 23 °C and 50% relative atmospheric humidity. For polyethylene packagings, the test may be carried out with the standard liquid mixture of hydrocarbons (white spirit) in place of benzene, toluene or xylene.

6.1.5.7.4 *Criterion for passing the test:* Permeability shall not exceed 0.008 g/(l·h).

6.1.5.8 Test Report

6.1.5.8.1 A test report containing at least the following particulars shall be drawn up and shall be available to the users of the packaging:

1. Name and address of the test facility.
2. Name and address of applicant (where appropriate).
3. A unique test report identification.
4. Date of the test report.
5. Manufacturer of the packaging.
6. Description of the packaging design type (e.g. dimensions, materials, closures, thickness, etc.), including method of manufacture (e.g. blow moulding) and which may include drawing(s) and/or photograph(s).
7. Maximum capacity
8. Characteristics of test contents, e.g. viscosity and relative density for liquids and particle size for solids. For plastics packagings subject to the internal pressure test in 6.1.5.5, the temperature of the water used.
9. Test descriptions and results.
10. The test report shall be signed with the name and status of the signatory.

The test report shall be made available to the users of packagings

6.1.5.8.2 The test report shall contain statements that the packaging prepared as for carriage was tested in accordance with the appropriate requirements of this section and that the use of other packaging methods or components may render it invalid. A copy of the test report shall be available to the competent authority.

6.1.6 Standard liquids for verifying the chemical compatibility testing of polyethylene packagings, including IBCs, in accordance with 6.1.5.2.6 and 6.5.6.3.5, respectively

6.1.6.1 The following standard liquids shall be used for this plastics material:

- a) **Wetting Solution** – for substances causing severe cracking in polyethylene under stress, in particular for all solutions and preparations containing wetting agents.

An aqueous solution of 1% of alkyl benzene sulphonate, or an aqueous solution of 5% nonylphenol ethoxylate which has been preliminary stored for at least 14 days at a temperature of 40°C before being used for the first time for the tests, shall be used. The surface tension of this solution shall be 31 to 35 mN/m at 23 °C. The stacking test shall be carried out on the basis of a relative density of not less than 1200 kg/m³. A compatibility test with acetic acid is not required if adequate chemical compatibility is proved with a wetting solution. For filling substances causing cracking in polyethylene under stress which is resistant to the wetting solution, adequate chemical compatibility may be proved after preliminary storing for 21 days at 40 °C in accordance with 6.1.5.2.6, but with the original filling matter.

- b) **Acetic acid** – for substances and preparations causing cracking in polyethylene under stress, in particular for monocarboxylic acids and monovalent alcohols.

Acetic acid in 98 to 100% concentration shall be used, with the relative density of 1050 kg/m³. The stacking test shall be carried out on the basis of a relative density not less than 1100 kg/m³. In the case of filling substances causing polyethylene to swell more than acetic acid and to such an extent that the polyethylene mass is increased by up to 4%, adequate chemical compatibility may be proved after preliminary storing for 21 days at 40 °C, in accordance with 6.1.5.2.6 but with the original filling matter.

- c) **Normal butyl acetate/normal butyl acetate-saturated wetting solution** – for substances and preparations causing polyethylene to swell to such an extent that the polyethylene mass is increased by about 4% and at the same time causing cracking under stress, in particular for phyto-sanitary products, liquid paints and esters.

Normal butyl acetate in 98 to 100% concentration shall be used for preliminary storage in accordance with 6.1.5.2.6. For the stacking test in accordance with 6.1.5.6, a test liquid consisting of a 1 to 10% aqueous wetting solution mixed with 2% normal butyl acetate conforming to (a) above shall be used. The stacking test shall be carried out on the basis of a relative density not less than 1000 kg/m³. The stacking test shall be carried out on the basis of a relative density not less than 1.0. In the case of filling substances causing polyethylene to swell more than normal butyl acetate and to such an extent that the polyethylene mass is increased by up to 7.5%, adequate chemical compatibility may be proved after preliminary storing for 21 days at 40 °C, in accordance with 6.1.5.2.6 but with the original filling matter.

- d) **Mixture of hydrocarbons (white spirit)** – for substances and preparations causing polyethylene to swell, in particular for hydrocarbons, esters and ketones. A mixture of hydrocarbons having a boiling range 160 °C to 220 °C, relative density from 780 to 800 kg/m³, flash-point > 50 °C and an aromatic content 16% to 21% shall be used.

The stacking test shall be carried out on the basis of a relative density not less than 1000 kg/m³. In the case of filling substances causing polyethylene to swell to such an extent that the polyethylene mass is increased by more than 7.5%, adequate chemical compatibility may be proved after preliminary storing for 21 days at 40 °C, in accordance with 6.1.5.2.6 but with the original filling matter.

- e) **Nitric acid** – for all substances and preparations having an oxidizing effect on polyethylene and causing molecular degradation identical to or less than 55% nitric acid.

Nitric acid in a concentration of not less than 55% shall be used. The stacking test shall be carried out on the basis of a relative density of not less than 1400 kg/m³. In the case of filling substances more strongly oxidizing than 55% nitric acid or causing degradation of the molecular mass proceed in accordance with 6.1.5.2.5. The period of use shall be determined in such cases by observing the degree of damage (e.g. two years for nitric acid in not less than 55% concentration).

- e) **Water** – for substances which do not attack polyethylene in any of the cases referred to under (a) to (e), in particular for inorganic acids and lyes, aqueous saline solutions, polyvalent alcohols and organic substances in aqueous solution.

The stacking test shall be carried out on the basis of a relative density of not less than 1200 kg/m³. A design type test with water is not required if adequate chemical compatibility is proved with wetting solution or nitric acid.

CHAPTER 6.2

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PRESSURE RECEPTACLES, AEROSOL DISPENSERS, SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES) AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS

Note: Aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas are not subject to the requirements of 6.2.1 to 6.2.5.

6.2.1 GENERAL REQUIREMENTS

6.2.1.1 Design and construction

6.2.1.1.1 Pressure receptacles shall be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during normal conditions of carriage and intended use.

6.2.1.1.2 (Reserved)

6.2.1.1.3 In no case shall the minimum wall thickness be less than that specified in the design and construction technical standards.

6.2.1.1.4 For welded pressure receptacles, only metals of weldable quality shall be used for parts to be welded.

6.2.1.1.5 The test pressure of pressure receptacle shells and bundles of cylinders shall be in accordance with packing instruction P 200 of 4.1.4.1, or, for a chemical under pressure, with packing instruction P 206 of 4.1.4.1. The test pressure for closed cryogenic receptacles shall be in accordance with packing instruction P 203 of 4.1.4.1. The test pressure of a metal hydride storage system shall be in accordance with packing instruction P 205 of 4.1.4.1. The test pressure of a cylinder shell for an adsorbed gas shall be in accordance with packing instruction P 208 of 4.1.4.1.

6.2.1.1.6 Cylinders or cylinder shells assembled in bundles shall be structurally supported and held together as a unit. Cylinders or cylinder shells shall be secured in a manner that prevents movement in relation to the structural assembly and movement that would result in the concentration of harmful local stresses. Manifold assemblies (e.g. manifold, valves, and pressure gauges) shall be designed and constructed such that they are protected from impact damage and forces normally encountered in carriage. Manifolds shall have at least the same test pressure as the cylinders. For toxic liquefied gases, each cylinder shell shall have an isolation valve to ensure that each cylinder can be filled separately and that no interchange of cylinder contents can occur during carriage.

Note: Toxic liquefied gases have the classification codes 2T, 2TF, 2TC, 2TO, 2TFC or 2TOC.

6.2.1.1.7 Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.

6.2.1.1.8 Additional requirements for the construction of closed cryogenic receptacles for refrigerated liquefied gases

6.2.1.1.8.1 The mechanical properties of the metal used shall be established for each pressure receptacle (including the impact strength and the bending coefficient).

Note: With regard to the impact strength, see 6.8.5.3.

6.2.1.1.8.2 The pressure receptacles shall be thermally insulated. The thermal insulation shall be protected against impact by means of a jacket. If the space between the inner vessel and the jacket is evacuated of air (vacuum-insulation), the jacket shall be designed to withstand without permanent deformation an external pressure of at least 100 kPa (1 bar) calculated in accordance with a recognised technical code or a calculated critical collapsing pressure of not less than 200 kPa (2 bar) gauge pressure. If the jacket is so closed as to be gas-tight (e.g. in the case of vacuum-insulation), a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas-tightness of the inner vessel or its service equipment. The device shall prevent moisture from penetrating into the insulation.

6.2.1.1.8.3 Closed cryogenic receptacles intended for the carriage of oxygen shall not include materials which may react with oxygen or oxygen enriched atmospheres in a dangerous manner, when located in parts of the thermal insulation where there is a risk of contact with oxygen or with oxygen enriched liquid.

6.2.1.1.8.4 Closed cryogenic receptacles shall be designed and constructed with suitable lifting and securing arrangements.

6.2.1.1.9 Additional requirements for the construction of acetylene cylinders

Cylinder shells for UN 1001 acetylene, dissolved, and UN 3374 acetylene, solvent free, shall be filled with a porous material, uniformly distributed, of a type that conforms to the requirements and testing specified by the competent authority and which:

- a) is compatible with the cylinder shell and does not form harmful or dangerous compounds either with the acetylene or with the solvent in the case of UN 1001;
- b) is capable of preventing the spread of decomposition of the acetylene in the porous material.

In the case of UN 1001, the solvent shall be compatible with those parts of the cylinder that are in contact with it.

6.2.1.2 Materials

6.2.1.2.1 Construction materials of pressure receptacles which are in direct contact with dangerous goods shall not be affected or weakened by the dangerous goods intended to be carried and shall not cause a dangerous effect, e.g. catalysing a reaction or reacting with the dangerous goods.

6.2.1.2.2 Pressure receptacles shall be made of the materials specified in the design and construction technical standards and the applicable packing instruction for the substances intended for carriage in the pressure receptacle. The materials shall be resistant to brittle fracture and to stress corrosion cracking as indicated in the design and construction technical standards.

6.2.1.3 Service equipment

6.2.1.3.1 Service equipment subjected to pressure, excluding porous, absorbent or adsorbent material, pressure relief devices, pressure gauges or indicators, shall be designed and constructed so that the burst pressure is at least 1.5 times the test pressure of the pressure receptacle.

6.2.1.3.2 Service equipment shall be configured or designed to prevent damage and unintended opening that could result in the release of the pressure receptacle contents during normal conditions of handling and carriage. All closures shall be protected in the same manner as is required for valves in 4.1.6.8. Manifold piping leading to shut-off valves shall be sufficiently flexible to protect the shut-off valves and the piping from shearing or releasing the pressure receptacle contents.

6.2.1.3.3 Pressure receptacles which are not capable of being handled manually or rolled, shall be fitted with handling devices (skids, rings, straps) ensuring that they can be safely handled by mechanical means and so arranged as not to impair the strength of, nor cause undue stresses in, the pressure receptacle.

6.2.1.3.4 Individual pressure receptacles shall be equipped with pressure relief devices as specified in provisions 6.2.1.3.6.4 and 6.2.1.3.6.5 except for the cases indicated in packing provisions P 200 (2) or P 205 of 4.1.4.1. Pressure-relief devices shall be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure. When fitted, pressure relief devices on manifolded horizontal pressure receptacles filled with flammable gas shall be arranged to discharge freely to the open air in such a manner as to prevent any impingement of escaping gas upon the pressure receptacle itself.

6.2.1.3.5 Pressure receptacles whose filling is measured by volume shall be provided with a level indicator.

6.2.1.3.6 Additional requirements for closed cryogenic receptacles

6.2.1.3.6.1 Each filling and discharge opening in a closed cryogenic receptacle used for the carriage of flammable refrigerated liquefied gases shall be fitted with at least two mutually independent shut-off devices in series, the first being a stop-valve, the second being a cap or equivalent device.

6.2.1.3.6.2 For sections of piping which can be closed at both ends and where liquid product can be trapped, a method of automatic pressure-relief shall be provided to prevent excess pressure build-up within the piping.

6.2.1.3.6.3 Each connection on a closed cryogenic receptacle shall be clearly marked to indicate its function (e.g. vapour or liquid phase).

6.2.1.3.6.4 Pressure-relief devices

6.2.1.3.6.4.1 Every closed cryogenic receptacle shall be provided with at least one pressure-relief device. The pressure-relief device shall be of the type that will resist dynamic forces including surge.

- 6.2.1.3.6.4.2** Closed cryogenic receptacles may, in addition, have a frangible disc in parallel with the spring loaded device(s) in order to meet the requirements of 6.2.1.3.6.5.
- 6.2.1.3.6.4.3** Connections to pressure-relief devices shall be of sufficient size to enable the required discharge of vapour and gases to pass unrestricted to the pressure-relief device.
- 6.2.1.3.6.4.4** All pressure-relief device inlets shall under maximum filling conditions be situated in the vapour space of the closed cryogenic receptacle and the devices shall be so arranged as to ensure that the escaping vapour is discharged unrestrictedly.
- 6.2.1.3.6.5 Capacity and setting of pressure-relief devices**
- Note:** In relation to pressure-relief devices of closed cryogenic receptacles, maximum allowable working pressure (MAWP) means the maximum effective gauge pressure permissible at the top of a loaded closed cryogenic receptacle in its operating position including the highest effective pressure during filling and discharge.*
- 6.2.1.3.6.5.1** The pressure-relief device shall:
- open automatically at a pressure not less than the MAWP;
 - be fully open at a pressure equal to 110% of the MAWP;
 - after discharge, close at a pressure not lower than 10% below the pressure at which discharge starts;
 - remain closed at all lower pressures.
- 6.2.1.3.6.5.2** Frangible discs shall be set to rupture at a nominal pressure which is the lower of either the test pressure or 150% of the MAWP.
- 6.2.1.3.6.5.3** In the case of the loss of vacuum in a vacuum-insulated closed cryogenic receptacle the combined capacity of all pressure-relief devices installed shall be sufficient so that the pressure (including accumulation) inside the closed cryogenic receptacle does not exceed 120% of the MAWP.
- 6.2.1.3.6.5.4** The required capacity of the pressure-relief devices shall be calculated in accordance with an established technical code recognized by the competent authority¹.
- 6.2.1.4 Approval of pressure receptacles**
- 6.2.1.4.1** The conformity of pressure receptacles shall be assessed at time of manufacture as required by the competent authority. The technical documentation shall include full specifications on design and construction, and full documentation on the manufacturing and testing.
- 6.2.1.4.2** Quality assurance systems shall conform to the requirements of the competent authority.
- 6.2.1.4.3** Pressure receptacle shells and the inner vessels of closed cryogenic receptacles shall be inspected, tested and approved by an inspection body.
- 6.2.1.4.4** For refillable cylinders, pressure drums and tubes the conformity assessment of the shell and the closure(s) may be carried out separately. In these cases, an additional assessment of the final assembly is not required.
- For bundles of cylinders, the cylinder shells and the valve(s) may be assessed separately, but an additional assessment of the complete assembly is required.
- For closed cryogenic receptacles, the inner vessels and the closures may be assessed separately, but an additional assessment of the complete assembly is required.
- For acetylene cylinders, conformity assessment shall comprise either:
- a) One assessment of conformity covering both the cylinder shell and the contained porous material; or
 - b) A separate assessment of conformity for the empty cylinder shell and an additional assessment of conformity covering the cylinder shell with the contained porous material.
- 6.2.1.5 Initial inspection and test**
- 6.2.1.5.1** New pressure receptacles, other than closed cryogenic receptacles, metal hydride storage systems,

¹ CGA Publications S-1.2-2003 "Pressure Relief Device Standards – Part 2 – Cargo and Portable Tanks for Compressed Gases" and S-1.1-2003 "Pressure Relief Device Standards – Part 1 – Cylinders for Compressed Gases".

and bundles of cylinders, shall be subjected to testing and inspection during and after manufacture in accordance with the applicable design standards or recognised technical codes, including the following:

On an adequate sample of pressure receptacle shells:

- a) Testing of the mechanical characteristics of the material of construction;
- b) Verification of the minimum wall thickness;
- c) Verification of the homogeneity of the material for each manufacturing batch;
- d) Internal and external visual inspection;
- e) Visual inspection of the closure neck threads, and pressure receptacles;
- f) Verification of the conformance with the design standard.

For all pressure receptacle shells:

- g) A hydraulic pressure test. Pressure receptacle shells shall withstand the test pressure without expansion greater than that allowed in the design specification;

Note: *With the agreement of the competent authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.*

- h) Inspection and assessment of manufacturing defects and either repairing them or rendering the pressure receptacle shells unserviceable. In the case of welded pressure receptacle shells, particular attention shall be paid to the quality of the welds;
- i) An inspection of the markings on the pressure receptacle shells;
- j) In addition, pressure receptacle shells intended for the carriage of UN No. 1001 acetylene, dissolved, and UN No. 3374 acetylene, solvent free, shall be inspected to ensure proper installation and condition of the porous material and, if applicable, the quantity of solvent.

On an adequate sample of closures:

- k) Verification of materials;
- l) Verification of dimensions;
- m) Verification of cleanliness;
- n) Inspection of completed assembly;
- o) Verification of the presence of marks.

For all closures:

- p) Testing for leakproofness.

6.2.1.5.2

Closed cryogenic receptacles shall be subjected to testing and inspection during and after manufacture in accordance with the applicable design standards or recognized technical codes including the following:

On an adequate sample of inner vessels:

- a) Testing of the mechanical characteristics of the material of construction;
- b) Verification of the minimum wall thickness;
- c) Inspection of the external and internal conditions;
- d) Verification of the conformance with the design standard or technical code;
- e) Inspection of welds by radiographic, ultrasonic or other suitable non-destructive test method according to the applicable design and construction standard or technical code.

For all inner vessels:

- f) A hydraulic pressure test. The inner vessel shall meet the acceptance criteria specified in the design and construction technical standard or technical code;

Note: *With the agreement of the competent authority, the hydraulic pressure test may be*

replaced by a test using a gas, where such an operation does not entail any danger.

- g) Inspection and assessment of manufacturing defects and either repairing them or rendering the inner vessel unserviceable;
- h) An inspection of the marks.

On an adequate sample of closures:

- i) Verification of materials;
- j) Verification of dimensions;
- k) Verification of cleanliness;
- l) Inspection of completed assembly;
- m) Verification of the presence of marks.

For all closures:

- n) Testing for leakproofness.

On an adequate sample of completed closed cryogenic receptacles:

- o) Testing the satisfactory operation of service equipment;
- p) Verification of the conformance with the design standard or technical code.

For all completed closed cryogenic receptacles:

- q) Testing for leakproofness.

6.2.1.5.3 For metal hydride storage systems, it shall be verified that the inspections and tests specified in 6.2.1.5.1 a), b), c), d), e) if applicable, f), g), h) and i) have been performed on an adequate sample of the pressure receptacle shells used in the metal hydride storage system. In addition, on an adequate sample of metal hydride storage systems, the inspections and tests specified in 6.2.1.5.1 c) and f) shall be performed, as well as 6.2.1.5.1 e), if applicable, and inspection of the external conditions of the metal hydride storage system.

Additionally, all metal hydride storage systems shall undergo the initial inspections and tests specified in 6.2.1.5.1 h) and i), as well as a leakproofness test and a test of the satisfactory operation of the service equipment.

6.2.1.5.4 For bundles of cylinders the cylinder shells and closures shall be subjected to initial inspection and tests specified in 6.2.1.5.1. An adequate sample of frames shall be proof load tested to two times the maximum gross weight of the bundles of cylinders.

Additionally, all manifolds of bundle of cylinders shall undergo a hydraulic pressure test and all the completed bundles of cylinders shall undergo a leakproofness test.

Note: *With the agreement of the competent authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.*

6.2.1.6 Periodic inspection and test

6.2.1.6.1 Refillable pressure receptacles, other than cryogenic receptacles, shall be subjected to periodic inspections and tests by a body authorised by the competent authority, in accordance with the following requirements:

- a) Check of the external conditions of the pressure receptacle and verification of the equipment and the external markings;
- b) Check of the internal conditions of the pressure receptacle e.g. internal inspection, verification of minimum wall thickness);
- c) Checking of the threads either:
 - 1) if there is evidence of corrosion; or
 - 2) if the closures or other service equipment are removed;
- d) A hydraulic pressure test of the pressure receptacle shell and, if necessary, verification of the characteristics of the material by suitable tests;
- e) Check of service equipment, if to be reintroduced into service. This check may be carried out separately from the inspection of the pressure receptacle shell; and

f) A leakproofness test of bundles of cylinders after reassembly.

Note 1: *With the agreement of the competent authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.*

Note 2: *For seamless steel cylinder shells and tube shells the check of 6.2.1.6.1 b) and hydraulic pressure test of 6.2.1.6.1 d) may be replaced by a procedure conforming to ISO 16148:2016 + Amd 1:2020 "Gas cylinders – Refillable seamless steel gas cylinders and tubes – Acoustic emission examination (AT) and follow-up ultrasonic examination (UT) for periodic inspection and testing".*

Note 3: *The check of internal conditions of 6.2.1.6.1 b) and the hydraulic pressure test of 6.2.1.6.1 d) may be replaced by ultrasonic examination carried out in accordance with ISO 18119:2018 + Amd 1:2021 for seamless steel and seamless aluminium alloy cylinder shells.*

Note 4: *For bundles of cylinders the hydraulic test specified in d) above shall be carried out on the cylinder shells and on the manifolds.*

Note 5: *For the periodic inspection and test frequencies, see packing instruction P 200 of 4.1.4.1 or, for a chemical under pressure, packing instruction P 206 of 4.1.4.1.*

6.2.1.6.2 Cylinders intended for the carriage of UN No. 1001 acetylene, dissolved and UN No. 3374 acetylene, solvent free, shall be examined only as specified in 6.2.1.6.1 (a), (c) and (e). In addition the condition of the porous material (e.g. cracks, top clearance, loosening, settlement) shall be examined.

6.2.1.6.3 Pressure relief valves for closed cryogenic receptacles shall be subject to periodic inspections and tests.

6.2.1.7 Requirements for manufacturers

6.2.1.7.1 The manufacturer shall be technically able and shall possess all resources required for the satisfactory manufacture of pressure receptacles; this relates in particular to qualified personnel:

- a) To supervise the entire manufacturing process;
- b) To carry out joining of materials (e.g. welding);
- c) To carry out the relevant tests.

6.2.1.7.2 A proficiency test of the manufacturers of pressure receptacle shells and the inner vessels of closed cryogenic receptacle shall in all instances be carried out by an inspection body approved by the competent authority of the country of approval. Proficiency testing of manufacturers of closures shall be carried out if the competent authority requires it. This test shall be carried out either during design type approval or during production inspection and certification.

6.2.1.8 Requirements for inspection bodies

6.2.1.8.1 Inspection bodies shall be independent from manufacturing enterprises and competent to perform the tests, inspections and approvals required.

6.2.2 REQUIREMENTS FOR UN PRESSURE RECEPTACLES

In addition to the general requirements of section 6.2.1, UN pressure receptacles shall comply with the requirements of this section, including the standards, as applicable. Manufacture of new pressure receptacles or service equipment according to any particular standard in 6.2.2.1 and 6.2.2.3 is not permitted after the date shown in the right hand column of the Tables.

Note 1: *UN pressure receptacles constructed according to standards applicable at the date of manufacture may continue in use subject to the periodic inspection provisions of Annex 2 to SMGS.*

Note 2: *When EN ISO versions of the following ISO standards are available, they may be used to fulfill the requirements of 6.2.2.1, 6.2.2.2, 6.2.2.3 and 6.2.2.4.*

6.2.2.1 Design, construction and initial inspection and test

6.2.2.1.1 The following standards apply for the design, construction, and initial inspection and test of refillable UN cylinder shells, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

Standard Number	Standard Title	Applicable for manufacture

Standard Number	Standard Title	Applicable for manufacture
ISO 9809-1:1999	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa. Note: <i>The note concerning the F factor in section 7.3 of this standard shall not be applied for UN cylinders.</i>	Until 31 December 2018
ISO 9809 – 1:2010	Gas cylinders - Refillable seamless steel gas cylinders - Design, construction and testing - Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 MPa.	Until 31 December 2026
ISO 9809-1:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1 100 MPa	Until further notice
ISO 9809-2:2000	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 Mpa.	Until 31 December 2018
ISO 9809 - 2:2010	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa.	Until 31 December 2026
ISO 9809-2:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 2: Quenched and tempered steel cylinders and tubes with tensile strength greater than or equal to 1 100 MPa	Until further notice
ISO 9809-3:2000	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 3: Normalized steel cylinders.	Until 31 December 2018
ISO 9809-3:2010	Gas cylinders - Refillable seamless steel gas cylinders - Design, construction and testing - Part 3: Normalized steel cylinders.	Until 31 December 2026
ISO 9809-3:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 3: Normalized steel cylinders and tubes	Until further notice
ISO 9809-4:2014	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa.	Until 31 December 2028
ISO 9809-4:2021	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa Note: <i>Small quantities are a batch of cylinders not exceeding 200.</i>	Until further notice
ISO 7866:1999	Gas cylinders – Refillable seamless aluminium alloy gas cylinders – Design, construction and testing. Note: <i>The note concerning the F factor in section 7.2 of this standard shall not be applied for UN cylinders. Aluminium alloy 6351A - T6 or equivalent shall not be authorized.</i>	Until 31 December 2020
ISO 7866:2012 + Cor 1 : 2014	Gas cylinders – Refillable seamless aluminium alloy gas cylinders – Design, construction and testing. Note: <i>Aluminium alloy 6351A or equivalent shall not be authorized.</i>	Until further notice
ISO 4706:2008	Gas cylinders – Refillable welded steel cylinders – Test pressure 60 bar and below.	Until further notice
ISO 18172-1:2007	Gas cylinders – Refillable welded stainless steel cylinders – Part 1: Test pressure 6 MPa and below.	Until further notice
ISO 20703:2006	Gas cylinders – Refillable welded aluminium-alloy cylinders – Design, construction and testing.	Until further notice

Standard Number	Standard Title	Applicable for manufacture
ISO 11119-1:2002	Gas cylinders of composite construction – Specification and test methods – Part 1: Hoop wrapped composite gas cylinders.	Until 31 December 2020
ISO 11119-1:2012	Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l	Until 31 December 2028
ISO 11119-1:2020	Gas cylinders – Design, construction and testing of refillable composite gas cylinders and tubes – Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l	Until further notice
ISO 11119-2:2002	Gas cylinders of composite construction – Specification and test methods – Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners.	Until 31 December 2020
ISO 11119-1:2012 + Amd 1 : 2014	Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners	Until 31 December 2028
ISO 11119-2:2020	Gas cylinders – Design, construction and testing of refillable composite gas cylinders and tubes – Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners	Until further notice
ISO 11119-3:2002	Gas cylinders of composite construction – Specification and test methods – Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners. Note: <i>This standard shall not be used for linerless cylinders manufactured from two parts joined together.</i>	Until 31 December 2020
ISO 11119-3:2013	Gas cylinders of composite construction – Specification and test methods – Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners. Note: <i>This standard shall not be used for linerless cylinders manufactured from two parts joined together.</i>	Until 31 December 2028
ISO 11119-3:2020	Gas cylinders – Design, construction and testing of refillable composite gas cylinders and tubes – Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with non-load-sharing metallic or non-metallic liners or without liners	Until further notice
ISO 11119-4:2016	Gas cylinders – Refillable composite gas cylinders – Design, construction and testing – Part 4: Fully wrapped fibre reinforced composite gas cylinders up to 150 l with load-sharing welded metallic liners	Until further notice

Note 1: In the above referenced standards, composite cylinder shells shall be designed for a design life of not less than 15 years.

Note 2: Composite cylinder shells with a design life longer than 15 years shall not be filled after 15 years from the date of manufacture, unless the design has successfully passed a service life test programme. The programme shall be part of the initial design type approval and shall specify inspections and tests to demonstrate that composite cylinder shells manufactured accordingly remain safe to the end of their design life. The service life test programme and the results shall be approved by the competent authority of the country of approval that is responsible for the initial approval of the cylinder design. The service life of a composite cylinder shell shall not be extended beyond its initial approved design life.

6.2.2.1.2 The following standard apply for the design, construction, and initial inspection and test of UN tube shells, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

Standard Number	Standard Title	Applicable for manufacture
ISO 11120:1999	Gas cylinders – Refillable seamless steel tubes for compressed gas transport, of water capacity between 150 l and 3 000 l – Design, construction and testing <i>Note: The note concerning the F factor in section 7.1 of this standard shall not be applied for UN tubes.</i>	Until 31 December 2022
ISO 11120:2015	Gas cylinders – Refillable seamless steel tubes of water capacity between 150 litres and 3 000 litres – Design, construction and testing	Until further notice
ISO 11119-1:2012	Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l	Until 31 December 2028
ISO 11119-1:2020	Gas cylinders – Design, construction and testing of refillable composite gas cylinders and tubes – Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l	Until further notice
ISO 11119-2:2012 + Amd 1:2014	Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners	Until 31 December 2028
ISO 11119-2:2020	Gas cylinders – Design, construction and testing of refillable composite gas cylinders and tubes – Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners	Until further notice
ISO 11119-3:2013	Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with non-load-sharing metallic or non-metallic liners <i>Note: This standard shall not be used for linerless tubes manufactured from two parts joined together</i>	Until 31 December 2028
ISO 11119-3:2020	Gas cylinders – Design, construction and testing of refillable composite gas cylinders and tubes – Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with non-load-sharing metallic or non-metallic liners or without liners	Until further notice
ISO 11515:2013	Gas cylinders – Refillable composite reinforced tubes of water capacity between 450 l and 3 000 l – Design, construction and testing	Until 31 December 2026
ISO 11515:2013 + Amd 1:2018	Gas cylinders – Refillable composite reinforced tubes of water capacity between 450 l and 3000 l – Design, construction and testing	Until further notice
ISO 9809-1:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1 100 MPa	Until further notice
ISO 9809-2:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 2: Quenched and tempered steel cylinders and tubes with tensile strength greater than or equal to 1 100 MPa	Until further notice
ISO 9809-3:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 3: Normalized steel cylinders and tubes	Until further notice

Note 1: In the above referenced standards composite tube shells shall be designed for a design life of not less than 15 years.

Note 2: Composite tube shells with a design life longer than 15 years shall not be filled after 15 years from the date of manufacture, unless the design has successfully passed a service life test programme. The programme shall be part of the initial design type approval and shall specify inspections and tests to demonstrate that composite tube shells manufactured accordingly remain safe to the end of their design life. The service life test programme and the results shall be approved by the competent authority of the country of approval that is responsible for the initial approval of the cylinder design. The service life of a composite tube shell shall not be extended beyond its initial approved design life.

6.2.2.1.3 The following standards apply for the design, construction and initial inspection and test of UN acetylene cylinders, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

For the cylinder shell:

Standard Number	Standard Title	Applicable for manufacture
ISO 9809-1:1999	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa. Note: The note concerning the F factor in section 7.3 of this standard shall not be applied for UN cylinders.	Until 31 December 2018
ISO 9809-1:2010	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 MPa.	Until 31 December 2026
ISO 9809-1:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1 100 MPa	Until further notice
ISO 9809-3:2000	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 3: Normalized steel cylinders.	Until 31 December 2018
ISO 9809-3:2010	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 3: Normalized steel cylinders.	Until 31 December 2026
ISO 9809-3:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 3: Normalized steel cylinders and tubes	Until further notice
ISO 4706:2008	Gas cylinders – Refillable welded steel cylinders – Test pressure 60 bar and below	Until further notice
ISO 7866:2012 + Cor 1:2014	Gas cylinders – Refillable seamless aluminium alloy gas cylinders – Design, construction and testing Note: Aluminium alloy 6351A or equivalent shall not be used.	Until further notice

For the acetylene cylinder including the porous material:

Standard number	Standard Title	Applicable for manufacture
ISO 3807-1:2000	Cylinders for acetylene – Basic requirements – Part 1: Cylinders without fusible plugs.	Until further notice

ISO 3807-2:2000	Cylinders for acetylene – Basic requirements – Part 2: Cylinders with fusible plugs.	Until 31 December 2020
ISO 3807:2013	Gas cylinders – Acetylene cylinders – Basic requirements and type testing)	Until further notice

- 6.2.2.1.4** The following standard apply for the design, construction, and initial inspection and test of UN closed cryogenic receptacles, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

Standard Number	Standard Title	Applicable for manufacture
ISO 21029-1:2004	Cryogenic vessels – Transportable vacuum insulated vessels of not more than 1 000 l volume – Part 1: Design, fabrication, inspection and tests.	Until 31 December 2026
ISO 21029-1:2018 + Amd 1:2019	Cryogenic vessels – Transportable vacuum insulated vessels of not more than 1 000 litres volume – Part 1: Design, fabrication, inspection and tests	Until further notice

- 6.2.2.1.5** The following standard applies for the design, construction, and initial inspection and test of UN metal hydride storage systems, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

Standard number	Title	Applicable for manufacture
ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride.	Until 31 December 2026
ISO 16111:2018	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride	Until further notice

- 6.2.2.1.6** The following standard applies to the design, construction and initial inspection and test of UN bundles of cylinders. Each cylinder in a UN bundle of cylinders shall be a UN cylinder or UN cylinder shell complying with the requirements of 6.2.2. The inspection requirements related to the conformity assessment system and approval for UN bundles of cylinders shall be in accordance with 6.2.2.5.

Standard Number	Standard Title	Applicable for manufacture
ISO 10961:2010	Gas cylinders – Cylinder bundles – Design, manufacture, testing and inspection.	Until 31 December 2026
ISO 10961:2019	Gas cylinders – Cylinder bundles – Design, manufacture, testing and inspection	Until further notice

Note: *Changing one or more cylinders or cylinder shells of the same design type, including the same test pressure, in an existing UN bundle of cylinders does not require a new conformity assessment of the existing bundle. Service equipment of the bundle of cylinders can also be replaced without requiring a new conformity assessment if it complies with the design type approval.*

- 6.2.2.1.7** The following standards apply to the design, construction and initial inspection and test of UN cylinders for adsorbed gases except that the inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5.

Standard Number	Standard Title	Applicable for manufacture
ISO 11513:2011	Gas cylinders – Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) – Design, construction, testing, use and periodic inspection.	Until 31 December 2026

ISO 11513:2019	Gas cylinders – Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) – Design, construction, testing, use and periodic inspection	Until further notice
ISO 9809-1:2010	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 MPa.	Until 31 December 2026
ISO 9809-1:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1 100 MPa	Until further notice

6.2.2.1.8

The following standards apply for the design, construction and initial inspection and test of UN pressure drums, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5

Standard Number	Standard Title	Applicable for manufacture
ISO 21172-1:2015	Gas cylinders – Welded steel pressure drums up to 3 000 litres capacity for the transport of gases – Design and construction – Part 1: Capacities up to 1 000 litres <i>Note: Irrespective of section 6.3.3.4 of this standard, welded steel gas pressure drums with dished ends convex to pressure may be used for the carriage of corrosive substances provided all applicable requirements of Annex 2 to SMGS are met.</i>	Until 31 December 2026
ISO 21172-1:2015 + Amd 1:2018	Gas cylinders – Welded steel pressure drums up to 3 000 litres capacity for the transport of gases – Design and construction – Part 1: Capacities up to 1 000 litres	Until further notice
ISO 4706:2008	Gas cylinders – Refillable welded steel cylinders – Test pressure 60 bar and below	Until further notice
ISO 18172-1:2007	Gas cylinders – Refillable welded stainless steel cylinders – Part 1: Test pressure 6 MPa and below	Until further notice

6.2.2.1.9

The following standards apply to the design, construction and initial inspection and test of non-refillable UN cylinders except that the inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5.

Standard Number	Standard Title	Applicable for manufacture
ISO 11118:1999	Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods	Until 31 December 2020
ISO 13340:2001	Transportable gas cylinders – Cylinder valves for non-refillable cylinders – Specification and prototype testing	Until 31 December 2020
ISO 11118:2015	Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods	Until 31 December 2026
ISO 11118:2015 + Amd 1:2019	Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods	Until further notice

6.2.2.2 Materials

In addition to the material requirements specified in the pressure receptacle design and construction standards, and any restrictions specified in the applicable packing instruction for the gas(es) to be carried (e.g. packing instruction P 200 or P 205 of 4.1.4.1), the following standards apply to material compatibility:

Standard Number	Standard Title
ISO 11114-1:2020	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic materials.
ISO 11114-2:2021	Gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 2: Non-metallic materials

6.2.2.3 Closures and their protection

The following standards apply to the design, construction, and initial inspection and test of closures and their protection:

Standard Number	Standard Title	Applicable for manufacture
ISO 11117:1998	Gas cylinders – Valve protection caps and valve guards for industrial and medical gas cylinders – Design, construction and tests.	Until 31 December 2014
ISO 11117:2008 + Cor 1:2009	Gas cylinders – Valve protection caps and valve guards – Design, construction and tests.	Until 31 December 2026
ISO 11117:2019	Gas cylinders – Valve protection caps and guards – Design, construction and tests	Until further notice
ISO 10297:1999	Gas cylinders – Refillable gas cylinder valves – Specification and type testing.	Until 31 December 2014
ISO 10297:2006	Transportable gas cylinders – Cylinder valves – Specification and type testing.	Until 31 December 2020
ISO 10297:2014	Gas cylinders – Cylinder valves – Specification and type testing	Until 31 December 2022
ISO 10297:2014 + Amd 1:2017	Gas cylinders – Cylinder valves – Specification and type testing.	Until further notice
ISO 14246:2014	Gas cylinders – Cylinder valves – Manufacturing tests and examination	Until 31 December 2024
ISO 14246:2014 + Amd 1:2017	Gas cylinders – Cylinder valves – Manufacturing tests and examinations	Until further notice
ISO 17871:2015	Gas cylinders – Quick-release cylinders valves- Specification and type testing. Note: This standard shall not be used for flammable gases.	Until 31 December 2026
ISO 17879:2017	Gas cylinders – Self-closing cylinder valves – Specification and type testing Note: This standard shall not be applied to self-closing valves in acetylene cylinders.	Until further notice
ISO 23826:2021	Gas cylinders – Ball valves – Specification and testing	Until further notice

For UN metal hydride storage systems, the requirements specified in the following standard apply to closures and their protection:

Standard Number	Standard Title	Applicable for manufacture
ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride.	Until 31 December 2026
ISO 16111:2018	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride	Until further notice

6.2.2.4 Periodic inspection and test

The following standards apply to periodic inspection and testing of UN cylinders and UN pressure receptacles:

Standard Number	Standard Title	Applicable for manufacture
ISO 6406:2005	Periodic inspection and testing of seamless steel gas cylinders.	Until 31 December 2024
ISO 18119:2018	Gas cylinders – Seamless steel and seamless aluminium-alloy gas cylinders and tubes – Periodic inspection and testing	Until 31 December 2026
ISO 18119:2018 + Amd 1:2021	Gas cylinders – Seamless steel and seamless aluminium-alloy gas cylinders and tubes – Periodic inspection and testing	Until further notice
ISO 10460:2005	Gas cylinders – Welded carbon-steel gas cylinders – Periodic inspection and testing. Note: <i>The repair of welds described in clause 12.1 of this standard shall not be permitted. Repairs described in clause 12.2 require the approval of the competent authority which approved the periodic inspection and test body in accordance with 6.2.2.6 of Annex 2 to SMGS.</i>	Until 31 December 2024
ISO 10460:2018	Gas cylinders – Welded aluminium-alloy, carbon and stainless steel gas cylinders – Periodic inspection and testing	Until further notice
ISO 10461:2005 + Amd 1:2006	Seamless aluminium-alloy gas cylinders – Periodic inspection and testing.	Until 31 December 2024
ISO 10462:2013	Gas cylinders – Acetylene cylinders – Periodic inspection and maintenance	Until 31 December 2024
ISO 10462:2013 + Amd 1:2019	Gas cylinders – Acetylene cylinders – Periodic inspection and maintenance	Until further notice
ISO 11513:2011	Gas cylinders – Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) – Design, construction, testing, use and periodic inspection.	Until 31 December 2024
ISO 11513:2019	Gas cylinders – Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) – Design, construction, testing, use and periodic inspection	Until further notice
ISO 11623:2015	Gas cylinders – Composite construction – Periodic inspection and testing	Until further notice
ISO 22434:2006	Transportable gas cylinders – Inspection and maintenance of cylinder valves	Until further notice
ISO 20475:2018	Gas cylinders – Cylinder bundles – Periodic inspection and testing	Until further notice

ISO 23088:2020	Gas cylinders – Periodic inspection and testing of welded steel pressure drums — Capacities up to 1 000 l	Until further notice

The following standard applies to the periodic inspection and testing of UN metal hydride storage systems:

Standard Number	Standard Title	Applicable for manufacture
ISO 16111:2008	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride	Until 31 December 2024
ISO 16111:2018	Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride	Until further notice

6.2.2.5 Conformity assessment system and approval for manufacture of pressure receptacles

6.2.2.5.0 Definitions

For the purposes of 6.2.2.5:

Conformity assessment system means a system for competent authority approval of a manufacturer, by pressure receptacle design type approval, approval of manufacturer's quality system and approval of inspection bodies.

Design type means a pressure receptacle design as specified by a particular pressure receptacle standard.

Verify means confirm by examination or provision of objective evidence that specified requirements have been fulfilled.

NOTE: In subsection 6.2.2.5 when separate assessment is used, the term *pressure receptacle* shall refer to *pressure receptacle*, *pressure receptacle shell*, *inner vessel of the closed cryogenic receptacle* or *closure*, as appropriate.

6.2.2.5.1 The requirements of 6.2.2.5 shall be used for the conformity assessments of pressure receptacles. Paragraph 6.2.1.4.4 gives details of which parts of pressure receptacles may be conformity assessed separately. However, the requirements of 6.2.2.5 may be replaced by requirements specified by the competent authority in the following cases:

- Conformity assessment of closures;
- Conformity assessment of the complete assembly of bundles of cylinders provided the cylinder shells have been conformity assessed in accordance with the requirements of 6.2.2.5; and
- Conformity assessment of the complete assembly of closed cryogenic receptacles provided the inner vessel has been conformity assessed in accordance with the requirements of 6.2.2.5.

6.2.2.5.2 General requirements

Competent authority

6.2.2.5.2.1 The competent authority that approves the pressure receptacle shall approve the conformity assessment system for the purpose of ensuring that pressure receptacles conform to the requirements of Annex 2 to SMGS. In instances where the competent authority that approves a pressure receptacle is not the competent authority in the country of manufacture, the marks of the approval country and the country of manufacture shall be indicated in the pressure receptacle marking (see 6.2.2.7 and 6.2.2.8).

The competent authority of the country of approval shall supply, upon request, evidence demonstrating compliance to this conformity assessment system to its counterpart in a country of use.

6.2.2.5.2.2 The competent authority may delegate its functions in this conformity assessment system in whole or in part.

6.2.2.5.2.3 The competent authority shall ensure that a current list of approved inspection bodies and their identity marks and approved manufacturers and their identity marks is available.

Inspection body

- 6.2.2.5.2.4** The inspection body shall be approved by the competent authority for the inspection of pressure receptacles and shall:
- a) have a staff with an organisational structure, capable, trained, competent, and skilled, to satisfactorily perform its technical functions;
 - b) have access to suitable and adequate facilities and equipment;
 - c) operate in an impartial manner and be free from any influence which could prevent it from doing so;
 - d) ensure commercial confidentiality of the commercial and proprietary activities of the manufacturer and other bodies;
 - e) maintain clear demarcation between actual inspection body functions and unrelated functions;
 - f) operate a documented quality system;
 - g) ensure that the tests and inspections specified in the relevant pressure receptacle standard and Annex 2 to SMGS are performed;
 - h) maintain an effective and appropriate report and record system in accordance with 6.2.2.5.6.
- 6.2.2.5.2.5** The inspection body shall perform design type approval, pressure receptacle production testing and inspection, and certification to verify conformity with the relevant pressure receptacle standard (see 6.2.2.5.4 and 6.2.2.5.5).

Manufacturer

- 6.2.2.5.2.6** The manufacturer shall:
- a) operate a documented quality system in accordance with 6.2.2.5.3;
 - b) apply for design type approvals in accordance with 6.2.2.5.4;
 - c) select an inspection body from the list of approved inspection bodies maintained by the competent authority in the country of approval;
 - d) maintain records in accordance with 6.2.2.5.6.

Testing laboratory

- 6.2.2.5.2.7** The testing laboratory shall have:
- a) staff with an organisational structure, sufficient in number, competence, and skill;
 - b) suitable and adequate facilities and equipment to perform the tests required by the manufacturing standard to the satisfaction of the inspection body.

6.2.2.5.3 Manufacturer's quality system

- 6.2.2.5.3.1** The quality system shall contain all the elements, requirements, and provisions adopted by the manufacturer. It shall be documented in a systematic and orderly manner in the form of written policies, procedures and instructions and it shall include adequate descriptions of:
- a) the organisational structure and responsibilities of personnel with regard to design and product quality;
 - b) the design control and design verification techniques, processes, and procedures that will be used when designing the pressure receptacles;
 - c) the relevant pressure receptacle manufacturing, quality control, quality assurance and process operation instructions that will be used;
 - d) quality records, such as inspection reports, test data and calibration data;
 - e) management reviews to ensure the effective operation of the quality system arising from the audits in accordance with 6.2.2.5.3.2;
 - f) the process describing how customer requirements are met;
 - g) the process for control of documents and their revision;
 - h) the means for control of non-conforming pressure receptacles, purchased components, in-process and final materials;
 - i) training programmes and qualification procedures for relevant personnel.

6.2.2.5.3.2 Audit of the quality system

The quality system shall be initially assessed to determine whether it meets the requirements in 6.2.2.5.3.1 to the satisfaction of the competent authority.

The manufacturer shall be notified of the results of the audit. The notification shall contain the conclusions of the audit and any corrective actions required.

Periodic audits shall be carried out, to the satisfaction of the competent authority, to ensure that the manufacturer maintains and applies the quality system. Reports of the periodic audits shall be provided to the manufacturer.

6.2.2.5.3.3 Maintenance of the quality system

The manufacturer shall maintain the quality system as approved in order that it remains adequate and efficient.

The manufacturer shall notify the competent authority that approved the quality system, of any intended changes. The proposed changes shall be evaluated in order to determine whether the amended quality system will still satisfy the requirements in 6.2.2.5.3.1.

6.2.2.5.4 Approval process

Initial design type approval

6.2.2.5.4.1 The initial design type approval shall consist of approval of the manufacturer's quality system and approval of the pressure receptacle design to be produced. An application for an initial design type approval shall meet the requirements of 6.2.2.5.4.2 to 6.2.2.5.4.6 and 6.2.2.5.4.9.

6.2.2.5.4.2 A manufacturer desiring to produce pressure receptacles in accordance with a pressure receptacle standard and Annex 2 to SMGS shall apply for, obtain, and retain a design type approval certificate issued by the competent authority in the country of approval for at least one pressure receptacle design type in accordance with the procedure given in 6.2.2.5.4.9. This certificate shall, on request, be submitted to the competent authority of the country of use.

6.2.2.5.4.3 An application shall be made for each manufacturing facility and shall include:

- a) the name and registered address of the manufacturer and in addition, if the application is submitted by an authorised representative, its name and address;
- b) the address of the manufacturing facility if different from the above;
- c) the name and title of the persons) responsible for the quality system;
- d) the designation of the pressure receptacle and the relevant pressure receptacle standard;
- e) details of any refusal of approval of a similar application by any other competent authority;
- f) the identity of the inspection body for design type approval;
- g) documentation on the manufacturing facility as specified under 6.2.2.5.3.1;
- h) the technical documentation required for design type approval, which shall enable verification of the conformity of the pressure receptacles with the requirements of the relevant pressure receptacle design standard. The technical documentation shall cover the design and method of manufacture and shall contain, as far as is relevant for assessment, at least the following:
 - pressure receptacle design standard, design and manufacturing drawings, showing components and subassemblies, if any;
 - descriptions and explanations necessary for the understanding of the drawings and intended use of the pressure receptacles;
 - a list of the standards necessary to fully define the manufacturing process;
 - design calculations and material specifications;
 - design type approval test reports, describing the results of examinations and tests carried out in accordance with 6.2.2.5.4.9.

6.2.2.5.4.4 An initial audit in accordance with 6.2.2.5.3.2 shall be performed to the satisfaction of the competent authority.

6.2.2.5.4.5 If the manufacturer is denied approval, the competent authority shall provide written detailed reasons for such denial.

6.2.2.5.4.6 Following approval, changes to the information submitted under 6.2.2.5.4.3 relating to the initial approval shall be provided to the competent authority.

Subsequent design type approvals

6.2.2.5.4.7 An application for a subsequent design type approval shall meet the requirements of 6.2.2.5.4.8 and 6.2.2.5.4.9, provided a manufacturer is in the possession of an initial design type approval. In such a case, the manufacturer's quality system according to 6.2.2.5.3 shall have been approved during the initial design type approval and shall be applicable for the new design.

6.2.2.5.4.8 The application shall include:

- a) the name and address of the manufacturer and in addition, if the application is submitted by an authorised representative, its name and address;
- b) details of any refusal of approval of a similar application by any other competent authority;
- c) evidence that initial design type approval has been granted;
- d) the technical documentation, as described in 6.2.2.5.4.3 (h)

Procedure for design type approval

6.2.2.5.4.9 The inspection body shall:

- a) examine the technical documentation to verify that:
 - the design is in accordance with the relevant provisions of the standard
 - the prototype lot has been manufactured in conformity with the technical documentation and is representative of the design;
- b) verify that the production inspections have been carried out as required in accordance with 6.2.2.5.5;
- c) as required by the pressure receptacle standard or technical code, carry out or supervise the tests of pressure receptacles as required for design type approval;
- d) perform or have performed the examinations and tests specified in the pressure receptacle standard to determine that:
 - the standard has been applied and fulfilled,
 - the procedures adopted by the manufacturer meet the requirements of the standard;
- e) ensure that the various type approval examinations and tests are correctly and competently carried out.

After prototype testing has been carried out with satisfactory results and all applicable requirements of 6.2.2.5.4 have been satisfied, a design type approval certificate shall be issued, which shall include the name and address of the manufacturer, results and conclusions of the examination, and the necessary data for identification of the design type. If it was not possible to evaluate exhaustively the compatibility of the materials of construction with the contents of the pressure receptacle when the certificate was issued, a statement that compatibility assessment was not completed shall be included in the design type approval certificate.

If the manufacturer is denied a design type approval, the competent authority shall provide written detailed reasons for such denial.

6.2.2.5.4.10 Modifications to approved design types

The manufacturer shall either:

- a) inform the issuing competent authority of modifications to the approved design type, where such modifications do not constitute a new design, as specified in the pressure receptacle standard;
- or
- b) request a subsequent design type approval where such modifications constitute a new design according to the relevant pressure receptacle standard. This additional approval shall be given in the form of an amendment to the original design type approval certificate.

6.2.2.5.4.11 Upon request, the competent authority shall communicate to any other competent authority, information concerning design type approval, modifications of approvals and withdrawn approvals.

6.2.2.5.5 Production inspection and certification

General requirements

An inspection body, or its delegate, shall carry out the inspection and certification of each pressure receptacle. The inspection body selected by the manufacturer for inspection and testing during production may be different from the inspection body used for the design type approval testing.

Where it can be demonstrated to the satisfaction of the inspection body that the manufacturer has trained competent inspectors, independent of the manufacturing operations, inspection may be performed by those inspectors. In such a case, the manufacturer shall maintain training records of the inspectors.

The inspection body shall verify that the inspections by the manufacturer, and tests performed on those pressure receptacles, fully conform to the standard and the requirements of Annex 2 to SMGS. Should non-conformance in conjunction with this inspection and testing be determined, the permission to have inspection performed by the manufacturer's inspectors may be withdrawn.

The manufacturer shall, after approval by the inspection body, make a declaration of conformity with the certified design type. The application of the pressure receptacle certification marking shall be considered a declaration that the pressure receptacle complies with the applicable pressure receptacle standards and the requirements of this conformity assessment system and Annex 2 to SMGS. The inspection body shall affix or delegate the manufacturer to affix the pressure receptacle certification marking and the registered mark of the inspection body to each approved pressure receptacle.

A certificate of compliance, signed by the inspection body and the manufacturer, shall be issued before the pressure receptacles are filled.

6.2.2.5.6 Records

Design type approval and certificate of compliance records shall be retained by the manufacturer and the inspection body for not less than 20 years.

6.2.2.6 Approval system for periodic inspection and test of pressure receptacles

6.2.2.6.1 Definition

For the purposes of 6.2.2.6:

Approval system means a system for competent authority approval of a body performing periodic inspection and test of pressure receptacles (hereinafter referred to as "periodic inspection and test body"), including approval of that body's quality system.

6.2.2.6.2 General requirements

Competent authority

6.2.2.6.2.1 The competent authority shall establish an approval system for the purpose of ensuring that the periodic inspection and test of pressure receptacles conform to the requirements of Annex 2 to SMGS. In instances where the competent authority that approves a body performing periodic inspection and test of a pressure receptacle is not the competent authority of the country approving the manufacture of the pressure receptacle, the marks of the approval country of periodic inspection and test shall be indicated in the pressure receptacle marking (see 6.2.2.7).

The competent authority of the country of approval for the periodic inspection and test shall supply, upon request, evidence demonstrating compliance to this approval system including the records of the periodic inspection and test to its counterpart in a country of use.

The competent authority of the country of approval may terminate the approval certificate referred to in 6.2.2.6.4.1, upon evidence demonstrating non-compliance with the approval system.

6.2.2.6.2.2 The competent authority may delegate its functions in this approval system, in whole or in part.

6.2.2.6.2.3 The competent authority shall ensure that a current list of approved periodic inspection and test bodies and their identity marks is available.

Periodic inspection and test body

6.2.2.6.2.4 The periodic inspection and test body shall be approved by the competent authority and shall:

- a) have a staff with an organisational structure, capable, trained, competent, and skilled, to satisfactorily perform its technical functions;
- b) have access to suitable and adequate facilities and equipment;
- c) operate in an impartial manner and be free from any influence which could prevent it from doing so;
- d) ensure commercial confidentiality;
- e) maintain clear demarcation between actual periodic inspection and test body functions and unrelated functions;
- f) operate a documented quality system accordance with 6.2.2.6.3;
- g) apply for approval in accordance with 6.2.2.6.4;
- h) ensure that the periodic inspections and tests are performed in accordance with 6.2.2.6.5;
- i) maintain an effective and appropriate report and record system in accordance with 6.2.2.6.6.

6.2.2.6.3 Quality system and audit of the periodic inspection and test body

6.2.2.6.3.1 Quality system

The quality system shall contain all the elements, requirements, and provisions adopted by the periodic inspection and test body. It shall be documented in a systematic and orderly manner in the form of written policies, procedures, and instructions.

The quality system shall include:

- a) a description of the organisational structure and responsibilities;
- b) the relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;
- c) Quality records, such as inspection reports, test data, calibration data and certificates;

- d) Management reviews to ensure the effective operation of the quality system arising from the audits performed in accordance with 6.2.2.6.3.2;
- e) a process for control of documents and their revision;
- f) a means for control of non-conforming pressure receptacles;
- g) training programmes and qualification procedures for relevant personnel.

6.2.2.6.3.2 Audit

The periodic inspection and test body and its quality system shall be audited in order to determine whether it meets the requirements of Annex 2 to SMGS to the satisfaction of the competent authority.

An audit shall be conducted as part of the initial approval process (see 6.2.2.6.4.3). An audit may be required as part of the process to modify an approval (see 6.2.2.6.4.6).

Periodic audits shall be conducted, to the satisfaction of the competent authority, to ensure that the periodic inspection and test body continues to meet the requirements of Annex 2 to SMGS.

The periodic inspection and test body shall be notified of the results of any audit. The notification shall contain the conclusions of the audit and any corrective actions required.

6.2.2.6.3.3 Maintenance of the quality system

The periodic inspection and test body shall maintain the quality system as approved in order that it remains adequate and efficient.

The periodic inspection and test body shall notify the competent authority that approved the quality system, of any intended changes, in accordance with the process for modification of an approval in 6.2.2.6.4.6.

6.2.2.6.4 Approval process for periodic inspection and test bodies

Initial approval

6.2.2.6.4.1 A body desiring to perform periodic inspection and test of pressure receptacles in accordance with a pressure receptacle standard and Annex 2 to SMGS shall apply for, obtain, and retain an approval certificate issued by the competent authority.

This written approval shall, on request, be submitted to the competent authority of a country of use.

6.2.2.6.4.2 An application shall be made for each periodic inspection and test body and shall include:

- a) the name and address of the periodic inspection and test body and, if the application is submitted by an authorised representative, its name and address;
- b) the address of each facility performing periodic inspection and test;
- c) the name and title of the person(s) responsible for the quality system;
- d) the designation of the pressure receptacles, the periodic inspection and test methods, and the relevant pressure receptacle standards met by the quality system;
- e) Documentation on each facility, the equipment, and the quality system as specified under 6.2.2.6.3.1;
- f) the qualifications and training records of the periodic inspection and test personnel;
- g) Details of any refusal of approval of a similar application by any other competent authority.

6.2.2.6.4.3 The competent authority shall:

- a) examine the documentation to verify that the procedures are in accordance with the requirements of the relevant pressure receptacle standards and Annex 2 to SMGS;
- b) conduct an audit in accordance with 6.2.2.6.3.2 to verify that the inspections and tests are carried out as required by the relevant pressure receptacle standards and Annex 2 to SMGS, to the satisfaction of the competent authority.

6.2.2.6.4.4 After the audit has been carried out with satisfactory results and all applicable requirements of 6.2.2.6.4 have been satisfied, an approval certificate shall be issued. It shall include the name of the periodic inspection and test body, the registered mark, the address of each facility, and the necessary data for identification of its approved activities (e.g. designation of pressure receptacles, periodic inspection and test method and pressure receptacle standards).

6.2.2.6.4.5 If the periodic inspection and test body is denied approval, the competent authority shall provide written detailed reasons for such denial.

Modifications to periodic inspection and test body approvals

6.2.2.6.4.6 Following approval, the periodic inspection and test body shall notify the issuing competent authority of any modifications to the information submitted under 6.2.2.6.4.2 relating to the initial approval.

The modifications shall be evaluated in order to determine whether the requirements of the relevant pressure receptacle standards and Annex 2 to SMGS will be satisfied. An audit in accordance with 6.2.2.6.3.2 may be required. The competent authority shall accept or reject these modifications in writing, and an amended approval certificate shall be issued as necessary.

6.2.2.6.4.7 Upon request, the competent authority shall communicate to any other competent authority, information concerning initial approvals, modifications of approvals, and withdrawn approvals.

6.2.2.6.5 Periodic inspection and test and certification

The application of the periodic inspection and test marking to a pressure receptacle shall be considered a declaration that the pressure receptacle complies with the applicable pressure receptacle standards and the requirements of Annex 2 to SMGS. The periodic inspection and test body shall affix the periodic inspection and test marking, including its registered mark, to each approved pressure receptacle (see 6.2.2.7.7).

A record certifying that a pressure receptacle has passed the periodic inspection and test shall be issued by the periodic inspection and test body, before the pressure receptacle is filled.

6.2.2.6.6 Records

The periodic inspection and test body shall retain records of pressure receptacle periodic inspection and tests (both passed and failed) including the location of the test facility, for not less than 15 years.

The owner of the pressure receptacle shall retain an identical record until the next periodic inspection and test unless the pressure receptacle is permanently removed from service.

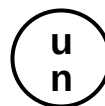
6.2.2.7 Marking of refillable UN pressure receptacles

Note: Marking requirements for UN metal hydride storage systems are given in 6.2.2.9 and marking requirements for UN bundles of cylinders are given in 6.2.2.10 and marking requirements for closures are given in 6.2.2.11.

6.2.2.7.1 Refillable UN pressure receptacle shells and closed cryogenic receptacles shall be marked clearly and legibly with certification, operational and manufacturing marks. These marks shall be permanently affixed to last throughout the entire service life of such receptacles (e.g. stamped, engraved, or etched) on the pressure receptacle. The marks shall be on the shoulder, top end or neck of the pressure receptacle shell or on a permanently affixed component of the pressure receptacle (e.g. welded collar or corrosion resistant plate welded on the outer jacket of a closed cryogenic receptacle). The minimum size of the marks shall be 5 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 2.5 mm for pressure receptacles with a diameter less than 140 mm. The minimum size of the UN packaging symbol shall be 10 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 5 mm for pressure receptacles with a diameter less than 140 mm.

6.2.2.7.2 The following certification marks shall be applied:

a) The United Nations packaging symbol



This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7 or 6.11. This symbol shall not be used for pressure receptacles which only conform to the requirements of 6.2.3 to 6.2.5 (see 6.2.3.9);

b) The technical standard (e.g. ISO 9809-1) used for design, manufacture and testing;

Note: For acetylene cylinders the standard ISO 3807 shall also be marked.

c) The character(s) identifying the country of approval as indicated by the distinguishing signs for motor vehicles in international traffic².

² Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

Note: For the purpose of this mark the country of approval means the country of the competent authority that authorized the initial inspection and test of the individual receptacle at the time of manufacture.

- d) The identity mark or stamp of the inspection body that is registered with the competent authority of the country authorizing the marking;
- e) The date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash (e.g. 2005/06).

Note: When an acetylene cylinder is conformity assessed in accordance with 6.2.1.4.4 b) and the inspection bodies for the cylinder shell and the acetylene cylinder are different, their respective marks d) are required. Only the initial inspection date e) of the completed acetylene cylinder is required. If the country of approval of the inspection body responsible for the initial inspection and test is different, a second mark c) shall be applied.

6.2.2.7.3

The following operational marks shall be applied:

- f) The test pressure in bar, preceded by the letters "PH" and followed by the letters "BAR";
- g) The mass of the empty pressure receptacle including all permanently attached integral parts (e.g. neck ring, foot ring, etc.) in kilograms, followed by the letters "KG". This mass shall not include the mass of closure(s), valve protection cap or valve guard, any coating, or porous material for acetylene. The mass shall be expressed to three significant figures rounded up to the last digit. For cylinders of less than 1 kg, the mass shall be expressed to two significant figures rounded up to the last digit. In the case of pressure receptacles for UN No. 1001 acetylene, dissolved and UN No. 3374 acetylene, solvent free, at least one decimal shall be shown after the decimal point and two digits for pressure receptacles of less than 1 kg;
- h) The minimum guaranteed wall thickness of the pressure receptacle in millimetres followed by the letters "MM". This mark is not required for pressure receptacles with a water capacity less than or equal to 1 litre or for composite cylinders or for closed cryogenic receptacles;
- i) In the case of pressure receptacles for compressed gases, UN No. 1001 acetylene, dissolved, and UN No. 3374 acetylene, solvent free, the working pressure in bar, preceded by the letters "PW". In the case of closed cryogenic receptacles, the maximum allowable working pressure preceded by the letters "MAWP";

Note: When a cylinder shell is intended for use as an acetylene cylinder (including the porous material), the working pressure mark is not required until the acetylene cylinder is completed.

- j) In the case of pressure receptacles for liquefied gases and refrigerated liquefied gases and dissolved gases, the water capacity in litres expressed to three significant figures rounded down to the last digit, followed by the letter "L". If the value of the minimum or nominal water capacity is an integer, the figures after the decimal point may be neglected;
- k) In the case of cylinders for UN No. 1001 acetylene, dissolved:
 - 1) the tare in kilograms consisting of the total of the mass of the empty cylinder shell, the service equipment (including porous material) not removed during filling, any coating, the solvent and the saturation gas expressed to three significant figures rounded down to the last digit followed by the letters "KG". At least one decimal shall be shown after the decimal point. For pressure receptacles of less than 1 kg, the mass shall be expressed to two significant figures rounded down to the last digit;
 - 2) the identity of the porous material (e.g.: name or trademark); and
 - 3) the total mass of the filled acetylene cylinder in kilograms followed by the letters "KG";
- (l) In the case of pressure receptacles for UN No. 3374 acetylene, solvent free:
 - 1) the tare in kilograms consisting of the total of the mass of the empty cylinder shell, the service equipment (including porous material) not removed during filling and any coating expressed to three significant figures rounded down to the last digit followed by the letters "KG". At least one decimal shall be shown after the decimal point. For pressure receptacles of less than 1 kg, the mass shall be expressed to two significant figures rounded down to the last digit;

- 2) the identity of the porous material (e.g.: name or trademark); and
- 3) the total mass of the filled acetylene cylinder in kilograms followed by the letters "KG";

6.2.2.7.4 The following manufacturing marks shall be applied:

- m) Identification of the cylinder thread (e.g. 25E). This mark is not required for closed cryogenic receptacles;

Note: Information on marks that may be used for identifying threads for cylinders is given in ISO/TR 11364 "Gas cylinders – Compilation of national and international valve stem/gas cylinder neck threads and their identification and marking system.

- n) The manufacturer's mark registered by the competent authority. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark shall be preceded by the character(s) identifying the country of manufacture as indicated by the distinguishing sign used on vehicles in international road traffic³. The country mark and the manufacturer's mark shall be separated by a space or slash;

Note: For acetylene cylinders, if the manufacturer of the acetylene cylinder and the manufacturer of the cylinder shell are different, only the mark of the manufacturer of the completed acetylene cylinder is required.

- o) The serial number assigned by the manufacturer;
- p) In the case of steel pressure receptacles and composite pressure receptacles with steel liner intended for the carriage of gases with a risk of hydrogen embrittlement, the letter "H" showing compatibility of the steel (see ISO 11114-1:2020).

6.2.2.7.5 The above marks shall be placed in three groups:

- Manufacturing marks shall be the top grouping and shall appear consecutively in the sequence given in 6.2.2.7.4;
- The operational marks in 6.2.2.7.3 shall be the middle grouping and the test pressure (f) shall be immediately preceded by the working pressure when the latter is required;
- Certification marks shall be the bottom grouping and shall appear in the sequence given in 6.2.2.7.2.

The following is an example of the markings applied to a cylinder.

(H)	(O)	(Π)	(P)	
25E	D MF	765432	H	
(И)	(e)	(Ж)	(К)	(З)
PW200	PH300BAR	62.1KG	50L	5.8MM
(a)	(б)	(B)	(Г)	(Д)
Ⓢ n	ISO 9809-1	F	IB	2000/12

6.2.2.7.6 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. In the case of closed cryogenic receptacles, such marks may be on a separate plate attached to the outer jacket. Such marks shall not conflict with required marks.

6.2.2.7.7 In addition to the preceding marks, each refillable pressure receptacle that meets the periodic inspection and test requirements of 6.2.2.4 shall be marked indicating:

³ Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

- a) The character(s) identifying the country authorizing the body performing the periodic inspection and test as indicated by the distinguishing sign used on vehicles in international road traffic⁴. This marking is not required if this body is approved by the competent authority of the country approving manufacture;
- b) The registered mark of the body authorised by the competent authority for performing periodic inspection and test;
- c) The date of the periodic inspection and test, the year (two digits) followed by the month (two digits) separated by a slash (i.e. "08/11"). Four digits may be used to indicate the year.

The above marks shall appear consecutively in the sequence given.

6.2.2.7.8 The marks in accordance with 6.2.2.7.7 may be engraved on a metallic ring affixed to the cylinder or pressure drum when the valve is installed, and which is removable only by disconnecting the valve from the cylinder or pressure drum.

6.2.2.7.9 (Reserved).

6.2.2.8 Marking of non-refillable UN cylinders

6.2.2.8.1 Non-refillable UN cylinders shall be marked clearly and legibly with certification and gas or cylinder specific marks. These marks shall be permanently affixed to last for the entire service life of the cylinder (e.g. stencilled, stamped, engraved, or etched) on the cylinder. Except when stencilled, the marks shall be on the shoulder, top end or neck of the cylinder shell or on a permanently affixed component of the cylinder (e.g. welded collar). The minimum size of the marks shall be 5 mm for cylinders with a diameter greater than or equal to 140 mm and 2.5 mm for cylinders with a diameter less than 140 mm. The minimum size of the UN packaging symbol shall be 10 mm for cylinders with a diameter greater than or equal to 140 mm and 5 mm for pressure receptacles with a diameter less than 140 mm. The minimum size of the "DO NOT REFILL" mark shall be 5 mm.

6.2.2.8.2 The marks listed in 6.2.2.7.2 to 6.2.2.7.4 shall be applied with the exception of (g), (h) and (m). The serial number (o) may be replaced by the batch number. In addition, the words "DO NOT REFILL" in letters of at least 5 mm in height are required.

6.2.2.8.3 The requirements of 6.2.2.7.5 shall apply.

Note: *Non-refillable cylinders may, on account of their size, substitute this marking by a label.*

6.2.2.8.4 Other marks are allowed provided they are made in low stress areas other than the side wall and are not of a size and depth that will create harmful stress concentrations. Such marks shall not conflict with required marks.

6.2.2.9 Marking of UN metal hydride storage systems

6.2.2.9.1 UN metal hydride storage systems shall be marked clearly and legibly with the marks listed below. These marks shall be permanently affixed (e.g. stamped, engraved, or etched) on the metal hydride storage system. The marks shall be on the shoulder, top end or neck of the metal hydride storage system or on a permanently affixed component of the metal hydride storage system. Except for the United Nations packaging symbol, the minimum size of the marks shall be 5 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm and 2.5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm. The minimum size of the United Nations packaging symbol shall be 10 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm and 5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm.

6.2.2.9.2 The following marking (marks) shall be applied:

- a) The United Nations packaging symbol



⁴ Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.11;

- b) «ISO 16111» (the technical standard used for design, manufacture and testing);
- c) The character(s) identifying the country of approval as indicated by the distinguishing sign used on vehicles in international road traffic⁵;

Note: *For the purpose of this mark the country of approval means the country of the competent authority that authorized the initial inspection and test of the individual system at the time of manufacture.*

- d) The identity mark or stamp of the inspection body that is registered with the competent authority of the country authorizing the marking;
- e) The date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash (e.g. 2009/07);
- f) The test pressure of the receptacle in bar, preceded by the letters "PH" and followed by the letters "BAR";
- g) The rated charging pressure of the metal hydride storage system in bar, preceded by the letters "RCP" and followed by the letters "BAR";
- h) The manufacturer's mark registered by the competent authority. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark shall be preceded by the character(s) identifying the country of manufacture as indicated by the distinguishing signs of motor vehicles in international traffic⁵. The country mark and the manufacturer's mark shall be separated by a space or slash;
- i) The serial number assigned by the manufacturer;
- j) In the case of steel receptacles and composite receptacles with steel liner, the letter "H" showing compatibility of the steel (see ISO 11114-1:2020);
- k) In the case of metal hydride storage systems having limited life, the date of expiry, denoted by the letters "FINAL" followed by the year (four digits) followed by the month (two digits) separated by a slash (e.g. 2015/08). The certification marks specified in (a) to (e) above shall appear consecutively in the sequence given. The test pressure (f) shall be immediately preceded by the rated charging pressure (g). The manufacturing marks specified in (h) to (k) above shall appear consecutively in the sequence given.

6.2.2.9.3 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. Such marks shall not conflict with required marks.

6.2.2.9.4 In addition to the preceding marks, each metal hydride storage system that meets the periodic inspection and test requirements of 6.2.2.4 shall be marked indicating:

- a) The character(s) identifying the country authorizing the body performing the periodic inspection and test, as indicated by the distinguishing sign used on vehicles in international road traffic⁶. This mark is not required if this body is approved by the competent authority of the country approving manufacture;
- b) The registered mark of the body authorised by the competent authority for performing periodic inspection and test;
- c) The date of the periodic inspection and test, the year (two digits) followed by the month (two digits) separated by a slash (i.e. 09/12). Four digits may be used to indicate the year.

The above marks shall appear consecutively in the sequence given.

6.2.2.10 Marking of UN bundles of cylinders

6.2.2.10.1 Individual cylinders in a bundle of cylinder shells shall be marked in accordance with 6.2.2.7. Individual closures in a bundle of cylinders shall be marked in accordance with 6.2.2.11.

6.2.2.10.2 Refillable UN bundles of cylinders shall be marked clearly and legibly with certification, operational, and manufacturing marks. These marks shall be permanently affixed (e.g. stamped, engraved, or etched) on a plate permanently attached to the frame of the bundle of cylinders. Except for the UN packaging symbol, the minimum size of the marks shall be 5 mm. The minimum size of the UN packaging symbol shall be 10 mm.

⁵ Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

⁶ Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

6.2.2.10.3 The following marks shall be applied:

- a) The certification marks specified in 6.2.2.7.2 a), b), c), d) and e);
- b) The operational marks specified in 6.2.2.7.3 f), i), j) and the total of the mass of the frame of the bundle and all permanently attached parts (cylinder shells and service equipment). Bundles intended for the carriage of UN 1001 acetylene, dissolved and UN 3374 acetylene, solvent free shall bear the tare as specified in clause B.4.2 of ISO 10961:2010; and
- c) The manufacturing marks specified in 6.2.2.7.4 n), o) and, where applicable, p).

6.2.2.10.4 The marks shall be placed in three groups:

- a) The manufacturing marks shall be the top grouping and shall appear consecutively in the sequence given in 6.2.2.10.3 c);
- b) The operational marks in 6.2.2.10.3 b) shall be the middle grouping and the operational mark specified in 6.2.2.7.3 f) shall be immediately preceded by the operational mark specified in 6.2.2.7.3 i) when the latter is required;
- c) Certification marks shall be the bottom grouping and shall appear in the sequence given in 6.2.2.10.3 a).

6.2.2.11 Marking of closures for refillable UN pressure receptacles

For closures the following permanent marks shall be applied clearly and legibly, (e.g. stamped, engraved or etched):

- a) Manufacturer's identification mark;
- b) Design standard or design standard designation;
- c) Date of manufacture (year and month or year and week) and
- d) The identity mark of the inspection body responsible for the initial inspection and test, if applicable.

The valve test pressure shall be marked when it is less than the test pressure which is indicated by the rating of the valve filling connection.

6.2.2.12 Equivalent procedures for conformity assessment and periodic inspection and test

For UN pressure receptacles the requirements of 6.2.2.5 and 6.2.2.6 are considered to have been complied with when the following procedures are applied:

Procedure	Relevant body
Type examination and type approval certificate issue A (1.8.7.2) ^a	
Supervision of manufacture (1.8.7.3) and initial A or IS inspection and tests (1.8.7.4)	
Periodic inspection (1.8.7.6)	A, B or IS

^a When an inspection body is designated by the competent authority to issue the type approval certificate, the type examination shall be performed by that inspection body.

Each procedure as defined in the table shall be performed by a single relevant body as indicated in the table.

For separate conformity assessments (e.g. cylinder shell and closure) see 6.2.1.4.4.

A means the competent authority or inspection body conforming to 1.8.6.3 and accredited according to EN ISO/IEC 17020:2012 (except clause 8.1.3) as type A.

B means inspection body conforming to 1.8.6.3 and accredited according to EN ISO/IEC 17020:2012 (except clause 8.1.3) type B, working exclusively for the owner or the duty holder responsible for the pressure receptacles.

IS means an in-house inspection service of the manufacturer or an enterprise with a testing facility under the surveillance of an inspection body conforming to 1.8.6.3 and 1.8.6.8 and accredited

according to EN ISO/IEC 17020:2012 (except clause 8.1.3) type A. The in-house inspection service shall be independent from design process, manufacturing operations, repair and maintenance.

If an in-house inspection service has been used for the initial inspection and tests, the mark specified in 6.2.2.7.2 d) shall be supplemented with the mark of the in-house inspection service.

If an in-house inspection service has carried out the periodic inspection, the mark specified in 6.2.2.7.7 b) shall be supplemented with the mark of the in-house inspection service.

6.2.3 GENERAL REQUIREMENTS FOR NON-UN PRESSURE RECEPTACLES

6.2.3.1 Design and construction

6.2.3.1.1 Pressure receptacles and their closures not designed, constructed, inspected, tested and approved according to the requirements of 6.2.2 shall be designed, constructed, inspected, tested and approved in accordance with the general requirements of 6.2.1 as supplemented or modified by the requirements of this section and those of 6.2.4 or 6.2.5.

6.2.3.1.2 Whenever possible the wall thickness shall be determined by calculation, accompanied, if needed, by experimental stress analysis. Otherwise the wall thickness may be determined by experimental means.

Appropriate design calculations for the pressure receptacles or pressure receptacle shells including all permanently attached parts (e.g. neck ring, foot ring, etc.) shall be used to ensure the safety of the pressure receptacles concerned.

The minimum wall thickness to withstand pressure shall be calculated in particular with regard to:

- the calculation pressures, which shall not be less than the test pressure;
- the calculation temperatures allowing for appropriate safety margins;
- the maximum stresses and peak stress concentrations where necessary;
- factors inherent to the properties of the material.

6.2.3.1.3 For welded pressure receptacles, only metals of weldable quality whose adequate impact strength at an ambient temperature of –20 °C can be guaranteed shall be used⁷.

6.2.3.1.4 For closed cryogenic receptacles, the impact strength to be established as required by 6.2.1.1.8.1 shall be tested as laid down in 6.8.5.3.

6.2.3.1.5 Acetylene cylinders shall not be fitted with fusible plugs or any other pressure relief devices.

6.2.3.2 (Reserved)

6.2.3.3 Service equipment

6.2.3.3.1 Service equipment shall comply with 6.2.1.3.

6.2.3.3.2 Pressure drums may be provided with openings for filling and discharge and with other openings intended for level gauges, pressure gauges or relief devices. The number of openings shall be kept to a minimum consistent with safe operations. Pressure drums may also be provided with an inspection opening, which shall be closed by an effective closure.

6.2.3.3.3 If cylinders are fitted with a device to prevent rolling, this device shall not be integral with the valve cap.

6.2.3.3.4 Pressure drums which are capable of being rolled shall be equipped with rolling hoops or be otherwise protected against damage due to rolling (e.g. by corrosion resistant metal sprayed on to the pressure receptacle surface).

6.2.3.3.5 Bundles of cylinders shall be fitted with appropriate devices ensuring that they can be handled and carried safely.

6.2.3.3.6 If level gauges, pressure gauges or relief devices are installed, they shall be protected in the same way as is required for valves in 4.1.6.8.

6.2.3.4 Initial inspection and test

6.2.3.4.1 New pressure receptacles shall be subjected to testing and inspection during and after manufacture in accordance with the requirements of 6.2.1.5.

⁷ For carriage to the Russian Federation or in transit through the territory of the Russian Federation in the period from 01.11 to 01.04 the ambient temperature amounts to – 50°C.

6.2.3.4.2 Specific provisions applying to aluminium alloy pressure receptacle shells

- a) In addition to the initial inspection required by 6.2.1.5.1, it is necessary to test for possible intercrystalline corrosion of the inside wall of the pressure receptacle shells where use is made of an aluminium alloy containing copper, or where use is made of an aluminium alloy containing magnesium and manganese and the magnesium content is greater than 3.5% or the manganese content lower than 0.5%.
- b) In the case of an aluminium/copper alloy the test shall be carried out by the manufacturer at the time of approval of a new alloy by the competent authority; it shall thereafter be repeated in the course of production, for each pour of the alloy.
- c) In the case of an aluminium/magnesium alloy the test shall be carried out by the manufacturer at the time of approval of a new alloy and of the manufacturing process by the competent authority. The test shall be repeated whenever a change is made in the composition of the alloy or in the manufacturing process.

6.2.3.5 Periodic inspection and test

6.2.3.5.1 Periodic inspection and test shall be in accordance with 6.2.1.6.

Note 1: *With the agreement of the competent authority of the country that issued the type approval, the hydraulic pressure test of welded steel cylinder shells intended for the carriage of gases of UN No. 1965, hydrocarbon gas mixture liquefied, n.o.s., with a capacity below 6.5 l may be replaced by another test ensuring an equivalent level of safety.*

Note 2: *For seamless steel cylinder shells and tube shells the check of 6.2.1.6.1 (b) and the hydraulic pressure test of 6.2.1.6.1 (d) may be replaced by a procedure conforming to EN ISO 16148:2016 +A1:2020 "Gas cylinders – Refillable seamless steel gas cylinders and tubes – Acoustic emission examination (AT) and follow-up ultrasonic examination (UT) for periodic inspection and testing".*

Note 3: *The check of 6.2.1.6.1 (b) and the hydraulic pressure test of 6.2.1.6.1 (d) may be replaced by ultrasonic examination carried out in accordance with EN ISO 18119:2018 + A1:2021 for cylinder shells and tube shells of seamless steel or seamless aluminium alloy. Notwithstanding clause B.1 of this standard, all cylinders and tubes whose wall thickness is less than the minimum design wall thickness shall be rejected.*

6.2.3.5.2 Closed cryogenic receptacles shall be subject to periodic inspections and tests in accordance with the periodicity defined in packing instruction P 203 (8) (b) of 4.1.4.1, in accordance with the following:

- a) Check of the external condition of the pressure receptacle and verification of the service equipment and the external markings;
- b) The leakproofness test.

6.2.3.6 Approval of pressure receptacles

6.2.3.6.1 The procedures for conformity assessment and periodic inspection of section 1.8.7 shall be performed by the relevant body according to the following Table.

Procedure	Relevant body
Type examination and type approval certificate issue (1.8.7.2) ^a	A
Supervision of manufacture (1.8.7.3) and initial inspection and tests (1.8.7.4)	A or IS
Initial inspection and tests (1.8.7.4)	A or IS
Periodic inspection (1.8.7.6)	A, B or IS

^a *The type approval certificate shall be issued by the inspection body that performed the type examination.*

Each procedure as defined in the table shall be performed by a single relevant body as indicated in the table. For separate conformity assessments (e.g. cylinder shell and closure) see 6.2.1.4.4. For

non-refillable pressure receptacles, separate type approval certificates for either the cylinder shell or the closure shall not be issued.

A means the competent authority or inspection body conforming to 1.8.6.3 and accredited according to EN ISO/IEC 17020:2012 (except clause 8.1.3) type A.

B means inspection body conforming to 1.8.6.3 and accredited according to EN ISO/IEC 17020:2012 (except clause 8.1.3) type B, working exclusively for the owner or the duty holder responsible for the pressure receptacles.

B means inspection body conforming to 1.8.6.2, 1.8.6.4, 1.8.6.5 and 1.8.6.8 and accredited according to EN ISO/IEC 17020:2012 (except clause 8.1.3) type B.

IS means an in-house inspection service of the manufacturer or an enterprise with a testing facility under the surveillance of an inspection body conforming to 1.8.6.3 and accredited according to EN ISO/IEC 17020:2012 (except clause 8.1.3) type A. The in-house inspection service shall be independent from design process, manufacturing operations, repair and maintenance.

If an in-house inspection service has been used for the initial inspection and tests, the mark specified in 6.2.2.7.2 d) shall be supplemented with the mark of the in-house inspection service.

If an in-house inspection service has carried out the periodic inspection, the mark specified in 6.2.2.7.7 b) shall be supplemented with the mark of the in-house inspection service.

6.2.3.6.2 If the country of approval is not a Contracting State to SMGS, the competent authority mentioned in 6.2.1.7.2 shall be the competent authority of a Contracting State to SMGS.

6.2.3.7 ***Requirements for manufacturers***

6.2.3.7.1 The relevant requirements of 1.8.7 shall be met.

6.2.3.8 ***Requirements for inspection bodies***

The requirements of 1.8.6.3 shall be met.

6.2.3.9 ***Marking of refillable pressure receptacles***

6.2.3.9.1 Markings shall be in accordance with sub-section 6.2.2.7 with the following variations.

6.2.3.9.2 The United Nations packaging symbol specified in 6.2.2.7.2 (a) shall not be applied.

6.2.3.9.3 The requirements of 6.2.2.7.3 (j) shall be replaced by the following:

- j) the water capacity of the pressure receptacle in litres followed by the letter "L". In the case of pressure receptacles for liquefied gases the water capacity in litres shall be expressed to three significant figures rounded down to the last digit. If the value of the minimum or nominal water capacity is an integer, the figures after the decimal point may be neglected.

The requirements of 6.2.2.7.4 (n) shall be replaced by the following:

- n) The manufacturer's mark. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark shall be preceded by the character(s) identifying the country of manufacture as indicated by the distinguishing sign used on vehicles in international road traffic³. The country mark and the manufacturer's mark shall be separated by a space or slash.

6.2.3.9.4 The marks specified in 6.2.2.7.3 g) and h) and 6.2.2.7.4 m) are not required for pressure receptacles for UN No. 1965 hydrocarbon gas mixture, liquefied, n.o.s.

6.2.3.9.5 When marking the date required by 6.2.2.7.7 (c), the month need not be indicated for gases for which the interval between periodic inspections is 10 years or more (see packing instructions P 200 and P 203 of 4.1.4.1).

6.2.3.9.6 The marks in accordance with 6.2.2.7.7 may be engraved on a ring of an appropriate material affixed to the cylinder when the valve is installed and which is removable only by disconnecting the valve from the cylinder.

6.2.3.9.7 Marking of bundles of cylinders

6.2.3.9.7.1 Individual cylinders in a bundle of cylinders shall be marked in accordance with 6.2.3.9.1 to 6.2.3.9.6.

6.2.3.9.7.2 Marking of bundles of cylinders shall be in accordance with 6.2.2.10.2 and 6.2.2.10.3, except that the United Nations packaging symbol specified in 6.2.2.7.2 a) shall not be applied.

6.2.3.9.7.3 In addition to the preceding marks, each bundle of cylinders that meets the periodic inspection and test requirements of 6.2.4.2 shall be marked indicating:

- a) The character(s) identifying the country authorizing the body performing the periodic inspection and test, as indicated by the distinguishing sign used on vehicles in international road traffic⁸. This marking is not required if this body is approved by the competent authority of the country approving manufacture;
- b) The registered mark of the body authorised by the competent authority for performing periodic inspection and test;
- c) The date of the periodic inspection and test, the year (two digits) followed by the month (two digits) separated by a slash (i.e. "yy/mm"). Four digits may be used to indicate the year.

The above marks shall appear consecutively in the sequence given either on the plate specified in 6.2.2.10.2 or on a separate plate permanently attached to the frame of the bundle of cylinders

6.2.3.9.8 Marking of closures for refillable pressure receptacles

6.2.3.9.8.1 Marking shall be in accordance with 6.2.2.11.

6.2.3.10 Markings of non-refillable cylinders

6.2.3.10.1 *Markings shall be in accordance with 6.2.2.8, except that the United Nations packaging symbol specified in 6.2.2.7.2 (a) shall not be applied.*

6.2.3.11 Salvage pressure receptacles

6.2.3.11.1 To permit the safe handling and disposal of the pressure receptacles carried within the salvage pressure receptacle, the design may include equipment not otherwise used for cylinders or pressure drums such as flat heads, quick opening devices and openings in the cylindrical part.

6.2.3.11.2 Instructions on the safe handling and use of the salvage pressure receptacle shall be clearly shown in the documentation for the application to the competent authority of the country of approval and shall form part of the approval certificate. In the approval certificate, the pressure receptacles authorized to be carried in a salvage pressure receptacle shall be indicated. A list of the materials of construction of all parts likely to be in contact with the dangerous goods shall also be included.

6.2.3.11.3 A copy of the approval certificate shall be delivered by the manufacturer to the owner of a salvage pressure receptacle.

6.2.3.11.4 The marking of salvage pressure receptacles according to 6.2.3 shall be determined by the competent authority of the country of approval taking into account suitable marking provisions of 6.2.3.9 as appropriate. The marking shall include the water capacity and test pressure of the salvage pressure receptacle.

6.2.4 Requirements for non-UN pressure receptacles designed, constructed and tested according to referenced standards

⁸ *Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.*

Note: *Persons or bodies identified in standards as having responsibilities in accordance with Annex 2 to SMGS, the responsibilities in accordance with Annex 2 to SMGS shall have priority.*

6.2.4.1 Design, construction and initial inspection and test

Since 1 January 2009 the use of the referenced standards has been mandatory in the EU countries that use RID. Exceptions are dealt with in 6.2.5.

Type approval certificates shall be issued in accordance with 1.8.7. For the issuance of a type approval certificate, only one document applicable according to the indication in column (4) shall be chosen from the table below.

Column (3) shows the paragraphs of Chapter 6.2 to which the document conforms.

Column (5) gives the latest date when existing type approvals shall be withdrawn according to 1.8.7.2.2.2; if no date is shown the type approval remains valid until it expires.

Documents shall be applied in accordance with 1.1.5. They shall be applied in full unless otherwise specified in the table below.

The scope of application of each document is defined in the scope clause of the document unless otherwise specified in the table below.

Note: *The words "cylinder", "tube" and "pressure drum" when used in these documents shall be understood to exclude closures except in the case of non-refillable cylinders.*

Normative-technical document number	Title of document	Requirements the standard complies with	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
for design and construction of pressure receptacles or pressure receptacle shells				
<i>The List</i> , Document No.23П		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.23M		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.21		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.2Б1		6.2.3.1 and 6.2.3.4	Between 1 July 2001 and 30 June 2007	As from 31 December 2012
<i>The List</i> , Document No.23Б2		6.2.3.1 and 6.2.3.4	Between 1 January 2007 and 31 December 2010	
<i>The List</i> , Document No.23Б3		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.19		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.19A1		6.2.1.1.9	Between 1 July 2001 and 31 December 2010	
<i>The List</i> , Document No.19A2		6.2.1.1.9	Between 1 January 2009 and 31 December 2016	
EN ISO 3807:2013	Gas cylinders – Acetylene cylinders – Basic requirements and type testing. Note: <i>Fusible plugs shall not be fitted.</i>	6.2.1.1.9	Until further notice	
<i>The List</i> , Document No. 233		6.2.3.1 and 6.2.3.4	Until 31 December 2014	
<i>The List</i> , Document No.23K1		6.2.3.1 and 6.2.3.4	Between 1 January 2009 and 31 December 2016	

Normative-technical document number	Title of document	Requirements the standard complies with	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
<i>The List, Document No.23K2</i>		6.2.3.1 and 6.2.3.4	Between 1 January 2009 and December 2016	
EN ISO 7866:2012 + AC:2014	Gas cylinders – Refillable seamless aluminium alloy gas cylinders – Design, construction and testing	6.2.3.1 and 6.2.3.4	Between 1 January 2015 and 31 December 2024	
EN ISO 7866:2012 + A1:2020	Gas cylinders – Refillable seamless aluminium alloy gas cylinders – Design, construction and testing	6.2.3.1 and 6.2.3.4	Until further notice	
EN ISO 11120:1999	Gas cylinders – Refillable seamless steel tubes for compressed gas transport of water capacity between 150 litres and 3 000 litres – Design, construction and testing.	6.2.3.1 and 6.2.3.4	Between 1 July 2001 and 30 June 2015	31 December 2015 for tubes marked with the letter "H" in accordance with 6.2.2.7.4 (p)
EN ISO 11120:1999 + A1:2013	Gas cylinders – Refillable seamless steel tubes for compressed gas transport of water capacity between 150 litres and 3000 litres – Design, construction and testing.	6.2.3.1 and 6.2.3.4	Between 1 January 2015 and 31 December 2020	
EN ISO 11120:2015	Gas cylinders – Refillable seamless steel tubes of water capacity between 150 litres and 3000 litres – Design, construction and testing	6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List, Document No.19Б</i>		6.2.3.1 and 6.2.3.4	Until 31 December 2026	
<i>The List, Document No.19В</i>		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List, Document No.19Г</i>		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List, Document No.19Д</i>	Transportable gas cylinders – Seamless, hoop wrapped composite cylinders.	6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List, Document No.19Е1</i>		6.2.3.1 and 6.2.3.4	Between 1 January 2005 and 31 December 2010	31 December 2012
<i>The List, Document No.19Е2</i>		6.2.3.1 and 6.2.3.4	Between 1 January 2009 and 31 December 2022	
<i>The List, Document No.19Е3</i>		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List, Document No.23И</i>		6.2.3.1 and 6.2.3.4	Until 31 December 2014	

Normative-technical document number	Title of document	Requirements the standard complies with	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
EN ISO 9809-1:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing – Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 MPa.	6.2.3.1 and 6.2.3.4	Between 1 January 2013 and 31 December 2022	
EN ISO 9809-1:2019	Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes - Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1100 MPa	6.2.3.1 and 6.2.3.4	Until further notice	
EN ISO 9809-2:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing – Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1100 MPa (ISO 9809-2:2010).	6.2.3.1 and 6.2.3.4	Until further notice	
EN ISO 9809-2:2019	Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes - Part 2: Quenched and tempered steel cylinders and tubes with tensile strength greater than or equal to 1100 MPa)	6.2.3.1 and 6.2.3.4	Until further notice	
EN ISO 9809-3:2010	Gas cylinders – Refillable seamless steel gas cylinders – Design, construction and testing – Part 3: Normalized steel cylinders	6.2.3.1 and 6.2.3.4	Between 1 January 2013 and 31 December 2022	
EN ISO 9809-3:2019	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 3: Normalized steel cylinders and tubes	6.2.3.1 and 6.2.3.4	Until further notice	
EN ISO 9809-4:2022	Gas cylinders – Design, construction and testing of refillable seamless steel gas cylinders and tubes – Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa <i>Note: Small quantities are a batch of cylinders not exceeding 200.</i>	6.2.3.1 and 6.2.3.4	Until further notice	
EN ISO 9809-3:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing – Part 3: Normalized steel cylinders (ISO 9809-3:2010).	6.2.3.1 and 6.2.3.4	Between 1 January 2013 and 31 December 2022	

Normative-technical document number	Title of document	Requirements the standard complies with	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
<i>The List</i> , Document No.19Ж		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.23B1		6.2.3.1 and 6.2.3.4	Until 1 July 2007	
<i>The List</i> , Document No.23B2		6.2.3.1 and 6.2.3.4	Between 1 January 2007 and 31 December 2026	Until further notice
<i>The List</i> , Document No. 23B3			6.2.3.1 and 6.2.3.4	Until further notice
<i>The List</i> , Document No. 1/31		6.2.3.1 and 6.2.3.4	Until 1 July 2007	
<i>The List</i> , Document No. 1932		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No. 19И1		6.2.3.1 and 6.2.3.4	Until 31 December 2014	31 December 2019, for cylinders and tubes without a liner, manufactured in two parts joined together; 31 December 2023, for cylinders for LPG
<i>The List</i> , Document No. 19И2		6.2.3.1 and 6.2.3.4	Between 1 January 2013 and 31 December 2024	31 December 2019 this standard is not applicable to cylinders and tubes without a liner, manufactured in two parts joined together; 31 December 2023, for cylinders for LPG
<i>The List</i> , Document No. 19И4		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No. 19И3		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No. 19К		6.2.3.1 and 6.2.3.4	Between 1 January 2005 and 31 December 2017	31 December 2018
EN ISO 11118:2015	Gas cylinders – Non-refillable metallic gas cylinders and test methods	6.2.3.1, 6.2.3.3 and 6.2.3.4	Between 1 January 2013 and 31 December 2024	
EN ISO 11118:2015 + A1:2020	Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods	6.2.3.1, 6.2.3.3 and 6.2.3.4	Until further notice	

Normative-technical document number	Title of document	Requirements the standard complies with	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
<i>The List</i> , Document No.19Л1		6.2.3.1 and 6.2.3.4	Until 31 December 2014	
<i>The List</i> , Document No.19Л2		6.2.3.1 and 6.2.3.4	Between 1 January 2013 and 31 December 2026	
<i>The List</i> , Document No. 19LZ		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.19M1		6.2.3.1 and 6.2.3.4	Between 1 January 2005 and 30 June 2007	
<i>The List</i> , Document No.19M2		6.2.3.1 and 6.2.3.4	Between 1 January 2007 and 31 December 2016	31 December 2023, for cylinders without a liner, manufactured from two parts joined together
<i>The List</i> , Document No.19M3		6.2.3.1 and 6.2.3.4	Between 1 January 2015 and 31 December 2024	31 December 2023, for cylinders without a liner, manufactured from two parts joined together
<i>The List</i> , Document No.19M4		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.19H		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.19O1		6.2.3.1 and 6.2.3.4	Between 1 January 2005 and 31 December 2010	
<i>The List</i> , Document No.19O2		6.2.3.1 and 6.2.3.4	Between 1 January 2007 and 31 December 2018	
<i>The List</i> , Document No.20		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.20A1		6.2.3.1 and 6.2.3.4	Until 1 July 2007	
<i>The List</i> , Document No.20A2		6.2.3.1 and 6.2.3.4	Until 31 December 2014	
EN ISO 10961: 2012	Gas cylinders – Cylinder bundles – Design, manufacture, testing and inspection.	6.2.3.1 and 6.2.3.4	Between 1 January 2013 and 31 December 2022	
EN ISO 10961: 2019	Gas cylinders – Cylinder bundles – Design, manufacture, testing and inspection.	6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.20B		6.2.3.1 and 6.2.3.4	Until further notice	

Normative-technical document number	Title of document	Requirements the standard complies with	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
<i>The List</i> , Document No.20B		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.20Г1		6.2.3.1 and 6.2.3.4	Between 1 January 2009 and 31 December 2016	
<i>The List</i> , Document No.20Г2		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No.20Г2		6.2.3.1 and 6.2.3.4	Until further notice	
for design and construction of closures				
<i>The List</i> , Document No. 23P1		6.2.3.1 and 6.2.3.3	Until 1 July 2003	As from 31 December 2014
<i>The List</i> , Document No. 23P2	Transportable gas cylinders – Cylinder valves: Specification and type testing.	6.2.3.1 and 6.2.3.3	Until 1 July 2007	As from 31 December 2016
EN ISO 10297:2006	Transportable gas cylinders – Cylinder valves: Specification and type testing.	6.2.3.1 and 6.2.3.3	Between 1 January 2009 and 31 December 2018	
EN ISO 10297:2014	Gas cylinders – Cylinder valves – Specification and type testing	6.2.3.1 and 6.2.3.3	Until further notice	Between 1 January 2015 and 31 December 2020
EN ISO 10297:2014 + A1:2017	Gas cylinders – Cylinder valves – Specification and type testing	6.2.3.1 and 6.2.3.3	Between 1 January 2019 and 31 December 2026	
EN ISO 10297:2024	Gas cylinders – Cylinder valves – Specification and type testing	6.2.3.1 and 6.2.3.3	Until further notice	
EN ISO 14245:2010	Gas cylinders — Specifications and testing of LPG cylinder valves — Self-closing	6.2.3.1 and 6.2.3.3	Between 1 January 2013 and 31 December 2022	
EN ISO 14245:2019	Gas cylinders — Specifications and testing of LPG cylinder valves — Self-closing	6.2.3.1 and 6.2.3.3	Between 1 January 2021 and 31 December 2024	
EN ISO 14245:2021	Gas Cylinders – Specifications and testing of LPG cylinder valves – Self-closing	6.2.3.1 and 6.2.3.3	Until further notice	
<i>The List</i> , Document No. 23Д1		6.2.3.1 and 6.2.3.3	Between 1 January 2005 and 31 December 2010	
<i>The List</i> , Document No. 23Д2		6.2.3.1 and 6.2.3.3	Between 1 January 2009 and 31 December 2014	
EN ISO 15995:2010	Gas cylinders — Specifications and testing of LPG cylinder valves — Manually operated	6.2.3.1 and 6.2.3.3	Between 1 January 2013 and 31 December 2022	

Normative-technical document number	Title of document	Requirements the standard complies with	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
EN ISO 15995:2019	Gas cylinders — Specifications and testing of LPG cylinder valves — Manually operated	6.2.3.1 and 6.2.3.3	Between 1 January 2021 and 31 December 2024	
EN ISO 15995:2021	Gas Cylinders – Specifications and testing of LPG cylinder valves – Manually operated	6.2.3.1 and 6.2.3.3	Until further notice	
<i>The List</i> , Document No. 23E1		6.2.3.1 and 6.2.3.3	Between 1 January 2005 and 31 December 2010	
EN 13153:2001+A1:2003	Specifications and testing of LPG – cylinder valves – Manually operated.	6.2.3.1 and 6.2.3.3	Between 1 January 2009 and 31 December 2014	
EN ISO 13340:2001	Transportable gas cylinders – Cylinder valves for non-refillable cylinders – Specification and prototype testing	6.2.3.1 and 6.2.3.3	Between 1 January 2011 and 31 December 2017	As from 31 December 2018
<i>The List</i> , Document No. 20Д		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> ”, Document No. 27		6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> ”, Document No. 28		6.2.3.1 and 6.2.3.3	Between 1 January 2017 and 31 December 2022	
<i>The List</i> ”, Document No. 28A		6.2.3.1 and 6.2.3.3	Between 1 January 2021 and 31 December 2024	
<i>The List</i> ”, Document No. 28A1		6.2.3.1 and 6.2.3.3	Until further notice	
EN ISO 17871:2015	Gas cylinders – Quick-release cylinder valves – Specification and type testing	6.2.3.1, 6.2.3.3 and 6.2.3.4	Between 1 January 2017 and 31 December 2021	
EN ISO 17871:2015 + A1:2018	Gas cylinders – Quick-release cylinder valves – Specification and type testing	6.2.3.1, 6.2.3.3 and 6.2.3.4	Between 1 January 2019 and 31 December 2024	
EN ISO 17871:2020	Gas cylinders – Quick-release cylinder valves – Specification and type testing	6.2.3.1, 6.2.3.3 and 6.2.3.4	Until further notice	
<i>The List</i> ”, Document No. 29		6.2.3.1, 6.2.3.3 and 6.2.3.4	Between 1 January 2017 and 31 December 2024	
<i>The List</i> ”, Document No. 29A0		6.2.3.1, 6.2.3.3 and 6.2.3.4	Until further notice	

Normative-technical document number	Title of document	Requirements the standard complies with	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
EN ISO 14246:2014	Gas cylinders – Cylinder valves – Manufacturing tests and examinations	6.2.3.1 and 6.2.3.4	Between 1 January 2015 and 31 December 2020	
EN ISO 14246:2014 + A1:2017	Gas cylinders – Cylinder valves – Manufacturing tests and examinations	6.2.3.1 and 6.2.3.4	Between 1 January 2019 and 31 December 2024	
EN ISO 14246:2022	Gas cylinders – Cylinder valves – Manufacturing tests and examinations	6.2.3.1 and 6.2.3.4	Until further notice	
EN ISO 17871:2017	Gas cylinders – Self-closing cylinder valves – Specification and type testing	6.2.3.1 and 6.2.3.4	Until further notice	
<i>The List</i> , Document No. 29A		6.2.3.1, 6.2.3.3 and 6.2.3.4	Until further notice	
EN ISO 23826:2021	Gas cylinders – Ball valves – Specification and testing	6.2.3.1 and 6.2.3.3	Effective as of 1 January 2025	
<i>The List</i> , Document No. 29B		6.2.3.1, 6.2.3.3 and 6.2.3.4	Until further notice	

6.2.4.2 Periodic inspection and test

The standards referenced in the table below shall be applied for the periodic inspection and test of pressure receptacles as indicated in column (3) to meet the requirements of 6.2.3.5. The standards shall be applied in compliance with 1.1.5.

The use of a referenced standard is mandatory in the EU Member States that use RID.

When a pressure receptacle is constructed in accordance with the provisions of 6.2.5, the procedure for periodic inspection if specified in the type approval shall be followed.

If more than one document is referenced for the application of the same requirements, the requirements of only one of them shall be applied in full.

The scope of application of each standard is defined in the scope clause of the standard unless otherwise specified in the Table below.

Normative-technical document number	Title of document	Applicable
(1)	(2)	(3)
<i>The List</i> , Document No. 30A		Until 31 December 2024
EN ISO 21029-2:2015	Cryogenic vessels – Transportable vacuum insulated vessels of not more than 1 000 litres volume – Part 2: Operational requirements Note: <i>Notwithstanding clause 14 of this standard, pressure relief valves shall be periodically inspected and tested at intervals not exceeding 5 years</i>	Mandatorily from 1 January 2025

Normative-technical document number	Title of document	Applicable
(1)	(2)	(3)
EN ISO 18119:2018	Gas cylinders - Seamless steel and seamless aluminium alloy gas cylinders and tubes - Periodic inspection and testing Note: <i>Notwithstanding B1 of this standard all tubes and cylinders shall be not allowed to be used whose thickness is less than a permissible minimum wall thickness.</i>	Until 31 January 2024
EN ISO 18119:2018 + A1:2021	Gas cylinders – Seamless steel and seamless aluminium-alloy gas cylinders and tubes – Periodic inspection and testing Note: <i>Notwithstanding clause B.1 of this standard, all cylinders and tubes whose wall thickness is less than the minimum design wall thickness shall be rejected.</i>	Mandatorily from 1 January 2025
EN ISO 10462:2013 + A1:2019	Gas cylinders – Acetylene cylinders - Periodic inspection and maintenance – Amendment 1	Until further notice
EN ISO 10460 : 2018	Gas cylinders – Welded aluminium-alloy, carbon and stainless steel gas cylinders – Periodic inspection and testing	Until further notice
EN ISO 11623:2015	Gas cylinders – Composite construction – Periodic inspection and testing	Until 31 December 2026
EN ISO 11623:2023	Gas cylinders – Composite construction – Periodic inspection and testing	Until further notice
EN ISO 22434:2011	Transportable gas cylinders – Inspection and maintenance of cylinder valves	Until 31 January 2024
EN ISO 22434:2022	Gas cylinders – Inspection and maintenance of valves	Mandatory from 1 July 2025
<i>The List, Document No. 30B</i>		Until 31 December 2024
EN ISO 23088:2020	<i>Gas cylinders – Periodic inspection and testing of welded steel pressure drums – Capacities up to 1 000 l</i>	Mandatory from 1 January 2025
<i>The List, Document No. 30</i>		Until 31 December 2024
<i>The List, Document No. 23X1</i>		Mandatory from 1 January 2025
<i>The List, Document No. 31A</i>		Until further notice
<i>The List, Document No. 32A0</i>		Until further notice
<i>The List, Document No. 32A</i>		Until 31 December 2024
EN ISO 20475:2020	Gas cylinders – Cylinder bundles – Periodic inspection and testing	Mandatory from 1 January 2025

6.2.5 REQUIREMENTS FOR NON-UN PRESSURE RECEPTACLES NOT DESIGNED, CONSTRUCTED AND TESTED ACCORDING TO REFERENCED STANDARDS SPECIFIED IN ANNEX 2 TO SMGS

Receptacles not designed, constructed and tested according to standards specified in 6.2.2 or 6.2.4 shall be designed, constructed and tested in accordance with technical codes providing the same level of safety and recognised by the competent authority. (This provision is not applicable for EU Member-States.

To reflect scientific and technical progress or where no standard is referenced in 6.2.2 or 6.2.4, or to deal with specific aspects not addressed in a standard referenced in 6.2.2 or 6.2.4, the competent authority may recognize the use of a technical code providing the same level of safety.

In the official type approval the issuing body shall specify the procedure for periodic inspections if the standards referenced in 6.2.2 or 6.2.4 are not applicable or shall not be applied.

The competent authority shall transmit to the OSJD Committee a list of the technical codes that it recognises. The list has to be updated in case of changes. The list should include the following details: name and date of the code, purpose of the code and details of where it may be obtained. The OSJD Committee shall make this information publicly available on its web-site.

A standard which has been adopted for reference in a future edition of Annex 2 to SMGS may be approved by the competent authority for use without notifying the OSJD Committee.

Non-un pressure receptacles not designed, constructed and tested according to standards shall meet requirements of 6.2.1, 6.2.3 and the following requirements:

Note: For this section, the references to technical standards in 6.2.1 shall be considered as references to technical codes.

6.2.5.1 Materials

The following provisions contain examples of materials that may be used to comply with the requirements for materials in 6.2.1.2:

- (a) Carbon steel for compressed, liquefied, refrigerated liquefied gases and dissolved gases as well as for substances not in Class 2 listed in Table 3 of packing instruction P 200 of 4.1.4.1;
- (b) Alloy steel (special steels), nickel, nickel alloy (such as monel) for compressed, liquefied, refrigerated liquefied gases and dissolved gases as well as for substances not in Class 2 listed in Table 3 of packing instruction P 200 of 4.1.4.1;
- (c) Copper for:
 - gases of classification codes 1A, 1O, 1F and 1TF, whose filling pressure referred to a temperature of 15 °C does not exceed 2 MPa (20 bar);
 - gases of classification code 2A and also UN No. 1033 dimethyl ether; UN No. 1037 ethyl chloride; UN No. 1063 methyl chloride; UN No. 1079 sulphur dioxide; UN No. 1085 vinyl bromide; UN No. 1086 vinyl chloride; and UN No. 3300 ethylene oxide and carbon dioxide mixture with more than 87% ethylene oxide;
 - gases of classification codes 3A, 3O and 3F;
- (d) Aluminum alloy: see special requirement "a" of packing instruction P 200 (10) of 4.1.4.1;
- (e) Composite material for compressed, liquefied, refrigerated liquefied gases and dissolved gases;
- (f) Synthetic materials for refrigerated liquefied gases;
- (g) Glass for the refrigerated liquefied gases of classification code 3A other than UN No. 2187 carbon dioxide, refrigerated, liquid or mixtures thereof, and gases of classification code 3O.

6.2.5.2 Service equipment

(Reserved)

6.2.5.3 Metal cylinders, tubes, pressure drums and bundles of cylinders

At the test pressure, the stress in the metal at the most severely stressed point of the pressure receptacle shell shall not exceed 77% of the guaranteed minimum yield stress (Re).

"Yield stress" means the stress at which a permanent elongation of 0.2% or, for austenitic steels, 1% of the gauge length on the test-piece, has been produced.

Note: In the case of sheet-metal the axis of the tensile test-piece shall be at right angles to the direction of rolling. The permanent elongation at fracture, shall be measured on a test-piece of circular cross-section in which the gauge length "l" is equal to five times the diameter "d" ($l = 5d$); if test pieces of rectangular cross-section are used, the gauge length "l" shall be calculated by the formula:

$$l = 5,65\sqrt{F_0}$$

Where F_0 indicates the initial cross-sectional area of the test-piece

Pressure receptacles shall be made of suitable materials which shall be resistant to brittle fracture and to stress corrosion cracking between $-20\text{ }^{\circ}\text{C}$ and $+50\text{ }^{\circ}\text{C}$ ⁹.

Welds shall be skillfully made and shall afford the fullest safety.

6.2.5.4 Additional provisions relating to aluminum-alloy pressure receptacles for compressed gases, liquefied gases, dissolved gases and non-pressurized gases subject to special requirements (gas samples) as well as articles containing gas under pressure other than aerosol dispensers and small receptacles containing gas (gas cartridges).

6.2.5.4.1 The materials of aluminum-alloy pressure receptacle shells which are to be accepted for carriage shall satisfy the following requirements:

Description of indicators	A Unalloyed aluminium, 99,5% pure	B Alloys of aluminium and magnesium	C Alloys of aluminium, silicon and magnesium, e.g. ISO/R209 Al-Si-Mg ("Aluminium Association" 6351)	D Alloys of aluminium, copper and magnesium
Tensile strength, R_m , MPa (N/mm ²)	49–186	196–372	196–372	343–490
Yield stress, R_e , MPa (N/mm ²) (permanent set $\lambda_g = 0.2\%$)	10–167	59–314	137–334	206–412
Permanent elongation at fracture ($l = 5d$), %	12–40	12–30	12–30	11–16
Bend test (diameter of former $d = n \times e$, where e is the thickness of the test piece)	$n=5(R_m \leq 98)$ $n=6(R_m > 98)$	$n=6(R_m \leq 325)$ $n=7(R_m > 325)$	$n=6(R_m \leq 325)$ $n=7(R_m > 325)$	$n=7(R_m \leq 392)$ $n=8(R_m > 392)$
Aluminium Association Series Number ^a	1 000	5 000	6 000	2 000

^a See "Aluminium Standards and Data", Fifth edition, January 1976, published by the Aluminium Association, 750 Third Avenue, New York.

The actual properties will depend on the composition of the alloy concerned and on the final treatment of the pressure receptacle shell, but whatever alloy is used the thickness of the pressure receptacle shell shall be calculated by one of the following formulae:

$$e = \frac{P_{MPa} D}{\frac{2Re}{1,3} + P_{MPa}} \quad \text{or} \quad e = \frac{P_{bar} D}{\frac{20Re}{1,3} + P_{bar}},$$

Where e = minimum thickness of pressure receptacle wall, in mm;

P_{MPa} = test pressure, in MPa;

⁹ For carriage to the Russian Federation or in transit through the territory of the Russian Federation in the period from 01.11 to 01.04 the ambient temperature amounts to $-50\text{ }^{\circ}\text{C}$.

- P_{bar} = test pressure, in bar;
 D = nominal external diameter of the pressure receptacle, in mm;
 R_e = guaranteed minimum proof stress with 0.2% proof stress, in MPa ($=\text{N/mm}^2$).

The value of the minimum guaranteed proof stress (R_e) introduced into the formula is in no case to be greater than 0.85 times the guaranteed minimum tensile strength (R_m), whatever the type of alloy used.

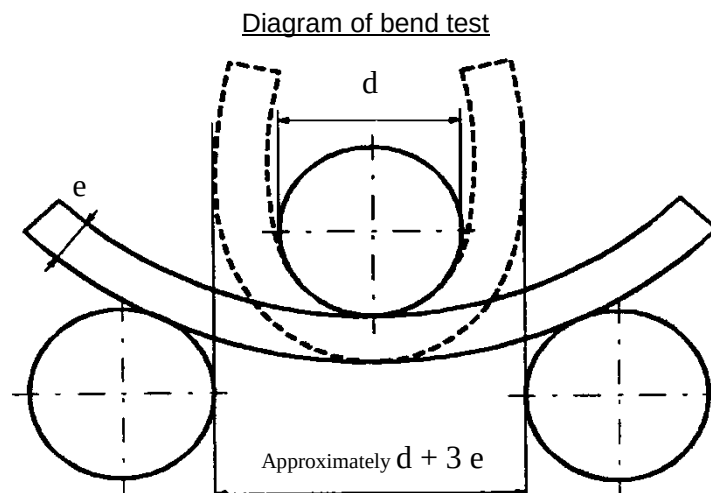
Note 1: (Reserved)

Note 2: The permanent elongation at fracture is measured by means of test-pieces of circular cross-section in which the gauge length "l" is equal to five times the diameter "d" ($l = 5d$); if test-pieces of rectangular section are used the gauge length shall be calculated by the formula:

$$l = 5,65\sqrt{F_0},$$

where F_0 – is the initial cross-section area of the test-piece.

- Note 3:** a) The bend test (see diagram) shall be carried out on specimens obtained by cutting into two equal parts of width $3e$, but in no case less than 25 mm, an annular section of a cylinder. The specimens shall not be machined elsewhere than on the edges;
- b) The bend test shall be carried out between a mandrel of diameter (d) and two circular supports separated by a distance of $(d + 3e)$. During the test the inner faces shall be separated by a distance not greater than the diameter of the mandrel.
- c) The specimen shall not exhibit cracks when it has been bent inwards around the mandrel until the inner faces are separated by a distance not greater than the diameter of the mandrel;
- d) The ratio (n) between the diameter of the mandrel and the thickness of the specimen shall conform to the values given in the Table.



- 6.2.5.4.2** A lower minimum elongation value is acceptable on condition that an additional test approved by the competent authority of the country in which the pressure receptacles are made proves that safety of carriage is ensured to the same extent as in the case of pressure receptacles constructed to comply with the characteristics given in the Table in 6.2.5.4.1 (see also EN ISO 7866:2012 + A1:2020).
- 6.2.5.4.3** The wall thickness of the pressure receptacles at the thinnest point shall be the following:
- where the diameter of the pressure receptacle is less than 50 mm: not less than 1.5 mm;

- where the diameter of the pressure receptacle is from 50 to 150 mm: not less than 2 mm; and
- where the diameter of the pressure receptacle is more than 150 mm: not less than 3 mm.

6.2.5.4.4 The ends of the pressure receptacles shall have a semicircular, elliptical or "basket-handle" section; they shall afford the same degree of safety as the body of the pressure receptacle.

6.2.5.5 *Pressure receptacles in composite materials*

For cylinders, tubes, pressure drums and bundles of cylinders which make use of composite materials, the construction shall be such that a minimum burst ratio (burst pressure divided by test pressure) is:

- 1.67 for hoop wrapped pressure receptacles;
- 2.00 for fully wrapped pressure receptacles.

6.2.5.6 *Closed cryogenic receptacles*

The following requirements apply to the construction of closed cryogenic receptacles for refrigerated liquefied gases:

6.2.5.6.1 If non-metallic materials are used, they shall resist brittle fracture at the lowest working temperature of the pressure receptacle and its fittings.

6.2.5.6.2 The pressure relief devices shall be so constructed as to work perfectly even at their lowest working temperature. Their reliability of functioning at that temperature shall be established and checked by testing each device or a sample of devices of the same type of construction.

6.2.5.6.3 The vents and pressure relief devices of pressure receptacles shall be so designed as to prevent the liquid from splashing out.

6.2.6 GENERAL REQUIREMENTS FOR AEROSOL DISPENSERS, SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES) AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS

6.2.6.1 Design and construction

6.2.6.1.1 Aerosol dispensers (UN No.1950 aerosols) containing only a gas or a mixture of gases, and small receptacles containing gas (gas cartridges) (UN No. 2037), shall be made of metal. This requirement shall not apply to aerosols and small receptacles containing gas (gas cartridges) with a maximum capacity of 100 ml for UN No. 1011 butane. Other aerosol dispensers (UN No.1950 aerosols) shall be made of metal, synthetic material or glass. Receptacles made of metal and having an outside diameter of not less than 40 mm shall have a concave bottom.

6.2.6.1.2 The capacity of receptacles made of metal shall not exceed 1 000 ml; that of receptacles made of synthetic material or of glass shall not exceed 500 ml.

6.2.6.1.3 Each model of receptacles (aerosol dispensers or cartridges) shall, before being put into service, satisfy a hydraulic pressure test carried out in conformity with 6.2.6.2.

6.2.6.1.4 The release valves and dispersal devices of aerosol dispensers (UN No.1950 aerosols) and the valves of UN No. 2037 small receptacles containing gas (gas cartridges) shall ensure that the receptacles are so closed as to be leakproof and shall be protected against accidental opening. Valves and dispersal devices which close only by the action of the internal pressure are not to be accepted.

6.2.6.1.5 The internal pressure of aerosol dispensers at 50 °C shall not exceed 1.2 MPa (12 bar) when using flammable liquefied gases, 1.32 MPa (13.2 bar) when using non-flammable liquefied gases, and 1.5 MPa (15 bar) when using non-flammable compressed or dissolved gases. In case of a mixture of several gases, the stricter limit shall apply. They shall be so filled that at 50 °C the liquid phase does not exceed 95% of their capacity. Small receptacles containing gas (gas cartridges) shall meet the test pressure and filling requirements of packing instruction P 200 of 4.1.4.1. In addition, the product of test pressure and water capacity shall not exceed 30 bar·litres for liquefied gases or 54 bar·litres for compressed gases and the test pressure shall not exceed 250 bar for liquefied gases or 450 bar for compressed gases.

6.2.6.2 Hydraulic pressure test

6.2.6.2.1 The internal pressure to be applied (test pressure) shall be 1.5 times the internal pressure at 50 °C, with a minimum pressure of 1 MPa (10 bar).

6.2.6.2.2 The hydraulic pressure tests shall be carried out on at least five empty receptacles of each model:

- a) until the prescribed test pressure is reached, by which time no leakage or visible permanent deformation shall have occurred;
- b) until leakage or bursting occurs; the dished end, if any, shall yield first and the receptacle shall not leak or burst until a pressure 1.2 times the test pressure has been reached or passed.

6.2.6.3 Tightness (leakproofness) test

Each filled aerosol dispenser or gas cartridge or fuel cell cartridge shall be subjected to a test in a hot water bath in accordance with 6.2.6.3.1 or an approved water bath alternative in accordance with 6.2.6.3.2.

6.2.6.3.1 Hot water bath test

6.2.6.3.1.1 The temperature of the water bath and the duration of the test shall be such that the internal pressure reaches that which would be reached at 55 °C (50 °C if the liquid phase does not exceed 95% of the capacity of the aerosol dispenser, gas cartridge or the fuel cell cartridge at 50 °C). If the contents are sensitive to heat or if the aerosol dispensers, gas cartridges or the fuel cell cartridges are made of plastics material which softens at this test temperature, the temperature of the bath shall be set at between 20 °C and 30 °C but, in addition, one aerosol dispenser, gas cartridge or the fuel cell cartridge in 2 000 shall be tested at the higher temperature.

6.2.6.3.1.2 No leakage or permanent deformation of an aerosol dispenser, gas cartridge or the fuel cell cartridge may occur, except that a plastic aerosol dispenser, gas cartridge or the fuel cell cartridge may be deformed through softening provided that it does not leak.

6.2.6.3.2 Quality system

With the approval of the competent authority alternative methods that provide an equivalent level of safety may be used provided that the requirements of 6.2.6.3.2.1 and, as appropriate, 6.2.6.3.2.2 or 6.2.6.3.2.3 are met.

6.2.6.3.2.1 Quality system

Aerosol dispenser, gas cartridge or the fuel cell cartridge fillers and component manufacturers shall have a quality system. The quality system shall implement procedures to ensure that all aerosol dispensers, gas cartridges or the fuel cell cartridges that leak or that are deformed are rejected and not offered for transport.

The quality system shall include:

- a) A description of the organizational structure and responsibilities;
- b) The relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;
- c) Quality records, such as inspection reports, test data, calibration data and certificates;
- d) Management reviews to ensure the effective operation of the quality system;
- e) A process for control of documents and their revision;
- f) A means for control of non-conforming aerosol dispensers, gas cartridges or the fuel cell cartridges;
- g) Training programmes and qualification procedures for relevant personnel; and
- h) Procedures to ensure that there is no damage to the final product.

An initial audit and periodic audits shall be conducted to the satisfaction of the competent authority. These audits shall ensure the approved system is and remains adequate and efficient. Any proposed changes to the approved system shall be notified to the competent authority in advance.

6.2.6.3.2.2 Aerosol dispensers

6.2.6.3.2.2.1 Pressure and leak testing of aerosol dispensers before filling

Each empty aerosol dispenser shall be subjected to a pressure equal to or in excess of the maximum expected in the filled aerosol dispensers at 55 °C (50 °C if the liquid phase does not exceed 95% of the capacity of the receptacle at 50 °C). This shall be at least two-thirds of the design pressure of the aerosol dispenser. If any aerosol dispenser shows evidence of leakage at a rate equal to or greater than 3.3×10^{-2} mbar·l·s⁻¹ at the test pressure, distortion or other defect, it shall be rejected.

6.2.6.3.2.2.2 Testing of the aerosol dispensers after filling

Prior to filling the filler shall ensure that the crimping equipment (equipment for aerosol packaging leakproofness) is set appropriately and the specified propellant is used.

Each filled aerosol dispenser shall be weighed and leak tested. The leak detection equipment shall be sufficiently sensitive to detect at least a leak rate of 2.0×10^{-3} mbar·l·s⁻¹ at 20 °C.

Any filled aerosol dispenser that shows evidence of leakage, deformation or excessive mass shall be rejected.

6.2.6.3.2.3 Gas cartridges and fuel cell cartridges

6.2.6.3.2.3.1 Pressure testing of gas cartridges and fuel cell cartridges

Each gas cartridge or fuel cell cartridge shall be subjected to a test pressure equal to or in excess of the maximum expected in the filled receptacle at 55 °C (50 °C if the liquid phase does not exceed 95% of the capacity of the receptacle at 50 °C). This test pressure shall be that specified for the gas cartridge or fuel cell cartridge and shall not be less than two thirds the design pressure of the gas cartridge or fuel cell cartridge. If any gas cartridge or fuel cell cartridge shows evidence of leakage at a rate equal to or greater than 3.3×10^{-2} mbar·l·s⁻¹ at the test pressure or distortion or any other defect, it shall be rejected.

6.2.6.3.2.3.2 Leak testing gas cartridges and fuel cell cartridges

Prior to filling and sealing, the filler shall ensure that the closures (if any), and the associated sealing equipment are closed appropriately and the specified gas is used.

Each filled gas cartridge or fuel cell cartridge shall be checked for the correct mass of gas and shall be leak tested. The leak detection equipment shall be sufficiently sensitive to detect at least a leak rate of 2.0×10^{-3} mbar·l·s⁻¹ at 20 °C.

Any gas cartridge or fuel cell cartridge that has gas masses not in conformity with the declared mass limits or shows evidence of leakage or deformation shall be rejected.

6.2.6.3.3 With the approval of the competent authority, aerosols and receptacles, small, are not subject to 6.2.6.3.1 and 6.2.6.3.2, if they are required to be sterile but may be adversely affected by water bath testing, provided:

- a) They contain a non-flammable gas and either
 - 1) contain other substances that are constituent parts of pharmaceutical products for medical, veterinary or similar purposes;
 - 2) contain other substances used in the production process for pharmaceutical products; or
 - 3) are used in medical, veterinary or similar applications;
- b) An equivalent level of safety is achieved by the manufacturer's use of alternative methods for leak detection and pressure resistance, such as helium detection and water bathing a statistical sample of at least 1 in 2000 from each production batch;
- c) For pharmaceutical products according to a) 1 and 3 above, they are manufactured under the authority of a national health administration. If required by the competent authority,

the principles of Good Manufacturing Practice (GMP) established by the World Health Organization (WHO)¹⁰ shall be followed.

6.2.6.4 Reference to standards

The requirements of section 6.2.6 are deemed to be met if the following standards are complied with:

- for aerosol dispensers (UN No. 1950 aerosols): Annex to Council Directive 75/324/EEC as amended and applicable at the date of manufacture;
- for UN No. 2037, small receptacles containing gas (gas cartridges) containing UN No. 1965, hydrocarbon gas mixture n.o.s, liquefied: EN 417:2012 (Non-refillable metallic gas cartridges for liquefied petroleum gases, with or without a valve, for use with portable appliances - Construction, inspection, testing and marking).

¹⁰ WHO publication "Quality assurance of pharmaceuticals. A compendium of guidelines and related materials. Volume 2: Good manufacturing practices and inspection".

CHAPTER 6.3

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PACKAGINGS FOR CLASS 6.2 INFECTIOUS SUBSTANCES OF CATEGORY A (UN Nos. 2814 and 2900)

Note: *The requirements of this Chapter don't apply to packagings used for the carriage of Class 6.2 substances according to packing instruction P621 of 4.1.4.1*

6.3.1 GENERAL

6.3.1.1 The requirements of this Chapter apply to packagings intended for the carriage of infectious substances of Category A. (UN Nos. 2814 and 2900)

6.3.2 REQUIREMENTS FOR PACKAGINGS

6.3.2.1 The requirements for packagings in this section are based on packagings, as specified in 6.1.4, currently used. In order to take into account progress in science and technology, there is no objection to the use of packagings having specifications different from those in this Chapter, provided that they are equally effective, acceptable to the competent authority and able to successfully fulfill the requirements described in 6.3.5. Methods of testing other than those described in Annex 2 to SMGS are acceptable, provided they are equivalent, and are recognized by the competent authority.

6.3.2.2 Packagings shall be manufactured and tested under a quality assurance programme which satisfies the competent authority in order to ensure that each packaging meets the requirements of this Chapter.

Note: *ISO 16106:2020 "Transport packaging – Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001) provides acceptable guidance on procedures which may be followed.*

6.3.2.3 Manufacturers and subsequent distributors of packagings shall provide information regarding procedures to be followed and a description of the types and dimensions of closures (including required gaskets) and any other components needed to ensure that packages as presented for carriage are capable of passing the applicable performance tests of this Chapter.

6.3.3 Code for designating types of packagings

6.3.3.1 The codes for designating types of packagings are set out in 6.1.2.7.

6.3.3.2 The letters "U" or "W" may follow the packaging code. The letter "U" signifies a special packaging conforming to the requirements of 6.3.5.1.6. The letter "W" signifies that the packaging, although, of the same type indicated by the code is manufactured to a specification different from that in 6.1.4 and is considered equivalent under the requirements of 6.3.2.1.

6.3.4 MARKING

Note 1: *The marks indicates that the packaging which bears it corresponds to a successfully tested design type and that it complies with the requirements of this Chapter which are related to the manufacture, but not to the use, of the packaging.*

Note 2: *The marks are intended to be of assistance to packaging manufacturers reconditioners, packaging users, carriers and regulatory authorities.*

Note 3: The marks do not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, to test reports or to a register of successfully tested packagings.

- 6.3.4.1** Each packaging intended for use according to Annex 2 to SMGS shall bear the marks which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. Letters, numerals and symbols shall be at least 12 mm high, except for packagings of 30 litres capacity or less or of 30 kg maximum net mass, when they shall be at least 6 mm in height and except for packagings of 5 litres capacity or less or of 5 kg maximum net mass when they shall be of an appropriate size
- 6.3.4.2** A packaging that meets the requirements of this section and of 6.3.5 shall, upon the respective decision of the competent authority, be marked with:

- a) the United Nations packaging symbol .
This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6 or 6.7;
- b) the code designating the type of packaging according to the requirements of 6.1.2;
- c) the text "CLASS 6.2";
- d) the last two digits of the year of manufacture of the packaging;
- e) the state authorizing the allocation of the mark, indicated by the distinguishing sign used on vehicles in international road traffic¹;
- f) the name of the manufacturer or other identification of the packaging specified by the competent authority;
- g) for packagings meeting the requirements of 6.3.5.1.6, the letter "U", inserted immediately following the marking required in (b) above.

- 6.3.4.3** Marks shall be applied in the sequence shown in 6.3.4.2 (a) to (g); each mark required in these sub-paragraphs shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable.

Any additional marks authorized by a competent authority shall still enable the marks required in 6.3.4.1 to be correctly identified.

6.3.4.4 Example of marking:



4G/CLASS 6.2/06 as in 6.3.4.2 a), b), c) and d)
RU/WS-7326-KMK as in 6.3.4.2 e) и f)

6.3.5 TEST REQUIREMENTS FOR PACKAGINGS

6.3.5.1 Performance and frequency of tests

- 6.3.5.1.1** The design type of each packaging shall be tested as provided in this section in accordance with procedures established by the competent authority allowing the allocation of the mark and shall be approved by this competent authority.

- 6.3.5.1.2** Each packaging design type shall successfully pass the tests prescribed in this Chapter before being used. A packaging design type is defined by the design, size,

¹ Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

material and thickness, manner of construction and packing, but may include various surface treatments. It may also include packagings which differ from the design type only in their lesser design height.

6.3.5.1.3 Tests shall be repeated on production samples at intervals established by the competent authority.

6.3.5.1.4 Tests shall also be repeated after each modification which alters the design, material or manner of construction of a packaging.

6.3.5.1.5 The competent authority may permit the selective testing of packagings that differ only in minor respects from a tested type, e.g. smaller sizes or lower net mass of primary receptacles; and packagings such as drums and boxes which are produced with small reductions in external dimensions.

6.3.5.1.6 Primary receptacles of any type may be assembled within a secondary packaging and carried without testing in the rigid outer packaging under the following conditions:

- a) The rigid outer packaging shall have been successfully tested in accordance with 6.3.5.2.2 with fragile (e.g. glass) primary receptacles;
- b) The total combined gross mass of primary receptacles shall not exceed one half the gross mass of primary receptacles used for the drop test in a) above;
- c) The thickness of cushioning between primary receptacles and between primary receptacles and the outside of the secondary packaging shall not be reduced below the corresponding thicknesses in the originally tested packaging; and if a single primary receptacle was used in the original test, the thickness of cushioning between primary receptacles shall not be less than the thickness of cushioning between the outside of the secondary packaging and the primary receptacle in the original test. When either fewer or smaller primary receptacles are used (as compared to the primary receptacles used in the drop test), sufficient additional cushioning material shall be used to take up the void spaces;
- d) The rigid outer packaging shall have successfully passed the stacking test in 6.1.5.6 while it is empty. The total mass of identical packages shall be based on the combined mass of packagings used in the drop test in (a) above;
- e) For primary receptacles containing liquids, an adequate quantity of absorbent material to absorb the entire liquid content of the primary receptacles shall be present;
- f) If the rigid outer packaging is intended to contain primary receptacles for liquids and is not leakproof, or is intended to contain primary receptacles for solids and is not siftproof, a means of containing any liquid or solid contents in the event of leakage shall be provided in the form of a leakproof liner, plastics bag or other equally effective means of containment;
- g) In addition to the marks prescribed in 6.3.4.2 (a) to (f), packagings shall be marked in accordance with 6.3.4.2 (g).

6.3.5.1.7 The competent authority may at any time require proof, by tests in accordance with this section, that serially-produced packagings meet the requirements of the design type tests.

6.3.5.1.8 Provided the validity of the test results is not affected and with the approval of the competent authority, several tests may be made on one sample.

6.3.5.2 Preparation of packagings for testing

6.3.5.2.1 Samples of each packaging shall be prepared as for carriage, except that a liquid or solid infectious substance shall be replaced by water or, where conditioning at –18 °C is specified, by water/antifreeze. Each primary receptacle shall be filled to not less than 98 % of its capacity.

Note: The term “water” includes water/antifreeze solution with a minimum specific gravity of 950 kg/m³ for testing at –18 °C.

6.3.5.2.2 Tests and number of samples required

Tests required for packaging types

Type of packaging ^a			Tests required					
Rigid outer packaging	Primary receptacle		Water spray 6.3.5.3.5.1	Cold conditioning 6.3.5.3.5.2	Drop 6.3.5.3	Additional drop 6.3.5.3.5.3	Puncture 6.3.5.4	Stacking 6.1.5.6
	Plastics	Other	No. of samples	No. of samples	No. of samples	No. of samples	No. of samples	No. of samples
Fibreboard box	x		5	5	10	1 (When dry ice is used)	2	3 (When testing a "U"-marked packaging as defined in 6.3.5.1.6 for specific provisions)
		x	5	0	5		2	
Fibreboard drum	x		3	3	6		2	
Plastics box		x	3	0	3		2	
	x		0	5	5		2	
Plastics drum/jerrican		x	0	5	5		2	
	x		0	3	3		2	
Boxes of other material		x	0	3	3		2	
	x		0	5	5		2	
Drums/jerricans of other material		x	0	0	5		2	
	x		0	3	3		2	
		x	0	0	3		2	

^a "Type of packaging" categorizes packagings for test purposes according to the kind of packaging and its material characteristics.

Note 1: In instances where a primary receptacle is made of two or more materials, the material most liable to damage determines the appropriate test.

Note 2: The material of the secondary packagings is not taken into consideration when selecting the test or conditioning for the test.

Explanation for use of the Table:

If the packaging to be tested consists of a fibreboard outer box with a plastics primary receptacle, five samples must undergo the water spray test (see 6.3.5.3.5.1) prior to dropping and another five must be conditioned to –18 °C (see 6.3.5.3.5.2) prior to dropping. If the packaging is to contain dry ice then one further single sample shall be dropped in accordance with 6.3.5.3.5.3.

Packagings prepared as for carriage shall be subjected to the tests in 6.3.5.3 and 6.3.5.4. For outer packagings, the headings in the Table relate to fibreboard or similar materials whose performance may be rapidly affected by moisture; plastics which may embrittle at low temperature; and other materials such as metal whose performance is not affected by moisture or temperature.

6.3.5.3 Drop test

6.3.5.3.1 Drop height and target

Samples shall be subjected to free-fall drops from a height of 9 m onto a non-resilient, horizontal, flat, massive and rigid surface in conformity with 6.1.5.3.4.

6.3.5.3.2 Number of test samples and drop orientation

6.3.5.3.2.1 Where the samples are in the shape of a box, five shall be dropped one in each of the following orientations:

- a) flat on the base;
- b) flat on the top;
- c) flat on the longest side;
- d) flat on the shortest side;
- e) on a corner.

6.3.5.3.2.2 Where the samples are in the shape of a drum or a jerrican, three shall be dropped one in each of the following orientations:

- a) diagonally on the top edge, with the centre of gravity directly above the point of impact;
- b) diagonally on the base edge;
- c) flat on the body or side.

6.3.5.3.3 While the sample shall be released in the required orientation, it is accepted that for aerodynamic reasons the impact may not take place in that orientation.

6.3.5.3.4 Following the appropriate drop sequence, there shall be no leakage from the primary receptacle(s) which shall remain protected by cushioning/absorbent material in the secondary packaging.

6.3.5.3.5 *Special preparation of test sample for the drop test*

6.3.5.3.5.1 Fibreboard – Water spray test

Fibreboard outer packagings: The sample shall be subjected to a water spray that simulates exposure to rainfall of approximately 5 cm per hour for at least one hour. It shall then be subjected to the test described in 6.3.5.3.1.

6.3.5.3.5.2 Plastics material – Cold conditioning

Plastics primary receptacles or outer packagings: the temperature of the test sample and its contents shall be reduced to $-18\text{ }^{\circ}\text{C}$ or lower for a period of at least 24 hours and within 15 minutes of removal from that atmosphere the test sample shall be subjected to the test described in 6.3.5.3.1. Where the sample contains dry ice, the conditioning period shall be reduced to 4 hours.

6.3.5.3.5.3 Packagings intended to contain dry ice shall be subjected to additional drop test.

Where the packaging is intended to contain dry ice, a test additional to that specified in 6.3.5.3.1 and, when appropriate, in 6.3.5.3.5.1 or 6.3.5.3.5.2 shall be carried out. One sample shall be stored so that all the dry ice dissipates and then that sample shall be dropped in one of the orientations described in 6.3.5.3.2.1 or in 6.3.5.3.2.2, as appropriate, which shall be that most likely to result in failure of the packaging.

6.3.5.4 Puncture test

6.3.5.4.1 *Packagings with a gross mass of 7 kg or less*

Samples shall be placed on a level hard surface. A cylindrical steel rod with a mass of at least 7 kg, a diameter of 38 mm and whose impact end edges have a radius not exceeding 6 mm (see Figure 6.3.5.4.2), shall be dropped in a vertical free fall from a height of 1 m, measured from the impact end to the impact surface of the sample. One sample shall be placed on its base. A second sample shall be placed in an orientation perpendicular to that used for the first. In each instance the steel rod shall be aimed to impact the primary

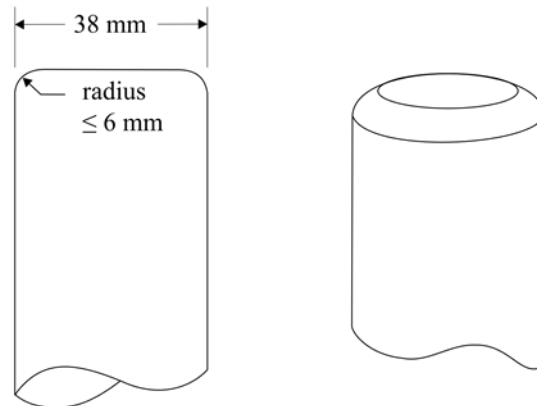
receptacle. Following each impact, penetration of the secondary packaging is acceptable, provided that there is no leakage from the primary receptacle(s).

6.3.5.4.2 *Packagings with a gross mass exceeding 7 kg*

Samples shall be dropped on to the end of a cylindrical steel rod. The rod shall be set vertically in a level hard surface. It shall have a diameter of 38 mm and the edges of its upper end shall have a radius not exceeding 6 mm (see Figure 6.3.5.4.2). The rod shall protrude from the surface a distance at least equal to that between the centre of the primary receptacle(s) and the outer surface of the outer packaging with a minimum of 200 mm. One sample shall be dropped with its top face lowermost in a vertical free fall from a height of 1 m, measured from the top of the steel rod.

A second sample shall be dropped from the same height in an orientation perpendicular to that used for the first. In each instance, the packaging shall be so orientated that the steel rod would be capable of penetrating the primary receptacle(s). Following each impact, penetration of the secondary packaging is acceptable, provided that there is no leakage from the primary receptacle(s).

Figure 6.3.5.4.2



6.3.5.5 Test report

6.3.5.5.1 A written test report containing at least the following particulars shall be drawn up and shall be available to the users of the packaging:

1. Name and address of the test facility;
2. Name and address of applicant (where appropriate);
3. A unique test report identification;
4. Date of the test and of the report;
5. Manufacturer of the packaging;
6. Description of the packaging design type (e.g. dimensions, materials, closures, thickness, etc.), including method of manufacture (e.g. blow moulding) and which may include drawing(s) and/or photograph(s);
7. Maximum capacity;
8. Test contents;
9. Test descriptions and results;
10. The test report shall be signed with the name and status of the signatory.

6.3.5.5.2 The test report shall contain statements that the packaging prepared as for carriage was tested in accordance with the appropriate requirements of this Chapter and that the use of other packaging methods or components may render it invalid. A copy of the test report shall be available to the competent authority.

CHAPTER 6.4

REQUIREMENTS FOR THE CONSTRUCTION, TESTING AND APPROVAL OF PACKAGES FOR RADIOACTIVE MATERIAL AND FOR THE APPROVAL OF SUCH MATERIAL

6.4.1 (Reserved)

6.4.2 GENERAL PROVISIONS

6.4.2.1 The package shall be so designed in relation to its mass, volume and shape that it can be safely carried. In addition, the package shall be so designed that it can be properly secured in or on the wagon.

6.4.2.2 The design shall be such that any lifting attachments on the package will not fail when used in the intended manner and that, if failure of the attachments should occur, the ability of the package to meet other requirements of this Annex would not be impaired. The design shall take account of appropriate safety factors to cover snatch lifting.

6.4.2.3 Attachments and any other features on the outer surface of the package which could be used to lift it shall be designed either to support its mass in accordance with the requirements of 6.4.2.2 or shall be removable or otherwise rendered incapable of being used during carriage.

6.4.2.4 As far as practicable, the packaging shall be that the external surfaces are free from protruding features and can be easily decontaminated.

6.4.2.5 As far as practicable, the outer layer of the package shall be so designed as to prevent the collection and the retention of water.

6.4.2.6 Any features added to the package at the time of carriage which are not part of the package shall not reduce its safety.

6.4.2.7 The package shall be capable of withstanding the effects of any acceleration, vibration or vibration resonance which may arise under routine conditions of carriage without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the package as a whole. In particular, nuts, bolts and other securing devices shall be so designed as to prevent them from becoming loose or being released unintentionally, even after repeated use.

6.4.2.8 The design of the package shall take into account ageing mechanisms.

6.4.2.9 The materials of the packaging and any components or structures shall be physically and chemically compatible with each other and with the radioactive contents. Account shall be taken of their behaviour under irradiation.

6.4.2.10 All valves through which the radioactive contents could escape shall be protected against unauthorized operation.

6.4.2.11 The design of the package shall take into account ambient temperatures and pressures that are likely to be encountered in routine conditions of carriage.

6.4.2.12 A package shall be so designed that it provides sufficient shielding to ensure that, under routine conditions of carriage and with the maximum radioactive contents that the package is designed to contain, the dose rate at any point on the external surface of the package would not exceed the values specified in 2.2.7.2.4.1.2, 4.1.9.1.11 and 4.1.9.1.12, as applicable, with account taken of 7.5.11 CW 33 (3.3) (b) and (3.5).

6.4.2.13 For radioactive material having other dangerous properties the package design shall take into account those properties; see 2.1.3.5.3 and 4.1.9.1.5.

6.4.2.14 Manufacturers and subsequent distributors of packagings shall provide information regarding procedures to be followed and a description of the types and dimensions of closures (including required gaskets) and any other components needed to ensure that packages as presented for carriage are capable of passing the applicable performance tests of this Chapter.

6.4.3 (Reserved)

6.4.4 REQUIREMENTS FOR EXCEPTED PACKAGES

An excepted package shall be designed to meet the requirements specified in 6.4.2.1 to 6.4.2.13 and, in addition, the requirements of 6.4.7.2 if it contains fissile material allowed by one of the provisions of 2.2.7.2.3.5 (a) to (f).

6.4.5 REQUIREMENTS FOR INDUSTRIAL PACKAGES

6.4.5.1 Type IP-1, Type IP-2 and Type IP-3 packages shall meet the requirements specified in 6.4.2 and 6.4.7.2.

6.4.5.2 A Type IP-2 package shall, if it were subjected to the tests specified in 6.4.15.4 and 6.4.15.5, prevent:

- a) loss or dispersal of the radioactive contents;
- b) more than a 20% increase in the maximum dose rate at any external surface of the package.

6.4.5.3 A Type IP-3 package shall meet all the requirements specified in 6.4.7.2 to 6.4.7.15.

6.4.5.4 Alternative requirements for Type IP-2 and Type IP-3 packages

6.4.5.4.1 Packages may be used as Type IP-2 package provided that:

- a) They satisfy the requirements of 6.4.5.1;
- b) They are designed to satisfy the requirements prescribed for packing group I or II in Chapter 6.1;
- c) When subjected to the tests required for packing groups I or II in Chapter 6.1, they would prevent:
 - loss or dispersal of the radioactive contents;
 - more than a 20% increase in the maximum dose rate at any external surface of the package.

6.4.5.4.2 Portable tanks may also be used as Type IP-2 or Type IP-3 package, provided that:

- a) They satisfy the requirements of 6.4.5.1;
- b) They are designed to satisfy the requirements prescribed in Chapter 6.7 and are capable of withstanding a test pressure of 265 kPa;
- c) They are designed so that any additional shielding which is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of carriage and of preventing an increase of more than 20% in the maximum dose rate at any external surface of the portable tanks.

6.4.5.4.3 Tanks, other than portable tanks, may also be used as Type IP-2 or Type IP-3 package for carrying LSA-I and LSA-II as prescribed in Table 4.1.9.2.5, provided that:

- a) They satisfy the requirements of 6.4.5.1;
- b) They are designed to satisfy the requirements prescribed in Chapter 6.8 or 6.20;
- c) They are designed so that any additional shielding which is provided shall be capable of withstanding the static and dynamic stresses resulting from handling

and routine conditions of carriage and of preventing more than a 20% increase in the maximum dose rate at any external surface of the tanks.

6.4.5.4.4 Containers with the characteristics of a permanent enclosure may also be used as Type IP-2 or Type IP-3 package, provided that:

- a) The radioactive contents are restricted to solid materials;
- b) They satisfy the requirements of 6.4.5.1; and
- c) They are designed to conform to ISO 1496-1:1990: "Series 1 Containers – Specifications and Testing – Part 1: General Cargo Containers" and subsequent amendments 1:1993, 2:1998, 3:2005, 4:2006 and 5:2006, excluding dimensions and ratings. They shall be designed such that if subjected to the tests prescribed in that document and the accelerations occurring during routine conditions of carriage they would prevent:
 - loss or dispersal of the radioactive contents; and
 - more than a 20% increase in the maximum dose rate at any external surface of the containers.

6.4.5.4.5 Metal intermediate bulk containers may also be used as Type IP-2 or Type IP-3 package, provided that:

- a) They satisfy the requirements of 6.4.5.1;
- b) They are designed to satisfy the requirements prescribed in Chapter 6.5 for packing group I or II, and if they were subjected to the tests prescribed in that Chapter, but with the drop test conducted in the most damaging orientation, they would prevent:
 - loss or dispersal of the radioactive contents;
 - more than a 20% increase in the maximum dose rate at any external surface of the intermediate bulk container (IBC).

6.4.6 REQUIREMENTS FOR PACKAGES CONTAINING URANIUM HEXAFLUORIDE

6.4.6.1 Packages designed to contain uranium hexafluoride shall meet the requirements which pertain to the radioactive and fissile properties of the material prescribed elsewhere in Annex 2 to SMGS. Except as allowed in 6.4.6.4, uranium hexafluoride in quantities of 0.1 kg or more shall also be packaged and carried in accordance with the provisions of ISO 7195:2005 "Nuclear Energy – Packaging of uranium hexafluoride (UF₆) for transport", and the requirements of 6.4.6.2 and 6.4.6.3.

6.4.6.2 Each package designed to contain 0.1 kg or more of uranium hexafluoride shall be designed so that it would meet the following requirements:

- a) Withstand without leakage and without unacceptable stress, as specified in ISO 7195:2005, the structural test as specified in 6.4.21.5 except as allowed in 6.4.6.4;
- b) Withstand without loss or dispersal of the uranium hexafluoride the free drop test specified in 6.4.15.4; and
- c) Withstand without rupture of the containment system the thermal test specified in 6.4.17.3 except as allowed in 6.4.6.4.

6.4.6.3 Packages designed to contain 0.1 kg or more of uranium hexafluoride shall not be provided with pressure relief devices.

6.4.6.4 Subject to multilateral approval, packages designed to contain 0.1 kg or more of uranium hexafluoride may be carried if the packages are designed:

- a) to international or national standards other than ISO 7195:2005 provided an equivalent level of safety is maintained;
- b) to withstand without leakage and without unacceptable stress a test pressure of less than 2.76 MPa as specified in 6.4.21.5; and/or

- c) to contain 9 000 kg or more of uranium hexafluoride and the packages do not meet the requirement of 6.4.6.2 (c).

In all other respects the requirements specified in 6.4.6.1 to 6.4.6.3 shall be satisfied.

6.4.7 REQUIREMENTS FOR TYPE A PACKAGES

6.4.7.1 Type A packages shall be designed to meet the general requirements of 6.4.2 and of 6.4.7.2 to 6.4.7.17.

6.4.7.2 The smallest overall external dimension of the package shall not be less than 0.1 m.

6.4.7.3 The outside of the package shall incorporate a feature such as a seal, which is not readily breakable and which, while intact, will be evidence that it has not been opened.

6.4.7.4 Any tie-down attachments on the package shall be so designed that, under normal and accident conditions of carriage, the forces in those attachments shall not impair the ability of the package to meet the requirements of Annex 2 to SMGS.

6.4.7.5 The design of the package shall take into account temperatures ranging from $-40\text{ }^{\circ}\text{C}^1$ to $+70\text{ }^{\circ}\text{C}$ for the components of the packaging. Attention shall be given to freezing temperatures for liquids and to the potential degradation of packaging materials within the given temperature range.

6.4.7.6 The design and manufacturing techniques shall be in accordance with national or international standards, or other requirements, acceptable to the competent authority.

6.4.7.7 The design shall include a containment system securely closed by a positive fastening device which cannot be opened unintentionally or by a pressure which may arise within the package.

6.4.7.8 Special form radioactive material may be considered as a component of the containment system.

6.4.7.9 If the containment system forms a separate unit of the package, the containment system shall be capable of being securely closed by a positive fastening device which is independent of any other part of the packaging.

6.4.7.10 The design of any component of the containment system shall take into account, where applicable, the radiolytic decomposition of liquids and other vulnerable materials and the generation of gas by chemical reaction and radiolysis.

6.4.7.11 The containment system shall retain its radioactive contents under a reduction of ambient pressure to 60 kPa.

6.4.7.12 All valves, other than pressure relief valves, shall be provided with an enclosure to retain any leakage from the valve.

6.4.7.13 A radiation shield which encloses a component of the package specified as a part of the containment system shall be so designed as to prevent the unintentional release of that component from the shield. Where the radiation shield and such component within it form a separate unit, the radiation shield shall be capable of being securely closed by a positive fastening device which is independent of any other packaging structure.

¹ For carriage to the Russian Federation, Republic of Kazakhstan or in transit through the territory of the Russian Federation, Republic of Kazakhstan in the period from 01.11 to 01.04 the ambient temperature amounts to -50°C .

- 6.4.7.14** A package shall be so designed that if it were subjected to the tests specified in 6.4.15, it would prevent:
- a) loss or dispersal of the radioactive contents;
 - b) more than a 20% increase in the maximum dose rate at any external surface of the package.
- 6.4.7.15** The design of a package intended for liquid radioactive material shall make provision for ullage to accommodate variations in the temperature of the contents, dynamic effects and filling dynamics.

Type A packages to contain liquids

- 6.4.7.16** A Type A package designed to contain liquid radioactive material shall, in addition:
- a) Be adequate to meet the conditions specified in 6.4.7.14 a) above if the package is subjected to the tests specified in 6.4.16; and
 - b) either
 - be provided with sufficient absorbent material to absorb twice the volume of the liquid contents. Such absorbent material shall be suitably positioned so as to contact the liquid in the event of leakage; or
 - be provided with a containment system composed of primary inner and secondary outer containment components designed to enclose the liquid contents completely and ensure their retention, within the secondary outer containment components, even if the primary inner components leak.

Type A packages to contain gas

- 6.4.7.17** A Type A package designed for gases shall prevent loss or dispersal of the radioactive contents if the package were subjected to the tests specified in 6.4.16, except for a Type A package designed for tritium gas or for noble gases.

6.4.8 REQUIREMENTS FOR TYPE B(U) PACKAGES

- 6.4.8.1** Type B(U) packages shall be designed to meet the requirements specified in 6.4.2, and of 6.4.7.2 to 6.4.7.15, except as specified in 6.4.7.14 a), and, in addition, the requirements specified in 6.4.8.2 to 6.4.8.15.
- 6.4.8.2** A package shall be so designed that, under the ambient conditions specified in 6.4.8.5 and 6.4.8.6 heat generated within the package by the radioactive contents shall not, under normal conditions of carriage, as demonstrated by the tests in 6.4.15, adversely affect the package in such a way that it would fail to meet the applicable requirements for containment and shielding if left unattended for a period of one week. Particular attention shall be paid to the effects of heat, which may cause one or more of the following:
- a) Alter the arrangement, the geometrical form or the physical state of the radioactive contents or, if the radioactive material is enclosed in a can or receptacle (for example, clad fuel elements), cause the can, receptacle or radioactive material to deform or melt;
 - b) Lessen the efficiency of the packaging through differential thermal expansion or cracking or melting of the radiation shielding material;
 - c) In combination with moisture, accelerate corrosion.
- 6.4.8.3** A package shall be so designed that, under the ambient condition specified in 6.4.8.5 and in the absence of insolation, the temperature of the accessible surfaces of a package shall not exceed 50 °C, unless the package is carried under exclusive use.

6.4.8.4 The maximum temperature of any surface readily accessible during carriage of a package under exclusive use shall not exceed 85 °C in the absence of insolation under the ambient conditions specified in 6.4.8.5. Account may be taken of barriers or screens intended to give protection to persons without the need for the barriers or screens being subject to any test.

6.4.8.5 The ambient temperature shall be assumed to be 38 °C.

6.4.8.6 The solar insolation conditions shall be assumed to be as specified in the Table below.

Table 6.4.8.6: Insolation data

Case	Form and location of surface	Insolation for 12 hours per day (W/m ²)
1	Flat surfaces carried horizontally-downward facing	0
2	Flat surfaces carried horizontally-upward facing	800
3	Surfaces carried vertically	200 ^a
4	Other downward facing (not horizontal) surfaces	200 ^a
5	All other surfaces	400 ^a

^{a)} Alternatively, a sine function may be used, with an absorption coefficient adopted and the effects of possible reflection from neighboring objects neglected.

6.4.8.7 A package which includes thermal protection for the purpose of satisfying the requirements of the thermal test specified in 6.4.17.3 shall be so designed that such protection will remain effective if the package is subjected to the tests specified in 6.4.15 and 6.4.17.2 a) and b) or 6.4.17.2 b) and c), as appropriate. Any such protection on the exterior of the package shall not be rendered ineffective by ripping, cutting, skidding, abrasion or rough handling.

6.4.8.8 A package shall be so designed that, if it were subjected to:

- a) The tests specified in 6.4.15, it would restrict the loss of radioactive contents to not more than 10⁻⁶ A₂ per hour; and
- b) The tests specified in 6.4.17.1, 6.4.17.2 b), 6.4.17.3, and 6.4.17.4 and either the test in:
 - 6.4.17.2 c), when the package has a mass not greater than 500 kg, an overall density not greater than 1 000 kg/m³ based on the external dimensions, and radioactive contents greater than 1 000 A₂ not as special form radioactive material, or
 - 6.4.17.2 a) for all other packages,

it would meet the following requirements:

- retain sufficient shielding to ensure that the dose rate at 1 m from the surface of the package would not exceed 10 mSv/h with the maximum radioactive contents which the package is designed to contain; and
- restrict the accumulated loss of radioactive contents in a period of one week to not more than 10 A₂ for krypton-85 and not more than A₂ for all other radionuclides.

Where mixtures of different radionuclides are present, the provisions of 2.2.7.2.2.4 to 2.2.7.2.2.6 shall apply except that for krypton-85 an effective A₂(i) value equal to 10 A₂ may be used. For case (a) above, the assessment shall take into account the external non-fixed contamination limits of 4.1.9.1.2.

6.4.8.9 A package for radioactive contents with activity greater than 10⁵ shall be so designed that if it were subjected to the enhanced water immersion test specified in 6.4.18, there would be no rupture of the containment system.

6.4.8.10 Compliance with the permitted activity release limits shall depend neither upon filters nor upon a mechanical cooling system.

6.4.8.11 A package shall not include a pressure relief system from the containment system which would allow the release of radioactive material to the environment under the conditions of the tests specified in 6.4.15 and 6.4.17.

6.4.8.12 A package shall be so designed that if it were at the maximum normal operating pressure and it were subjected to the tests specified in 6.4.15 and 6.4.17, the level of strains in the containment system would not attain values which would adversely affect the package in such a way that it would fail to meet the applicable requirements.

6.4.8.13 A package shall not have a maximum normal operating pressure in excess of a gauge pressure of 700 kPa.

6.4.8.14 A package containing low dispersible radioactive material shall be so designed that any features added to the low dispersible radioactive material that are not part of it, or any internal components of the packaging shall not adversely affect the performance of the low dispersible radioactive material.

6.4.8.15 A package shall be designed for an ambient temperature range from $-40\text{ }^{\circ}\text{C}^2$ to $+38\text{ }^{\circ}\text{C}$.

6.4.9 REQUIREMENTS FOR TYPE B(M) PACKAGES

6.4.9.1 Type B(M) packages shall meet the requirements for Type B(U) packages specified in 6.4.8.1, except that for packages to be carried solely within a specified country or solely between specified countries, conditions other than those given in 6.4.7.5, 6.4.8.4 to 6.4.8.6, and 6.4.8.9 to 6.4.8.15 above may be assumed with the approval of the competent authorities of these countries. Notwithstanding, the requirements for Type B(U) packages specified in 6.4.8.4 and 6.4.8.9 to 6.4.8.15 shall be met as far as practicable.

6.4.9.2 Intermittent venting of Type B(M) packages may be permitted during carriage, provided that the operational controls for venting are acceptable to the relevant competent authorities.

6.4.10 REQUIREMENTS FOR TYPE C PACKAGES

6.4.10.1 Type C packages shall be designed to meet the requirements specified in 6.4.2 and of 6.4.7.2 to 6.4.7.15, except as specified in 6.4.7.14 a), and of the requirements specified in 6.4.8.2 to 6.4.8.6, 6.4.8.10 to 6.4.8.15, and, in addition, of 6.4.10.2 to 6.4.10.4.

6.4.10.2 A package shall be capable of meeting the assessment criteria prescribed for tests in 6.4.8.8 (b) and 6.4.8.12 after burial in an environment defined by a thermal conductivity of $0.33\text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ and a temperature of $38\text{ }^{\circ}\text{C}$ in the steady state. Initial conditions for the assessment shall assume that any thermal insulation of the package remains intact, the package is at the maximum normal operating pressure and the ambient temperature is $38\text{ }^{\circ}\text{C}$.

6.4.10.3 A package shall be so designed that, if it were at the maximum normal operating pressure and subjected to:

² For carriage to the Russian Federation, Republic of Kazakhstan or in transit through the territory of the Russian Federation, Republic of Kazakhstan in the period from 01.11 to 01.04 the ambient temperature amounts to $-50\text{ }^{\circ}\text{C}$.

- a) The tests specified in 6.4.15, it would restrict the loss of radioactive contents to not more than 10⁻⁶ A2 per hour; and
- b) The test sequences in 6.4.20.1:
 - 1) it would retain sufficient shielding to ensure that the dose rate at 1m from the surface of the package would not exceed 10 mSv/h with the maximum radioactive contents which the package is designed to contain; and
 - 2) it would restrict the accumulated loss of radioactive contents in a period of 1 week to not more than 10 A2 for krypton-85 and not more than A2 for all other radionuclides.

Where mixtures of different radionuclides are present, the provisions of 2.2.7.2.2.4 to 2.2.7.2.2.6 shall apply except that for krypton-85 an effective A2(i) value equal to 10 A2 may be used. For case (a) above, the assessment shall take into account the external contamination limits of 4.1.9.1.2.

6.4.10.4 A package shall be so designed that there will be no rupture of the containment system following performance of the enhanced water immersion test specified in 6.4.18.

6.4.11 REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL

6.4.11.1 Fissile material shall be carried so as to:

- a) Maintain sub-criticality during routine, normal and accident conditions of carriage; in particular, the following contingencies shall be considered:
 - 1) water leaking into or out of packages;
 - 2) the loss of efficiency of built-in neutron absorbers or moderators;
 - 3) rearrangement of the contents either within the package or as a result of loss from the package;
 - 4) reduction of spaces within or between packages;
 - 5) packages becoming immersed in water or buried in snow; and
 - 6) temperature changes; and
- b) Meet the requirements:
 - 1) of 6.4.7.2 except for unpackaged material when specifically allowed by 2.2.7.2.3.5 e);
 - 2) prescribed elsewhere in Annex 2 SMGS which pertain to the radioactive properties of the material
 - 3) of 6.4.7.3 unless the material is excepted by 2.2.7.2.3.5.
 - 4) of 6.4.11.4 to 6.4.11.14, unless the material is excepted by 2.2.7.2.3.5, 6.4.11.2 or 6.4.11.3.

6.4.11.2 Packages containing fissile material that meet the provisions of subparagraph (d) and one of the provisions of (a) to (c) below are excepted from the requirements of 6.4.11.4 to 6.4.11.14.

- a) Packages containing fissile material in any form provided that:
 - 1) The smallest external dimension of the package is not less than 10 cm;
 - 2) The criticality safety index of the package is calculated using the following formula:

$$CSI = 50 \times 5 \times \left[\frac{\frac{\text{mass of U-235 in package (g)}}{Z}}{\frac{\text{mass of other fissile nuclides in package (g)}}{280}} \right]$$

*Plutonium may be of any isotopic composition provided that the amount of ^{241}Pu is less than that of ^{240}Pu in the package.

where the values of Z are taken from Table 6.4.11.2;

3) The CSI of any package does not exceed 10;

b) Packages containing fissile material in any form provided that:

1) The smallest external dimension of the package is not less than 30 cm;

2) The package, after being subjected to the tests specified in 6.4.15.1 to 6.4.15.6:

- Retains its fissile material contents;
- Preserves the minimum overall outside dimensions of the package to at least 30 cm;
- Prevents the entry of a 10 cm cube;

3) The criticality safety index of the package is calculated using the following formula:

$$\text{CSI} = 50 \times 2 \times \left[\frac{\frac{\text{mass of U-235 in package (g)}}{Z}}{\frac{\text{mass of other fissile nuclides in package (g)}}{280}} \right]$$

*Plutonium may be of any isotopic composition provided that the amount of ^{241}Pu is less than that of ^{240}Pu in the package.

where the values of Z are taken from Table 6.4.11.2;

4) The criticality safety index of any package does not exceed 10;

c) Packages containing fissile material in any form provided that:

1) The smallest external dimension of the package is not less than 10 cm;

2) The package, after being subjected to the tests specified in 6.4.15.1 to 6.4.15.6:

- Retains its fissile material contents;
- Preserves the minimum overall outside dimensions of the package to at least 10 cm;
- Prevents the entry of a 10 cm cube;

3) The criticality safety index of the package is calculated using the following formula:

$$\text{CSI} = 50 \times 2 \times \left[\frac{\frac{\text{mass of U-235 in package (g)}}{450}}{\frac{\text{mass of other fissile nuclides in package (g)}}{280}} \right]$$

*Plutonium may be of any isotopic composition provided that the amount of ^{241}Pu is less than that of ^{240}Pu in the package.

4) The total mass of fissile nuclides in any package does not exceed 15 g;

d) The total mass of beryllium, hydrogenous material enriched in deuterium, graphite and other allotropic forms of carbon in an individual package shall not be greater than the mass of fissile nuclides in the package except where the total concentration of these materials does not exceed 1 g in any 1 000 g of material. Beryllium incorporated in copper alloys up to 4% in weight of the alloy does not need to be considered.

Table 6.4.11.2 Values of Z for calculation of criticality safety index in accordance with 6.4.11.2

Enrichment ^a	Z
Uranium enriched up to 1,5%	2200
Uranium enriched up to 5%	850
Uranium enriched up to 10%	660
Uranium enriched up to 20%	580
Uranium enriched up to 100%	450

^a If a package contains uranium with varying enrichments of U-235, then the value corresponding to the highest enrichment shall be used for Z.

6.4.11.3 Packages containing not more than 1 000 g of plutonium are excepted from the application of 6.4.11.4 to 6.4.11.14 provided that:

- a) Not more than 20% of the plutonium by mass is fissile nuclides;
- b) The criticality safety index of the package is calculated using the following formula:

$$CSI = 50 \times 2 \times \left[\frac{\text{mass of plutonium (g)}}{1000} \right]$$

- c) If uranium is present with the plutonium, the mass of uranium shall be no more than 1 % of the mass of the plutonium.

6.4.11.4 Where the chemical or physical form, isotopic composition, mass or concentration, moderation ratio or density, or geometric configuration is not known, the assessments of 6.4.11.8 to 6.4.11.13 shall be performed assuming that each parameter that is not known has the value which gives the maximum neutron multiplication consistent with the known conditions and parameters in these assessments.

6.4.11.5 For irradiated nuclear fuel the assessments of 6.4.11.8 to 6.4.11.13 shall be based on an isotopic composition demonstrated to provide either:

- a) The maximum neutron multiplication during the irradiation history; or
- b) A conservative estimate of the neutron multiplication for the package assessments. After irradiation but prior to shipment, a measurement shall be performed to confirm the conservatism of the isotopic composition.

6.4.11.6 The package, after being subjected to the tests specified in 6.4.15, shall:

- (a) Preserve the minimum overall outside dimensions of the package to at least 10 cm; and
- (b) Prevent the entry of a 10 cm cube.

6.4.11.7 The package shall be designed for an ambient temperature range of –40 °C³ to +38 °C unless the competent authority specifies otherwise in the certificate of approval for the package design.

6.4.11.8 For a package in isolation, it shall be assumed that water can leak into or out of all void spaces of the package, including those within the containment system. However, if the design incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of error, absence of leakage may be assumed in respect of those void spaces. Special features shall include either of the following:

³ For carriage to the Russian Federation, Republic of Kazakhstan or in transit through the territory of the Russian Federation, Republic of Kazakhstan in the period from 01.11 to 01.04 the ambient temperature amounts to – 50°C.

- a) Multiple high standard water barriers, not less than two of which would remain watertight if the package were subject to the tests prescribed in 6.4.11.13 (b), a high degree of quality control in the manufacture, maintenance and repair of packagings and tests to demonstrate the closure of each package before each shipment; or;
- b) For packages containing uranium hexafluoride only, with maximum enrichment of 5 mass percent uranium-235:
 - packages where, following the tests prescribed in 6.4.11.12 (b), there is no physical contact between the valve or the plug and any other component of the packaging other than at its original point of attachment and where, in addition, following the test prescribed in 6.4.17.3 the valves remain leak-tight; and;
 - a high degree of quality control in the manufacture, maintenance and repair of packagings coupled with tests to demonstrate closure of each package before each shipment.

6.4.11.9 It shall be assumed that the confinement system is closely reflected by at least 0.2 m of water or such greater reflection as may additionally be provided by the surrounding material of the packaging. However, when it can be demonstrated that the confinement system remains within the packaging following the tests prescribed in 6.4.11.13 (b), close reflection of the package by at least 0.2 m of water may be assumed in 6.4.11.10 (c).

6.4.11.10 The package shall be subcritical under the conditions of 6.4.11.8 and 6.4.11.9 with the package conditions that result in the maximum neutron multiplication consistent with:

- a) Routine conditions of carriage (incident free);
- b) The tests specified in 6.4.11.12 (b);
- c) The tests specified in 6.4.11.13 (b).

6.4.11.11 (Reserved)

6.4.11.12 For normal conditions of carriage a number "N" shall be derived, such that five times "N" packages shall be subcritical for the arrangement and package conditions that provide the maximum neutron multiplication consistent with the following:

- a) There shall not be anything between the packages, and the package arrangement shall be reflected on all sides by at least 20 cm of water; and
- b) The state of the packages shall be their assessed or demonstrated condition if they had been subjected to the tests specified in 6.4.15.

6.4.11.13 For accident conditions of carriage a number "N" shall be derived, such that two times "N" packages shall be subcritical for the arrangement and package conditions that provide the maximum neutron multiplication consistent with the following:

- a) Hydrogenous moderation between packages, and the package arrangement reflected on all sides by at least 0.2 m of water; and
- b) The tests specified in 6.4.15 followed by whichever of the following is the more limiting:
 - the tests specified in 6.4.17.2 (b) and, either 6.4.17.2 (c) for packages having a mass not greater than 500 kg and an overall density not greater than 1 000 kg/m³ based on the external dimensions, or 6.4.17.2 (a) for all other packages; followed by the test specified in 6.4.17.3 and completed by the tests specified in 6.4.19.1 to 6.4.19.3; or
 - the test specified in 6.4.17.4; and

(c) Where any part of the fissile material escapes from the containment system following the tests specified in 6.4.11.13 (b), it shall be assumed that fissile material escapes from each package in the array and all of the fissile material shall be arranged in the configuration and moderation that results in the maximum neutron multiplication with close reflection by at least 0.2 m of water.

6.4.11.14 The criticality safety index (CSI) for packages containing fissile material shall be obtained by dividing the number 50 by the smaller of the two values of "N" derived in 6.4.11.12 and 6.4.11.13 (i.e. $CSI = 50/N$). The value of the criticality safety index may be zero provided that an unlimited number of packages is subcritical (i.e. N is effectively equal to infinity in both cases).

6.4.12 TEST PROCEDURES AND DEMONSTRATION OF COMPLIANCE

6.4.12.1 Demonstration of compliance with the performance standards required in 2.2.7.2.3.3.1, 2.2.7.2.3.3.2, 2.2.7.2.3.4.1, 2.2.7.2.3.4.2, 2.2.7.2.3.4.3 and 6.4.2 to 6.4.11 must be accomplished by any of the methods listed below or by a combination thereof:

- a) Performance of tests with specimens representing special form radioactive material, or low dispersible radioactive material or with prototypes or samples of the packaging, where the contents of the specimen or the packaging for the tests shall simulate as closely as practicable the expected range of radioactive contents and the specimen or packaging to be tested shall be prepared as presented for carriage.
- b) Reference to previous satisfactory demonstrations of a sufficiently similar nature.
- c) Performance of tests with models of appropriate scale incorporating those features which are significant with respect to the item under investigation when engineering experience has shown results of such tests to be suitable for design purposes. When a scale model is used, the need for adjusting certain test parameters, such as penetrator diameter or compressive load, shall be taken into account.
- d) Calculation, or reasoned argument, when the calculation procedures and parameters are generally agreed to be reliable or conservative.

6.4.12.2 After the specimen, prototype or sample has been subjected to the tests, appropriate methods of assessment shall be used to assure that the requirements for the test procedures have been fulfilled in compliance with the performance and acceptance standards prescribed in 2.2.7.2.3.3.1, 2.2.7.2.3.3.2, 2.2.7.2.3.4.1, 2.2.7.2.3.4.2, 2.2.7.2.3.4.3 and 6.4.2 to 6.4.11.

6.4.12.3 All specimens shall be inspected before testing in order to identify and record faults or damage including the following:

- a) Divergence from the design;
- b) Defects in manufacture;
- c) Corrosion or other deterioration; and
- d) Distortion of features.

The containment system of the package shall be clearly specified. The external features of the specimen shall be clearly identified so that reference may be made simply and clearly to any part of such specimen.

6.4.13 TESTING THE INTEGRITY OF THE CONTAINMENT SYSTEM AND SHIELDING AND EVALUATING CRITICALITY SAFETY

After each test or group of tests or sequence of the applicable tests, as appropriate, specified in 6.4.15 to 6.4.21:

- a) Faults and damage shall be identified and recorded;
- b) It shall be determined whether the integrity of the containment system and shielding has been retained to the extent required in 6.4.2 to 6.4.11 for the package under test; and
- c) For packages containing fissile material, it shall be determined whether the assumptions and conditions used in the assessments required by 6.4.11.1 to 6.4.11.14 for one or more packages are valid.

6.4.14 TARGET FOR DROP TESTS

The target for the drop tests specified in 2.2.7.2.3.3.5 (a), 6.4.15.4, 6.4.16 (a), 6.4.17.2 and 6.4.20.2 shall be a flat, horizontal surface of such a character that any increase in its resistance to displacement or deformation upon impact by the specimen would not significantly increase the damage to the specimen.

6.4.15 TESTS FOR DEMONSTRATING ABILITY TO WITHSTAND NORMAL CONDITIONS OF CARRIAGE

6.4.15.1 The tests are: the water spray test, the free drop test, the stacking test and the penetration test. Specimens of the package shall be subjected to the free drop test, the stacking test and the penetration test, preceded in each case by the water spray test. One specimen may be used for all the tests, provided that the requirements of 6.4.15.2 are fulfilled.

6.4.15.2 The time interval between the conclusion of the water spray test and the succeeding test shall be such that the water has soaked in to the maximum extent, without appreciable drying of the exterior of the specimen. In the absence of any evidence to the contrary, this interval shall be taken to be two hours if the water spray is applied from four directions simultaneously. No time interval shall elapse, however, if the water spray is applied from each of the four directions consecutively.

6.4.15.3 Water spray test: The specimen shall be subjected to a water spray test that simulates exposure to rainfall of approximately 5 cm per hour for at least one hour.

6.4.15.4 Free drop test: The specimen shall drop onto the target so as to suffer maximum damage in respect of the safety features to be tested.

The height of drop measured from the lowest point of the specimen to the upper surface of the target shall be not less than the distance specified in Table 6.4.15.4 for the applicable mass. The target shall be as defined in 6.4.14;

For rectangular fibreboard or wood packages not exceeding a mass of 50 kg, a separate specimen shall be subjected to a free drop onto each corner from a height of 0.3 m;

For cylindrical fibreboard packages not exceeding a mass of 100 kg, a separate specimen shall be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.

Table 6.4.15.4: Free drop distance for testing packages to normal conditions of carriage.

Package mass, kg	Free drop distance, m
Package mass < 5000	1.2
5000 ≤ Package mass < 10000	0.9
10000 ≤ Package mass < 15000	0.6
Package mass ≥ 15000	0.3

6.4.15.5 Stacking test: Unless the shape of the packaging effectively prevents stacking, the specimen shall be subjected, for a period of 24 h, to a compressive load equal to the greater of the following:

- a) The equivalent of 5 times the maximum weight of the package;
- b) The equivalent of 13 kPa multiplied by the vertically projected area of the package.

The load shall be applied uniformly to two opposite sides of the specimen, one of which shall be the base on which the package would typically rest.

6.4.15.6 Penetration test: The specimen shall be placed on a rigid, flat, horizontal surface which will not move significantly while the test is being carried out.

- a) A bar of 3.2 cm in diameter with a hemispherical end and a mass of 6 kg shall be dropped and directed to fall, with its longitudinal axis vertical, onto the centre of the weakest part of the specimen, so that, if it penetrates sufficiently far, it will hit the containment system. The bar shall not be significantly deformed by the test performance.
- b) The height of drop of the bar measured from its lower end to the intended point of impact on the upper surface of the specimen shall be 1 m.

6.4.16 ADDITIONAL TESTS FOR TYPE A PACKAGES DESIGNED FOR LIQUIDS AND GASES

A specimen or separate specimens shall be subjected to each of the following tests unless it can be demonstrated that one test is more severe for the specimen in question than the other, in which case one specimen shall be subjected to the more severe test.

- a) Free drop test: The specimen shall drop onto the target so as to suffer the maximum damage in respect of containment. The height of the drop measured from the lowest part of the specimen to the upper surface of the target shall be 9 m. The target shall be as defined in 6.4.14.
- b) Penetration test: The specimen shall be subjected to the test specified in 6.4.15.6 except that the height of drop shall be increased to 1.7 m from the 1 m specified in 6.4.15.6 b).

6.4.17 TESTS FOR DEMONSTRATING ABILITY TO WITHSTAND ACCIDENT CONDITIONS IN CARRIAGE

6.4.17.1 The specimen shall be subjected to the cumulative effects of the tests specified in 6.4.17.2 and 6.4.17.3, in that order. Following these tests, either this specimen or a separate specimen shall be subjected to the effect(s) of the water immersion test(s) as specified in 6.4.17.4 and, if applicable, 6.4.18.

6.4.17.2 Mechanical test: The mechanical test consists of three different drop tests. Each specimen shall be subjected to the applicable drops as specified in 6.4.8.8 or 6.4.11.13. The order in which the specimen is subjected to the drops shall be such

that, on completion of the mechanical test, the specimen shall have suffered such damage as will lead to the maximum damage in the thermal test which follows.

- a) For drop I, the specimen shall drop onto the target so as to suffer the maximum damage, and the height of the drop measured from the lowest point of the specimen to the upper surface of the target shall be 9 m. The target shall be as defined in 6.4.14.
- b) For drop II, the specimen shall drop onto a bar rigidly mounted perpendicularly on the target so as to suffer the maximum damage. The height of the drop measured from the intended point of impact of the specimen to the upper surface of the bar shall be 1 m. The bar shall be of solid mild steel of circular cross section, (150 mm $\pm$ 5 mm) in diameter and 200 mm long unless a longer bar would cause greater damage, in which case a bar of sufficient length to cause maximum damage shall be used. The upper end of the bar shall be flat and horizontal with its edge rounded off to a radius of not more than 6 mm. The target on which the bar is mounted shall be as described in 6.4.1.
- c) For drop III, the specimen shall be subjected to a dynamic crush test by positioning the specimen on the target so as to suffer maximum damage by the drop of a 500 kg mass from 9 m onto the specimen. The mass shall consist of a solid mild steel plate 1 m by 1 m and shall fall in a horizontal attitude. The lower face of the steel plate shall have its edges and corners rounded off to a radius of not more than 6 mm. The height of the drop shall be measured from the underside of the plate to the highest point of the specimen. The target on which the specimen rests shall be as defined in 6.4.14.

6.4.17.3 Thermal test: The specimen shall be in thermal equilibrium under conditions of an ambient temperature of 38 °C, subject to the solar insolation conditions specified in Table 6.4.8.6 and subject to the design maximum rate of internal heat generation within the package from the radioactive contents. Alternatively, any of these parameters are allowed to have different values prior to and during the test, providing due account is taken of them in the subsequent assessment of package response:

- a) Exposure of a specimen for a period of 30 minutes to a thermal environment which provides a heat flux at least equivalent to that of a hydrocarbon fuel/air fire in sufficiently quiescent ambient conditions to give a minimum average flame emissivity coefficient of 0.9 and an average temperature of at least 800 °C, fully engulfing the specimen, with a surface absorptivity coefficient of 0.8 or that value which the package may be demonstrated to possess if exposed to the fire specified, followed by
- b) Exposure of the specimen to an ambient temperature of 38 °C, subject to the solar insolation conditions specified in Table 6.4.8.6 and subject to the design maximum rate of internal heat generation within the package by the radioactive contents for a sufficient period to ensure that temperatures in the specimen are decreasing in all parts of the specimen and/or are approaching initial steady state conditions. Alternatively, any of these parameters are allowed to have different values following cessation of heating, providing due account is taken of them in the subsequent assessment of package response.

During and following the test the specimen shall not be artificially cooled and any combustion of materials of the specimen shall be permitted to proceed naturally.

6.4.17.4 Water immersion test: The specimen shall be immersed under a head of water of at least 15 m for a period of not less than eight hours in the attitude which will lead to

maximum damage. For demonstration purposes, an external gauge pressure of at least 150 kPa shall be considered to meet these conditions.

6.4.18 ENHANCED WATER IMMERSION TEST FOR TYPE B(U) AND TYPE B(M) PACKAGES CONTAINING MORE THAN 105 A2 AND TYPE C PACKAGES

Enhanced water immersion test: The specimen shall be immersed under a head of water of at least 200 m for a period of not less than one hour. For demonstration purposes, an external gauge pressure of at least 2 MPa shall be considered to meet these conditions.

6.4.19 WATER LEAKAGE TEST FOR PACKAGES CONTAINING FISSILE MATERIAL

6.4.19.1 Packages for which water in-leakage or out-leakage to the extent which results in greatest reactivity has been assumed for purposes of assessment under 6.4.11.8 to 6.4.11.13 shall be excepted from the test.

6.4.19.2 Before the specimen is subjected to the water leakage test specified below, it shall be subjected to the tests in 6.4.17.2 (b), and either 6.4.17.2 (a) or (c) as required by 6.4.11.13 and the test specified in 6.4.17.3.

6.4.19.3 The specimen shall be immersed under a head of water of at least 0.9 m for a period of not less than 8 hours and in the attitude for which maximum leakage is expected.

6.4.20 TESTS FOR TYPE C PACKAGES

6.4.20.1 Specimens shall be subjected to the effects of each of the following test sequences in the orders specified;

a) The tests specified in 6.4.17.2 (a), 6.4.17.2 (c), 6.4.20.2 and 6.4.20.3; and

b) The test specified in 6.4.20.4.

Separate specimens are allowed to be used for each of the sequences (a) and (b).

6.4.20.2 Puncture/tearing test: The specimen shall be subjected to the damaging effects of a vertical solid probe made of mild steel. The orientation of the package specimen and the impact point on the package surface shall be such as to cause maximum damage at the conclusion of the test sequence specified in 6.4.20.1 a).

a) The specimen, representing a package having a mass less than 250 kg, shall be placed on a target and subjected to a probe having a mass of 250 kg falling from a height of 3 m above the intended impact point. For this test the probe shall be a 20 cm diameter cylindrical bar with the striking end forming a frustum of a right circular cone with the following dimensions: 30 cm height and 2.5 cm in diameter at the top with its edge rounded off to a radius of not more than 6 mm. The target on which the specimen is placed shall be as specified in 6.4.14;

b) For packages having a mass of 250 kg or more, the base of the probe shall be placed on a target and the specimen dropped onto the probe. The height of the drop, measured from the point of impact with the specimen to the upper surface of the probe shall be 3 m. For this test the probe shall have the same properties and dimensions as specified in (a) above, except that the length and mass of the probe shall be such as to incur maximum damage to the specimen. The target on which the base of the probe is placed shall be as specified in 6.4.14.

6.4.20.3 Enhanced thermal test: The conditions for this test shall be as specified in 6.4.17.3, except that the exposure to the thermal environment shall be for a period of 60 minutes.

6.4.20.4 Impact test: The specimen shall be subject to an impact on a target at a velocity of not less than 90 m/s, at such an orientation as to suffer maximum damage. The target shall be as defined in 6.4.14, except that the target surface may be at any orientation as long as the surface is normal to the specimen path.

6.4.21 INSPECTIONS FOR PACKAGINGS DESIGNED TO CONTAIN 0.1 KG OR MORE OF URANIUM HEXAFLUORIDE

6.4.21.1 Every manufactured packaging and its service and structural equipment shall, either jointly or separately, undergo an inspection initially before being put into service and periodically thereafter. These inspections shall be performed and certified by agreement with the competent authority.

6.4.21.2 The initial inspection shall consist of a check of the design characteristics, a structural test, a leakproofness test, a water capacity test and a check of satisfactory operation of the service equipment.

6.4.21.3 The periodic inspections shall consist of a visual examination, a structural test, a leakproofness test and a check of satisfactory operation of the service equipment. The maximum intervals for periodic inspections shall be five years. Packagings which have not been inspected within this five-year period shall be examined before carriage in accordance with a programme approved by the competent authority. They shall not be refilled before completion of the full programme for periodic inspections.

6.4.21.4 The check of design characteristics shall demonstrate compliance with the design type specifications and the manufacturing programme.

6.4.21.5 For the initial structural test, packagings designed to contain 0.1 kg or more of uranium hexafluoride shall be tested hydraulically at an internal pressure of at least 1.38 MPa but, when the test pressure is less than 2.76 MPa, the design shall require multilateral approval. For retesting packagings, any other equivalent non-destructive testing may be applied subject to multilateral approval.

6.4.21.6 The leakproofness test shall be performed in accordance with a procedure which is capable of indicating leakages in the containment system with a sensitivity of 0.1 Pa·l/s (10^{-6} bar·l/s).

6.4.21.7 The water capacity of the packagings shall be established with an accuracy of $\pm 0.25\%$ at a reference temperature of 15 °C. The volume shall be stated on the plate described in 6.4.21.8.

6.4.21.8 A plate made of non-corroding metal shall be durably attached to every packaging in a readily accessible place. The method of attaching the plate must not impair the strength of the packaging. The following particulars, at least, shall be marked on the plate by stamping or by any other equivalent method:

- Approval number;
- Manufacturer's serial number;
- Maximum working pressure (gauge pressure);
- Test pressure (gauge pressure);
- Contents: uranium hexafluoride;
- Capacity in litres;
- Maximum permissible filling mass of uranium hexafluoride;
- Tare mass;
- Date (month, year) of the initial test and the most recent periodic test;
- Stamp of the expert who performed the tests.

6.4.22 APPROVALS OF PACKAGE DESIGNS AND MATERIALS

6.4.22.1 The approval of designs for packages containing 0.1 kg or more of uranium hexafluoride requires that:

- a) Each design that meets the requirements of 6.4.6.4 shall require multilateral approval;
- b) Each design that meets the requirements of 6.4.6.1 to 6.4.6.3 shall require unilateral approval by the competent authority of the country of origin of the design, unless multilateral approval is otherwise required by Annex 2 to SMGS.

6.4.22.2 Each Type B(U) and Type C package design shall require unilateral approval, except that:

- a) A package design for fissile material, which is also subject to 6.4.22.4, 6.4.23.7, and 5.1.5.2.1 shall require multilateral approval; and
- b) A Type B(U) package design for low dispersible radioactive material shall require multilateral approval.

6.4.22.3 Each Type B(M) package design, including those for fissile material which are also subject to the requirements of 6.4.22.4, 6.4.23.7, and 5.1.5.2.1 and those for low dispersible radioactive material, shall require multilateral approval.

6.4.22.4 Each package design for fissile material which is not excepted by any of the paragraphs 2.2.7.2.3.5 (a) to (f), 6.4.11.2 and 6.4.11.3 shall require multilateral approval.

6.4.22.5 The design for special form radioactive material shall require unilateral approval. The design for low dispersible radioactive material shall require multilateral approval (see also 6.4.23.8).

6.4.22.6 The design for a fissile material excepted from "FISSILE" classification in accordance with 2.2.7.2.3.5 (f) shall require multilateral approval.

6.4.22.7 Alternative activity limits for an exempt consignment of instruments or articles in accordance with 2.2.7.2.2.2 (b) shall require multilateral approval.

6.4.22.8 Any design that requires unilateral approval originating in a country being SMGS Contracting State shall be approved by the competent authority of this country; if the country where the package has been designed is not an SMGS Contracting State, carriage is possible on condition that:

- a) a certificate has been supplied by this country, proving that the package design satisfies the technical requirements of SMGS, and that this certificate is validated by the competent authority of the first SMGS Contracting State reached by the consignment;
- b) if no certificate and no existing package design approval by an SMGS Contracting State has been supplied, the package design is approved by the competent authority of the first SMGS Contracting State reached by the consignment.

6.4.22.9 For designs approved under the transitional measures see 1.6.6.

6.4.23 APPLICATIONS AND APPROVALS FOR RADIOACTIVE MATERIAL CARRIAGE

6.4.23.1 (Reserved)

6.4.23.2 Applications for approval of shipment

6.4.23.2.1 An application for approval of shipment shall include:

- a) The period of time, related to the shipment, for which the approval is sought;
- b) The actual radioactive contents, the expected modes of carriage, the type of wagon, and the probable or proposed route; and
- c) The details of how the precautions and administrative or operational controls, referred to in the certificate of approval for the package design, if applicable, issued under 5.1.5.2.1 a) V), VI) or VII), are to be put into effect.

6.4.23.2.2 An application for approval of SCO-III shipments shall include:

- a) A statement of the respects in which, and of the reasons why, the consignment is considered SCO-III;
- b) Justification for choosing SCO-III by demonstrating that:
 - 1) No suitable packaging currently exists;
 - 2) Designing and/or constructing a packaging or segmenting the object is not practically, technically or economically feasible;
 - 3) No other viable alternative exists;
- c) A detailed description of the proposed radioactive contents with reference to their physical and chemical states and the nature of the radiation emitted;
- d) A detailed statement of the design of the SCO-III, including complete engineering drawings and schedules of materials and methods of manufacture;
- e) All information necessary to satisfy the competent authority that the requirements of 4.1.9.2.4 (e) and the requirements of 7.5.11, CW 33 (2), if applicable, are satisfied;
- f) A transport plan;
- g) A specification of the applicable management system as required in 1.7.3

6.4.23.3 An application for approval of shipments under special arrangement shall include all the information necessary to satisfy the competent authority that the overall level of safety in carriage is at least equivalent to that which would be provided if all the applicable requirements of Annex 2 to SMGS had been met. The application shall also include:

- a) A statement of the respects in which, and of the reasons why, the shipment cannot be made in full accordance with the applicable requirements;
- b) A statement of any special precautions or special administrative or operational controls which are to be employed during carriage to compensate for the failure to meet the applicable requirements.

6.4.23.4 An application for approval of Type B(U) or Type C package design shall include:

- a) A detailed description of the proposed radioactive contents with reference to their physical and chemical states and the nature of the radiation emitted;
- b) A detailed statement of the design, including complete engineering drawings and schedules of materials and methods of manufacture;
- c) A statement of the tests which have been done and their results, or evidence based on calculative methods or other evidence that the design is adequate to meet the applicable requirements;
- d) The proposed operating and maintenance instructions for the use of the packaging;
- e) If the package is designed to have a maximum normal operating pressure in excess of 100 kPa gauge, a specification of the materials of manufacture of the containment system, the samples to be taken, and the tests to be made;

- f) If the package is to be used for shipment after storage, a justification of considerations to ageing mechanisms in the safety analysis and within the proposed operating and maintenance instructions; (f) If the package is to be used for shipment after storage, a justification of considerations to ageing mechanisms in the safety analysis and within the proposed operating and maintenance instructions;
- g) Where the proposed radioactive contents are irradiated nuclear fuel, a statement and a justification of any assumption in the safety analysis relating to the characteristics of the fuel and a description of any pre-shipment measurement as required by 6.4.11.5 (b);
- h) Any special stowage provisions necessary to ensure the safe dissipation of heat from the package considering the various modes of carriage to be used and type of wagon or container;
- i) A reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the package;
- j) A specification of the applicable management system as required in 1.7.3. and
- k) For packages which are to be used for shipment after storage, a gap analysis programme describing a systematic procedure for a periodic evaluation of changes of applicable regulations, changes in technical knowledge and changes of the state of the package design during storage.

6.4.23.5 An application for approval of a Type B(M) package design shall include, in addition to the general information required in 6.4.23.4 for Type B(U) packages:

- a) A list of the requirements specified in 6.4.7.5, 6.4.8.4 to 6.4.8.6 and 6.4.8.9 to 6.4.8.15 with which the package does not conform;
- b) Any proposed supplementary operational controls to be applied during carriage not regularly provided for in this Annex, but which are necessary to ensure the safety of the package or to compensate for the deficiencies listed in (a) above;
- c) A statement relative to any restrictions on the mode of carriage and to any special loading, carriage, unloading or handling procedures; and
- d) A statement of the range of ambient conditions (temperature, solar radiation) which are expected to be encountered during carriage and which have been taken into account in the design.

6.4.23.6 The application for approval of designs for packages containing 0.1 kg or more of uranium hexafluoride shall include all information necessary to satisfy the competent authority that the design meets the applicable requirements of 6.4.6.1, and a description of the applicable management system as required in 1.7.3.

6.4.23.7 An application for a fissile package approval shall include all information necessary to satisfy the competent authority that the design meets the applicable requirements of 6.4.11.1, and a specification of the applicable management system as required by 1.7.3.

6.4.23.8 An application for approval of design for special form radioactive material and design for low dispersible radioactive material shall include:

- a) A detailed description of the radioactive material or, if a capsule, the contents; particular reference shall be made to both physical and chemical states;
- b) A detailed statement of the design of any capsule to be used;
- c) A statement of the tests which have been done and their results, or evidence based on calculations to show that the radioactive material is capable of meeting the performance standards, or other evidence that the special form radioactive

material or low dispersible radioactive material meets the applicable requirements of Annex 2 to SMGS;

d) A specification of the applicable management system as required in 1.7.3; and

e) Any proposed pre-shipment actions for use in the consignment of special form radioactive material or low dispersible radioactive material.

6.4.23.9 An application for approval of design for fissile material excepted from "FISSILE" classification in accordance with Table 2.2.7.2.1.1, under 2.2.7.2.3.5 (f) shall include:

a) A detailed description of the material; particular reference shall be made to both physical and chemical states;

b) A statement of the tests that have been carried out and their results, or evidence based on calculation methods to show that the material is capable of meeting the requirements specified in 2.2.7.2.3.6;

c) A specification of the applicable management system as required in 1.7.3;

d) A statement of specific actions to be taken prior to shipment.

6.4.23.10 An application for approval of alternative activity limits for an exempt consignment of instruments or articles shall include:

a) An identification and detailed description of the instrument or article, its intended uses and the radionuclide(s) incorporated;

b) The maximum activity of the radionuclide(s) in the instrument or article;

c) Maximum external dose rates arising from the instrument or article;

d) The chemical and physical forms of the radionuclide(s) contained in the instrument or article;

e) Details of the construction and design of the instrument or article, particularly as related to the containment and shielding of the radionuclide in routine, normal and accident conditions of carriage;

f) The applicable management system, including the quality testing and verification procedures to be applied to radioactive sources, components and finished products to ensure that the maximum specified activity of radioactive material or the maximum dose rates specified for the instrument or article are not exceeded, and that the instruments or articles are constructed according to the design specifications;

g) The maximum number of instruments or articles expected to be shipped per consignment and annually;

h) Dose assessments in accordance with the principles and methodologies set out in the Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014),), including individual doses to transport workers and members of the public and, if appropriate, collective doses arising from routine, normal and accident conditions of carriage, based on representative carriage scenarios the consignments are subject to.

6.4.23.11 Each certificate of approval issued by a competent authority shall be assigned an identification mark. The identification mark shall be of the following generalized type:

VRI/Number/Type Code

- a) Except as provided in 6.4.23.12 (b), VRI represents the distinguishing sign used on vehicles in international road traffic⁴ of the country issuing the certificate;
- b) The number shall be assigned by the competent authority, and shall be unique and specific with regard to the particular design or shipment or alternative activity limit for exempt consignment. The identification mark of the approval of shipment shall be clearly related to the identification mark of the approval of design.
- c) The following type codes shall be used in the order listed to indicate the types of certificate of approval issued:
 - AF – Type A package design for fissile material
 - B(U) – Type B(U) package design [B(U) F if for fissile material]
 - B(M) – Type B(M) package design [B(M) F if for fissile material]
 - C – Type C package design (CF if for fissile material)
 - IF – Industrial package design for fissile material
 - S – Special form radioactive material
 - LD – Low dispersible radioactive material
 - FE – Fissile material complying with the requirements of 2.2.7.2.3.6
 - T – Shipment
 - X – Special arrangement
 - AL – Alternative activity limits for an exempt consignment of instruments or articles.

In the case of package designs for non-fissile or fissile excepted uranium hexafluoride, where none of the above codes apply, then the following type codes shall be used:

- H(U) – Unilateral approval
- H(M) – Multilateral approval

6.4.23.12 These identification marks shall be applied as follows:

- a) Each certificate and each package shall bear the appropriate identification mark, comprising the symbols prescribed in 6.4.23.11 (a), (b) and (c) above, except that, for packages, only the applicable design type codes shall appear following the second stroke, that is, the "T" or "X" shall not appear in the identification mark on the package. Where the approval of design and the approval of shipment are combined, the applicable type codes do not need to be repeated.

For example:

- RUS/100/B(M)F: Type B(M) package design approved for fissile material, requiring multilateral approval, for which the competent authority of the Russian Federation has assigned the design number 100 (to be marked on both the package and on the certificate of approval for the package design);
- RUS/100/B(M)F T: The approval of shipment issued for a package bearing the identification mark elaborated above (to be marked on the

⁴ Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

- certificate only);
- RUS/944/X: An approval of special arrangement issued by the competent authority of the Russian Federation, to which the number 944 has been assigned (to be marked on the certificate only);
- RUS/782/IF: An industrial package design for fissile material approved by the competent authority of the Russian Federation, to which package design number 782 has been assigned (to be marked on both the package and on the certificate of approval for the package design); and
- RUS/515/H(U) A package design for fissile excepted uranium hexafluoride approved by the competent authority of the Russian Federation, to which package design number 515 has been assigned (to be marked on both the package and on the certificate of approval for the package design).
- b) Where multilateral approval is effected by validation according to 6.4.23.20, only the identification mark issued by the country of origin of the design or shipment shall be used. Where multilateral approval is effected by issue of certificates by successive countries, each certificate shall bear the appropriate identification mark and the package whose design was so approved shall bear all appropriate identification marks.
- For example:
- RUS/100/B(M)F
- UA/70/B(M)F
- would be the identification mark of a package which was originally approved by the Russian Federation and was subsequently approved, by separate certificate, by Ukraine. Additional identification marks would be tabulated in a similar manner on the package.
- c) The revision of a certificate shall be indicated by a parenthetical expression following the identification mark on the certificate. For example, RUS/100/B(M)F (Rev.2) would indicate revision 2 of the Russian Federation certificate of approval for the package design; or RUS/100/B(M)F (Rev.0) would indicate the original issuance of the Russian Federation certificate of approval for the package design. For original issuances, the parenthetical entry is optional and other words such as "original issuance" may also be used in place of "Rev.0". Certificate revision numbers may only be issued by the country issuing the original certificate of approval
- d) Additional symbols (as may be necessitated by national regulations) may be added in brackets to the end of the identification mark; for example, RUS/100B(M)F(SP503).
- e) It is not necessary to alter the identification mark on the packaging each time that a revision to the design certificate is made. Such re-marking shall be required only in those cases where the revision to the package design certificate involves a change in the letter type codes for the package design following the second stroke.

6.4.23.13 Each certificate of approval issued by a competent authority for special form radioactive material or low dispersible radioactive material shall include the following information:

- a) Type of certificate;
- b) The competent authority identification mark;
- c) The issue date and an expiry date;
- d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the special form radioactive material or low dispersible radioactive material is approved;
- e) The identification of the special form radioactive material or low dispersible radioactive material;
- f) A description of the special form radioactive material or low dispersible radioactive material;
- g) Design specifications for the special form radioactive material or low dispersible radioactive material which may include references to drawings;
- h) A specification of the radioactive contents which includes the activities involved and which may include the physical and chemical form;
- i) A specification of the applicable management system as required in 1.7.3;
- j) Reference to information provided by the applicant relating to specific actions to be taken prior to shipment;
- k) If deemed appropriate by the competent authority, reference to the identity of the applicant;
- l) Signature and identification of the certifying official.

6.4.23.14 Each certificate of approval issued by a competent authority for material excepted from classification as "FISSILE" shall include the following information:

- a) Type of certificate;
- b) The competent authority identification mark; (c) The issue date and an expiry date;
- d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the exception is approved;
- e) A description of the excepted material;
- f) Limiting specifications for the excepted material;
- g) A specification of the applicable management system as required in 1.7.3;
- h) Reference to information provided by the applicant relating to specific actions to be taken prior to shipment;
- i) If deemed appropriate by the competent authority, reference to the identity of the applicant; j) Signature and identification of the certifying official;
- k) Reference to documentation that demonstrates compliance with 2.2.7.2.3.6

6.4.23.15 Each certificate of approval issued by a competent authority for a special arrangement shall include the following information:

- a) Type of certificate;
- b) The competent authority identification mark;
- c) The issue date and an expiry date;
- d) Mode(s) of carriage;
- e) Any restrictions on the modes of carriage, type of wagon, container, and any necessary routing instructions;
- f) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the special arrangement is approved;
- g) The following statement:

"This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be carried.";

- h) References to certificates for alternative radioactive contents, other competent authority validation, or additional technical data or information, as deemed appropriate by the competent authority;
- i) Description of the packaging by a reference to the drawings or a specification of the design. If deemed appropriate by the competent authority, a reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the package shall also be provided, accompanied by a brief description of the packaging, including materials of manufacture, gross mass, general outside dimensions and appearance;
- j) A specification of the authorized radioactive contents, including any restrictions on the radioactive contents which might not be obvious from the nature of the packaging. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), mass in grams (for fissile material or for each fissile nuclide when appropriate), and whether special form radioactive material, low dispersible radioactive material or fissile material excepted under 2.2.7.2.3.5 (f) if applicable;
- k) Additionally, for packages containing fissile material:
 - 1) a detailed description of the authorized radioactive contents;
 - 2) the value of the criticality safety index;
 - 3) reference to the documentation that demonstrates the criticality safety of the packages;
 - 4) special features, on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;
 - 5) any allowance (based on 6.4.11.5 (b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and;
 - 6)) the ambient temperature range for which the special arrangement has been approved;

- l) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the consignment, including any special stowage provisions for the safe dissipation of heat;
- m) If deemed appropriate by the competent authority, reasons for the special arrangement;
- n) Description of the compensatory measures to be applied as a result of the shipment being under special arrangement;
- o) Reference to information provided by the applicant relating to the use of the packaging or specific actions to be taken prior to the shipment;
- p) A statement regarding the ambient conditions assumed for purposes of design if these are not in accordance with those specified in 6.4.8.5, 6.4.8.6 and 6.4.8.15, as applicable;
- q) Any emergency arrangements deemed necessary by the competent authority;
- r) A specification of the applicable management system as required in 1.7.3;
- s) If deemed appropriate by the competent authority, reference to the identity of the applicant and to the identity of the carrier;
- t) Signature and identification of the certifying official.

6.4.23.16 Each certificate of approval for a shipment issued by a competent authority shall include the following information:

- a) Type of certificate;
- b) The competent authority identification mark(s);
- c) The issue date and an expiry date;
- d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the shipment is approved;
- e) Any restrictions on the modes of carriage, type of wagon, container, and any necessary routing instructions;
- f) The following statement: "This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be carried";
- g) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the consignment, including any special stowage provisions for the safe dissipation of heat or maintenance of criticality safety;
- h) Reference to information provided by the applicant relating to specific actions to be taken prior to shipment;
- i) Reference to the applicable certificate(s) of approval of design;
- j) A specification of the actual radioactive contents, including any restrictions on the radioactive contents which might not be obvious from the nature of the packaging. This shall include the physical and chemical forms, the total activities involved (including those of the various isotopes, if appropriate), mass in grams (for fissile material or for each fissile nuclide when appropriate), and whether special form

radioactive material, low dispersible radioactive material or fissile material excepted under 2.2.7.2.3.5 (f) if applicable;

- k) Any emergency arrangements deemed necessary by the competent authority;
- l) A specification of the applicable management system as required in 1.7.3;
- m) If deemed appropriate by the competent authority, reference to the identity of the applicant;
- n) Signature and identification of the certifying official.

6.4.23.17 Each certificate of approval of the design of a package issued by a competent authority shall include the following information:

- a) Type of certificate;
- b) The competent authority identification mark;
- c) The issue date and an expiry date;
- d) Any restriction on the modes of carriage, if appropriate;
- e) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the design is approved;
- f) The following statement: "This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be carried";
- g) References to certificates for alternative radioactive contents, other competent authority validation, or additional technical data or information, as deemed appropriate by the competent authority;
- h) A statement authorizing shipment where approval of shipment is required under 5.1.5.1.2, if deemed appropriate;
- i) Identification of the packaging;
- j) Description of the packaging by a reference to the drawings or specification of the design. If deemed appropriate by the competent authority, a reproducible illustration, not larger than 21 cm by 30 cm, showing the make-up of the package shall also be provided, accompanied by a brief description of the packaging, including materials of manufacture, gross mass, general outside dimensions and appearance;
- k) Specification of the design by reference to the drawings;
- l) A specification of the authorized radioactive content, including:
 - any restrictions on the radioactive contents which might not be obvious from the nature of the packaging;
 - information on the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), mass in grams (for fissile material the total mass of fissile nuclides or the mass for each fissile nuclide when appropriate) and whether special form radioactive material, low dispersible radioactive material or fissile material expected under 2.2.7.2.3.5 (f), if applicable;
- m) A description of the containment system;

- n) For package designs containing fissile material which require multilateral approval of the package design in accordance with 6.4.22.4:
 - 1) a detailed description of the authorized radioactive contents;
 - 2) a description of the confinement system;
 - 3) the value of the criticality safety index;
 - 4) reference to the documentation that demonstrates the criticality safety of the packages;
 - 5) any special features, on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;
 - 6) any allowance (based on 6.4.11.5 (b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and;
 - 7) the ambient temperature range for which the package design has been approved;
- o) For Type B(M) packages, a statement specifying those requirements of 6.4.7.5, 6.4.8.4, 6.4.8.5, 6.4.8.6 and 6.4.8.9 to 6.4.8.15 with which the package does not conform and any amplifying information which may be useful to other competent authorities;
- p) For package designs subject to the transitional provisions in 1.6.6.2.1, a statement specifying those requirements of Annex 2 to SMGS applicable as from 1 January 2021 with which the package does not conform;
- q) For packages containing more than 0.1 kg of uranium hexafluoride, a statement specifying those provisions of 6.4.6.4 which apply if any and any amplifying information which may be useful to other competent authorities;
- r) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the consignment, including any special stowage provisions for the safe dissipation of heat;
- s) Reference to information provided by the applicant relating to the use of the packaging or specific actions to be taken prior to shipment;
- t) A statement regarding the ambient conditions assumed for purposes of design if these are not in accordance with those specified in 6.4.8.5, 6.4.8.6 and 6.4.8.15, as applicable;
- u) A specification of the applicable management system as required in 1.7.3;
- v) Any emergency arrangements deemed necessary by the competent authority;
- w) If deemed appropriate by the competent authority, reference to the identity of the applicant;
- x) Signature and identification of the certifying official.

6.4.23.18 Each certificate issued by a competent authority for alternative activity limits for an exempt consignment of instruments or articles according to 5.1.5.2.1 (d) shall include the following information:

- a)-Type of certificate;
- b) The competent authority identification mark;
- c) The issue date and an expiry date;

- d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the exemption is approved;
- e) The identification of the instrument or article;
- f) A description of the instrument or article;
- g) Design specifications for the instrument or article;
- h) A specification of the radionuclide(s), the approved alternative activity limit(s) for the exempt consignment(s) of the instrument(s) or article(s);
- i) Reference to documentation that demonstrates compliance with 2.2.7.2.2.2 (b);
- j) If deemed appropriate by the competent authority, reference to the identity of the applicant;
- k) Signature and identification of the certifying official.

6.4.23.19 The competent authority shall be informed of the serial number of each packaging manufactured to a design approved by them under 1.6.6.2.1, 1.6.6.2.2, 6.4.22.2, 6.4.22.3 and 6.4.22.4.

6.4.23.20 Multilateral approval may be by validation of the original certificate issued by the competent authority of the country of origin of the design or shipment. Such validation may take the form of an endorsement on the original certificate or the issuance of a separate endorsement, annex, supplement, etc., by the competent authority of the country through or into which the shipment is made.

CHAPTER 6.5

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF INTERMEDIATE BULK CONTAINERS (IBCs)

6.5.1 GENERAL REQUIREMENTS

6.5.1.1 Scope

The requirements of this Chapter apply to intermediate bulk containers (IBCs) the use of which is expressly authorized for the carriage of certain dangerous goods according to the packing instructions indicated in Column (8) of Table A in Chapter 3.2. Portable tanks and tank-containers which meet the requirements of Chapter 6.7 or 6.8 respectively are not considered to be IBCs. IBCs which meet the requirements of this Chapter are not considered to be containers for the purposes of Annex 2 to SMGS.

6.5.1.1.2 The requirements for IBCs in 6.5.3 are based on IBCs currently in use. In order to take into account progress in science and technology, there is no objection to the use of IBCs having specifications different from those in 6.5.3 and 6.5.5, provided that they are equally effective, acceptable to the competent authority and able to successfully fulfil the requirements described in 6.5.4 and 6.5.6. Methods of inspection and testing other than those described in Annex 2 to SMGS are acceptable, provided they are equivalent, and are recognized by the competent authority.

6.5.1.1.3 The construction, equipment, testing, marking and operation of IBCs shall be subject to acceptance by the competent authority of the country in which the IBCs are officially approved.

***Note:** Parties performing inspections and tests in other countries, after the IBC has been put into service, need not be accepted by the competent authority of the country in which the IBC has been approved, but the inspections and tests have to be performed according to the rules specified in the official IBC's approval.*

6.5.1.1.4 Manufacturers and subsequent distributors of IBCs shall provide information regarding procedures to be followed and a description of the types and dimensions of closures (including required gaskets) and any other components needed to ensure that IBCs as presented for carriage are capable of passing the applicable performance tests provided in this Chapter

6.5.1.2 (Reserved)

6.5.1.3 (Reserved)

6.5.1.4 Designatory code system for IBCs

6.5.1.4.1 The code shall consist of two Arabic numerals as specified in (a), followed by a capital letter(s) specified in (b), followed, when specified in an individual section, by an Arabic numeral indicating the category of IBC.

a)

Type	For solids, filled or discharged		For liquids
	by gravity	Under pressure of more than 10 kPa(0,1bar)	
rigid	11	21	31
flexible	13	-	-

b) Materials

- A. Steel (all types and surface treatments)
- B. Aluminium
- C. Natural wood
- D. Plywood
- F. Reconstituted wood
- G. Fibreboard
- H. Plastics material
- L. Textile
- M. Paper, multiwall
- N. Metal (other than steel or aluminium).

6.5.1.4.2 For composite IBCs, two capital letters in Latin characters shall be used in sequence in the second position of the code. The first shall indicate the material of the inner receptacle of the IBC and the second that of the outer packaging of the IBC.

6.5.1.4.3 The following types and codes of IBC are assigned:

Table 6.5.1.4.3

Material	Purpose and special characteristics of IBC structure	Code	Sub-section
(1)	(2)	(3)	(4)
Metal			6.5.5.1
A. Steel	for solids, filled or discharged by gravity	11A	
	for solids, filled or discharged under pressure	21A	
	for liquids	31A	
B. Aluminium	for solids, filled or discharged by gravity	11B	
	for solids, filled or discharged under pressure	21B	
	for liquids	31B	
N. Other than steel or aluminium	for solids, filled or discharged by gravity	11N	
	for solids, filled or discharged under pressure	21N	
	for liquids	31N	
Flexible			6.5.5.2
H. Plastics	woven plastics without coating or liner	13H1	
	woven plastics, coated	13H2	
	woven plastics with liner	13H3	
	Woven plastics coated and with liner	13H4	
	plastics film	13H5	
L. Textile	without coating or liner	13L1	
	Coated	13L2	
	with liner	13L3	
	coated and with liner	13L4	

Material	Purpose and special characteristics of IBC` structure	Code	Sub-section
(1)	(2)	(3)	(4)
M. Paper	Multiwall	13M1	
	multiwall, water resistant	13M2	
H. Rigid plastics	for solids, filled or discharged by gravity fitted with structural equipment	11H1	6.5.5.3
	for solids, filled or discharged by gravity, freestanding	11H2	
	for solids, filled or discharged under pressure, fitted with structural equipment	21H1	
	for solids, filled or discharged under pressure, freestanding	21H2	
	for liquids, fitted with structural equipment	31H1	
	for liquids, without additional equipment	31H2	
HZ. Composite with plastics inner receptacle¹	for solids, filled or discharged by gravity, with rigid plastics inner receptacle	11HZ1	6.5.5.4
	for solids, filled or discharged by gravity, with flexible plastics inner receptacle	11HZ2	
	for solids, filled or discharged under pressure, with rigid plastics inner receptacle	21HZ1	
	for solids, filled or discharged under pressure, with flexible plastics inner receptacle	21HZ2	
	for liquids, with rigid plastics inner receptacle	31HZ1	
	for liquids, with flexible plastics inner receptacle	31HZ2	
G. Fibreboard	for solids, filled or discharged by gravity	11G	6.5.5.5
Wooden			6.5.5.6
C. Natural wood	for solids, filled or discharged by gravity with inner	11C	
D. Plywood	for solids, filled or discharged by gravity, with inner liner	11D	
F. Reconstituted wood	for solids, filled or discharged by gravity, with inner liner	11F	

6.5.1.4.4 The letter "W" may follow the IBC code. The letter "W" signifies that the IBC, although of the same type indicated by the code, is manufactured to a specification different from those in 6.5.5 and is considered equivalent in accordance with the requirements in 6.5.1.1.2.

6.5.2 MARKING

6.5.2.1 Primary marking

6.5.2.1.1 Each IBC manufactured and intended for use according to Annex 2 to SMGS shall bear markings which are durable, legible and placed in a location so as to be readily visible. Letters, numerals and symbols shall be at least 12 mm high.

The marking shall show:



- a) The United Nations packaging symbol: . This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.11. For metal IBCs on which the marking is stamped or embossed, the capital letters "UN" may be applied instead of the symbol;

-
- ¹ The code shall be completed by replacing the letter Z by a capital letter in accordance with 6.5.1.4.1 b) to indicate the nature of the material used for the outer casing.
- b) The code designating the type of IBC according to 6.5.1.4;
- c) A capital letter designating the packing group(s) for which the design type has been approved:
- X – for packing groups I, II and III (IBCs for solids only);
 - Y – for packing groups II and III;
 - Z – for packing group III only;
- d) The month and year (last two digits) of manufacture;
- e) The State authorizing the allocation of the mark; indicated by the distinguishing sign used on vehicles in international road traffic²²;
- f) The name or symbol of the manufacturer and other identification of the IBC as specified by the competent authority;
- g) The stacking test load in kg. For IBCs not designed for stacking, the figure "0" shall be shown
- h) The maximum permissible gross mass in kg.

The primary marking required above shall be applied in the sequence of the subparagraphs below. The marking required by 6.5.2.2 and any further marking authorized by a competent authority shall still enable the parts of the mark to be correctly identified. Each element of the marking applied in accordance with (a) to (h) and with 6.5.2.2 shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable.

6.5.2.1.2 IBCs manufactured from recycled plastics material as defined in 1.2.1 shall be marked "REC". For rigid IBCs this mark shall be placed near the marks prescribed in 6.5.2.1.1. For the inner receptacle of composite IBCs, this mark shall be placed near the marks prescribed in 6.5.2.2.4

6.5.2.1.3 Examples of marking for various types of IBC in accordance with 6.5.2.1.1 (a) to (h) above:.



11A/Y/02 03
UA/UMZ 777
5500/1500

For a metal IBC for solids discharged by gravity and made from steel / for packing groups II and

manufactured in February 2003

authorized by Ukraine

manufactured by "South Machine-Building Plant", and of a design type to which the competent authority has allocated serial number 777

the stacking test load 5500 kg

the maximum permissible gross mass 1500 kg.

13H3/Z/03 03

For a flexible IBC for solids discharged for instance by gravity

² Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.



Fin/Nokia 1713
0/1500

and made from woven plastics with a liner.
Not designed to be stacked.



31H1/Y/07 03
RUS/JSK "NZHK"
45165/1200

For a rigid plastics IBC for liquids made from plastics with structural equipment withstanding the stack load.



31HA1/Y/05 05
SK/Tatra 1683
10800/1200

For a composite IBC for liquids with a rigid plastics inner receptacle and a steel outer casing..



11C/X/11 03
PL/Hortex 6366
3000/910

For a wooden IBC for solids with an inner liner authorized for packing groups I, II and III solids.

6.5.2.1.4 Where an IBC conforms to one or more than one tested IBC design type, including one or more than one tested packaging or large packaging design type, the IBC may bear more than one mark to indicate the relevant performance test requirements that have been met. Where more than one mark appears on an IBC, the marks shall appear in close proximity to one another and each mark shall appear in its entirety

6.5.2.2 Additional marking

6.5.2.2.1 Each IBC shall bear the markings required in 6.5.2.1 and, in addition, the following markings which may appear on a corrosion-resistant plate permanently attached in a place readily accessible for inspection:

Table 6.5.2.2.1

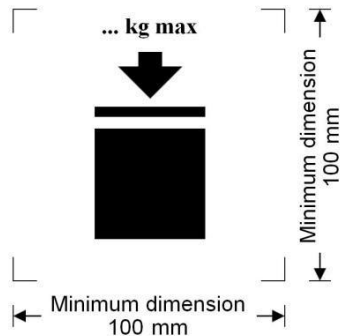
Additional marking	Material of IBC body or category of IBC				
	Metal	Rigid plastics	Composite	Fibreboard	Wooden
Capacity (in litres at 20 °C*),	X	X	X		
Tare mass in kg *	X	X	X	X	X
Test (gauge) pressure, in kPa or bar*, if applicable		X	X		
Maximum filling / discharge pressure in kPa (bar) *, if applicable	X	X	X		
Body material and its minimum thickness in mm	X				
Date of last leakproofness test, if applicable (month and year)	X	X	X		
Date of last inspection (month and year)	X	X	X		
Serial number assigned by the manufacturer	X				

X - The data required shall be indicated

* - The unit used shall be indicated

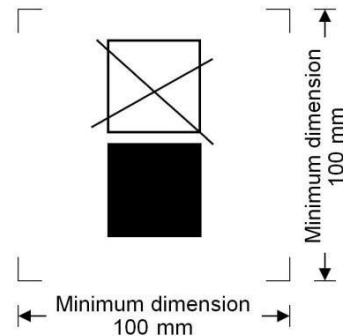
- 6.5.2.2.2** The maximum permitted stacking load shall be displayed on a symbol as shown in Figure 6.5.2.2.2.1 or Figure 6.5.2.2.2.2. The symbol shall be durable and clearly visible.

Figure 6.5.2.2.2.1



IBCs capable of being stacked

Figure 6.5.2.2.2.2



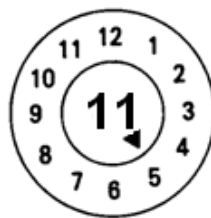
IBCs NOT capable of being stacked

The minimum dimensions shall be 100 mm $\square$ 100 mm. The letters and numbers indicating the mass shall be at least 12 mm high. The area within the printer's marks indicated by the dimensional arrows shall be square. Where dimensions are not specified, all features shall be in approximate proportion to those shown. The mass marked above the symbol shall not exceed the load imposed during the design type test (see 6.5.6.6.4) divided by 1.8.

- 6.5.2.2.3** In addition to the markings required in 6.5.2.1, flexible IBCs may bear a pictogram indicating recommended lifting methods

- 6.5.2.2.4** The inner receptacle of composite IBCs shall bear the markings indicated in 6.5.2.1.1 (b), (c), (d) (where the date of the manufacture of the plastics inner receptacle is specified), (e) and (f). The UN packaging symbol shall not be applied. The marking shall be applied in the sequence shown in 6.5.2.1.1. They shall be durable, legible and placed in a location so as to be readily accessible for inspection after assembling the inner receptacle in the outer casing. When the marks on the inner receptacle are not readily accessible for inspection due to the design of the outer casing, a duplicate of the required marks 6.5-5 on the inner receptacle shall be placed on the outer casing preceded by the wording "Inner receptacle". This duplicate shall be durable, legible and placed in a location so as to be readily accessible for inspection.

The date of the manufacture of the plastics inner receptacle may alternatively be marked on the inner receptacle adjacent to the remainder of the marking. In such a case, the date may be waived from the remainder of the marks. An example of an appropriate marking method is:



Note 1: Other methods that provide the minimum required information in a durable, visible and legible form are also acceptable.

Note 2: The date of manufacture of the inner receptacle may be different from the marked date of manufacture (see 6.5.2.1), repair (see 6.5.4.5.3) or remanufacture (see 6.5.2.4) of the composite IBC.

- 6.5.2.2.5** Where a composite IBCs is designed in such a manner that the outer casing is intended to be dismantled for carriage when empty (such as for return of the IBC for reuse to the original consignor), each of the parts intended to be detached when so dismantled shall be marked with the month and year of manufacture and the name or symbol of the manufacturer and other identification of the IBC as specified by the competent authority (see 6.5.2.1.1 (f)).

6.5.2.3 Conformity to design type

The marking indicates that IBCs correspond to a successfully tested design type and that the requirements referred to in the certificate have been met.

6.5.2.4 Marking of remanufactured composite IBCs (31HZ1)

The marking specified in 6.5.2.1.1 and 6.5.2.2 shall be removed from the original IBC or made permanently illegible and new markings shall be applied to an IBC remanufactured in accordance with Annex 2 to SMGS.

6.5.3 CONSTRUCTION REQUIREMENTS

6.5.3.1 General requirements

6.5.3.1.1 IBCs shall be resistant to or adequately protected from deterioration due to the external environment.

6.5.3.1.2 IBCs shall be so constructed and closed that none of the contents can escape under normal conditions of carriage including the effect of vibration, or by changes in temperature, humidity or pressure.

6.5.3.1.3 KCM IBCs and their closures shall be constructed of materials compatible with their contents, or be protected internally, so that they are not liable:

- a) To be attacked by the contents so as to make their use dangerous;
- b) To cause the contents to react or decompose, or form harmful or dangerous compounds with the IBCs.

6.5.3.1.4 Gaskets, where used, shall be made of materials not subject to attack by the contents of the IBCs.

6.5.3.1.5 All service equipment shall be so positioned or protected as to minimize the risk of escape of the contents owing to damage during filling/discharge handling and carriage.

6.5.3.1.6 IBCs, their attachments and their service and structural equipment shall be designed to withstand, without loss of contents, the internal pressure of the contents and the stresses of normal filling /discharge handling and carriage. IBCs intended for stacking shall be designed for stacking. Any lifting or securing attachments of IBCs shall be of sufficient strength to withstand the normal conditions of filling/discharge handling and carriage without gross distortion or failure and shall be so positioned that no undue stress is caused in any part of the IBC.

6.5.3.1.7 Where an IBC consists of a body within a framework it shall be so constructed that:

- a) The body does not chafe or rub against the framework so as to cause material damage to the body;
- b) The body is retained within the framework at all times;
- c) The items of equipment are fixed in such a way that they cannot be damaged if the connections between body and frame allow relative expansion or movement.

6.5.3.1.8 Where a bottom discharge valve is fitted, it shall be capable of being made secure in the closed position and the whole discharge system shall be suitably protected from damage. Valves having lever closures shall be able to be secured against accidental opening. The open or closed position shall be readily apparent. For IBCs containing liquids, a secondary means of sealing the discharge aperture shall also be provided, e.g. a blank flange or equivalent device.

6.5.4 TESTING, CERTIFICATION AND INSPECTION

6.5.4.1 *Quality assurance:* the IBCs shall be manufactured, remanufactured, repaired and tested under a quality assurance programme which satisfies the competent authority, in order to ensure that each manufactured, remanufactured or repaired IBC meets the requirements of this Chapter.

Note: *ISO 16106:2020 "Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001" provides acceptable guidance on procedures which may be followed.*

6.5.4.2 **Test requirements:** IBCs shall be subject to design type tests and, if applicable, to initial and periodic inspections and tests in accordance with 6.5.4.4.

6.5.4.3 **Certification:** in respect of each design type of IBC a certificate and mark (as in 6.5.2) shall be issued attesting that the design type, including its equipment, meets the test requirements.

6.5.4.4 Inspection and testing

Note: *See also 6.5.4.5 for tests and inspections on repaired IBCs.*

6.5.4.4.1 Every metal, rigid plastics and composite IBC shall be inspected to the satisfaction of the competent authority

a) before it is put into service (including after remanufactured), and thereafter at intervals not exceeding five years, with regard to:

- conformity to design type including marking;
- internal and external surface condition;
- proper functioning of service equipment.

Thermal insulation, if any, need be removed only to the extent necessary for a proper examination of the body of the IBC.

b) at intervals of not more than two and a half years, with regard to:

- internal and external surface condition;
- proper functioning of service equipment.

Thermal insulation, if any, need be removed only to the extent necessary for a proper examination of the body of the IBC.

Each IBC shall correspond in all respects to its design type.

6.5.4.4.2 Every metal, rigid plastics and composite IBC for liquids, or for solids which are filled or discharged under pressure, shall undergo a suitable leakproofness test. This test is part of a quality assurance programme as stipulated in 6.5.4.1 which shows the capability of meeting the appropriate test level indicated in 6.5.6.7.3

a) before it is first used for carriage;

b) at intervals of not more than two and a half years

For this test the IBC shall be fitted with the primary bottom closure. The inner receptacle of a composite IBC may be tested without the outer casing, provided that the test results are not affected.

6.5.4.4.3 A report of each inspection and test shall be kept by the owner of the IBC at least until the next inspection or test. The report shall include the results of the inspection and test and shall identify the party performing the inspection and test (see also the marking requirements in 6.5.2.2.1).

6.5.4.4.4 The competent authority may at any time require proof, by tests in accordance with this Chapter, that IBCs meet the requirements of the design type tests.

6.5.4.5 Repaired IBCs

6.5.4.5.1 When an IBC is impaired as a result of an accident or any other cause, it shall be repaired or otherwise maintained (see definition of "Routine maintenance of IBCs" in 1.2.1), so as to conform to the design type. The bodies of rigid plastics IBCs and the inner receptacles of composite IBCs that are impaired shall be replaced

6.5.4.5.2 In addition to any other testing and inspection requirements in Annex 2 to SMGS, an IBC shall be subjected to the full testing and inspection requirements set out in 6.5.4.4, and the required reports shall be prepared, whenever it is repaired.

6.5.4.5.3 The party performing the tests and inspections after the repair shall durably mark the IBC near the manufacturer's UN design type marking to show:

- a) the State in which the tests and inspections were carried out;
- b) the name or authorized symbol of the party performing the tests and inspections; and
- c) the date (month, year) of the tests and inspections.

6.5.4.5.4 Test and inspections performed in accordance with 6.5.4.5.2 may be considered to satisfy the requirements for the two and a half and five year periodic tests and inspections.

6.5.5 SPECIFIC REQUIREMENTS FOR IBCs

6.5.5.1 Specific requirements for metal IBCs

6.5.5.1.1 These requirements apply to metal IBCs intended for the carriage of solids and liquids. There are three categories of metal IBCs:

- a) 11A, 11B, 11N (for solids which are filled or discharged by gravity;

b) 21A, 21B, 21N (those for solids which are filled or discharged at a gauge pressure greater than 10 kPa);

c) 31A, 31B, 31N (for liquids).

6.5.5.1.2 Bodies shall be made of suitable ductile metal in which the weldability has been fully demonstrated. Welds shall be skilfully made and afford complete safety. Low temperature performance of the material shall be taken into account when appropriate.

6.5.5.1.3 Care shall be taken to avoid damage by galvanic action due to the juxtaposition of dissimilar metals.

6.5.5.1.4 Aluminium IBCs intended for the carriage of flammable liquids shall have no movable parts (such as covers, closures etc.) made of unprotected steel liable to rust, which might cause a dangerous reaction by coming into frictional or percussive contact with the aluminium.

6.5.5.1.5 Metal IBCs shall be made of metals which meet the following requirements:

a) for steel the elongation at fracture (in %) shall not be less than

$$\frac{10000}{R_m} \text{ (with an absolute minimum of 20\%);}$$

where:

R_m – guaranteed minimum tensile strength of the steel to be used, in MPa

b) for aluminium and its alloy the elongation at fracture (in %) shall not be less than

$$\frac{10000}{6R_m} \text{ (with an absolute minimum of 8\%).}$$

Specimens used to determine the elongation at fracture shall be taken transversely to the direction of rolling and be so secured that:

$L_0 = 5d$ or

$$L_0 = 5,65\sqrt{A}$$

where:

L_0 – gauge length of the specimen before the test;

d – diameter;

A – cross sectional area of the test specimen.

6.5.5.1.6 Minimum wall thickness

Metal IBCs with a capacity of more than 1500 litres shall comply with the following minimum wall thickness requirement:

a) for reference steel having a product $R_m \times A_0 = 10000$, the wall thickness shall not be less than the values indicated in the Table:

Table 6.5.3.1.6.

Wall thickness (T),mm			
Types 11A, 11B, 11N		Types 21A, 21B, 21N, 31A, 31B, 31N	
unprotected	protected	unprotected	Protected
2,0	1,5	2,5	2,0
$T = C/2000 + 1,5$	$T = C/2000 + 1,0$	$T = C/2000 + 1,0$	$T = C/2000 + 1,5$

where:

A_0 – minimum elongation of the reference steel to be used (in %) under tensile stress (see 6.5.5.1.5);

C - capacity in litres

- b) for metals other than the reference steel, the minimum wall thickness is given by the following equivalence formula:

$$e_1 = \frac{21,4 \times e_0}{\sqrt[3]{Rm_1 \times A_1}}$$

where:

e_1 – equivalent wall thickness of the metal to be used, in mm ;

e_0 – minimum wall thickness for the reference steel, in mm;

Rm_1 – guaranteed minimum tensile strength of the metal to be used, in MPa (see. (c));

A_1 – minimum elongation in %, of the metal to be used under tensile stress (see 6.5.5.1.5).

However, in no case shall the wall thickness be less than 1,5 mm.

- c) the guaranteed minimum tensile strength of the metal to be used (Rm_1) shall be the minimum value according to national or international material standards. For austenitic steels, the specified value for Rm according to the material standards may be increased by up to 15 % when a grater is attested in the material inspection certificate. When no material standard exists for the material in question, the value of Rm shall be the minimum value attested in the material inspection certificate.

6.5.5.1.7 Pressure relief requirements: IBCs for liquids shall be capable of releasing a sufficient amount of vapour in the event of fire engulfment to ensure that no rupture of the body will occur. This can be achieved by conventional pressure relief devices or by other constructional means. The start-to-discharge pressure shall not to be higher than kPa (0,65 bar) and not lower than the total gauge manometrical pressure in the IBC (i.e.the vapour pressure of the filling substance plus the partial pressure of the air or other inert gases, minus 100 kPa (1 bar)) at 55°C, determined on the basis of a maximum degree of filling as defined in 4.1.1.4. The required relief devices shall be fitted in the vapour area.

6.5.5.2 Flexible IBCs

6.5.5.2.1 These following requirements apply to flexible IBCs of the following types:

13H1 (woven plastics without coating or liner)

13H2 (woven plastics , coated)

13H3 (woven plastics with liner)

13H4 (woven plastics, coated and with liner)

13H5 (plastics film)

13L1 (textile without coating or liner)

13L2 (textile, coated)

13L3 (textile with liner)

13L4 (textile, coated and with liner)

13M1 (paper, multiwall)

13M2 (paper, multiwall, water resistant)

Flexible IBCs are intended for the carriage of solids only.

6.5.5.2.2 Body of IBC shall be manufactured from suitable materials. The strength of the material and the construction of the flexible IBC shall be appropriate to its capacity and its intended use.

6.5.5.2.3 All materials used in the construction of flexible IBCs of Codes 13M1 и 13M2 shall, after complete immersion in water for not less than 24 hours, retain at least 85% of the tensile strength as measured originally on material at 67% relative humidity.

6.5.5.2.4 Seams (welds) shall be formed by stitching, heat sealing, gluing or any equivalent method. All stitched seam-ends shall be secured.

6.5.5.2.5 Flexible IBCs shall provide adequate resistance to ageing and to degradation caused by ultraviolet radiation or the climatic conditions, or by the substance contained, thereby rendering them appropriate to their intended use.

- 6.5.5.2.6** For flexible plastics IBCs where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the body. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the tested design type, re-testing may be waived if changes in the carbon black content, the pigment content or inhibitor content do not adversely affect the physical or mechanical properties of the material of construction.
- 6.5.5.2.7** Additives may be incorporated into the material of the body to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.
- 6.5.5.2.8** No material recovered from used receptacles shall be used in the manufacture of IBC bodies. Production residues or scrap from the same manufacturing process may, however, be used. Component parts such as fittings and pallet bases may also be used provided that such components have not in any way been damaged in previous use.
- 6.5.5.2.9** When filled, the ratio of height to weight shall be not more than 2:1.
- 6.5.5.2.10** The liner shall be made of a suitable material. The strength of the material used and the construction of the liner shall be appropriate to the capacity of the IBC and the intended use. Joins and closures shall be sift-proof and capable of withstanding pressures and impacts liable to occur under normal conditions of filling, discharging and carriage.
- 6.5.5.3** Rigid plastics IBCs
- 6.5.5.3.1** These requirements apply to rigid plastics IBCs for the carriage of solids or liquids. Rigid plastics IBCs have following codes:
- 11H1 (for solids which are filled and/or discharged by gravity, fitted with structural equipment designed to withstand the whole load when IBCs are stacked);
- 11H2 (for solids which are filled and/or discharged by gravity, freestanding);
- 21H1 (for solids which are filled and/or discharged under pressure, fitted with structural equipment designed to withstand the whole load when IBCs are stacked);
- 21H2 (for solids which are filled and/or discharged under pressure, freestanding);
- 31H1 (for liquids, fitted with structural equipment designed to withstand the whole load when IBCs are stacked);
- 31H2 (for liquids, freestanding).
- 6.5.5.3.2** The body shall be manufactured from suitable material of known specifications and be of adequate strength in relation to its capacity and its intended use. Except for recycled plastics material as defined in 1.2.1, no used material other than production residues or regrind from the same manufacturing process may be used. The material shall be adequately resistant to ageing and to degradation caused by the substance contained or, where relevant, by ultraviolet radiation. Low temperature performance shall be taken into account when appropriate. Leakage of the substance contained shall not constitute a danger under normal condition of carriage.
- 6.5.5.3.3** Where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the body. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the tested design type, re-testing may be waived if changes in the carbon black content, the pigment content or the inhibitor content do not adversely affect the physical mechanical properties of the material of construction.
- 6.5.5.3.4** Additives may be incorporated in the material of the body to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.
- 6.5.5.3.5** No used material other than production residues or regrind from the same manufacturing process may be used in the manufacture of rigid plastics IBCs.
- 6.5.5.4** **Composite IBCs with plastics inner receptacles**
- 6.5.5.4.1** These requirements apply to composite IBCs for the carriage of solids and liquids of the following codes:

11HZ1 (Composite IBCs with a rigid plastics inner receptacle, for solids filled or discharged by gravity);

11HZ2 (Composite IBCs with a flexible plastics inner receptacle, for solids filled or discharged by gravity);

21HZ1 (Composite IBCs with a rigid plastics inner receptacle, for solids filled or discharged under pressure);

21HZ2 (Composite IBCs with a flexible plastics inner receptacle, for solids filled or discharged under pressure);

31HZ1 (Composite IBCs with a rigid plastics inner receptacle, for liquids);

31HZ2 (Composite IBCs with a flexible plastics inner receptacle, for liquids).

This code shall be completed by replacing the letter Z by a capital letter in accordance with 6.5.1.4.1 b) to indicate the nature of the material used for the outer casing.

- 6.5.5.4.2** The inner receptacle is not intended to perform a containment function without its outer casing. A "rigid" inner receptacle is a receptacle which retains its general shape when empty without closures in place and without benefit of the outer casing. Any receptacle that is "rigid" is considered to be "flexible".
- 6.5.5.4.3** The outer casing normally consists of rigid material formed so as to protect the inner receptacle from mechanical damage during filling/discharging and carriage but is not intend to perform the containment function. It includes the base (pallet) where appropriate.
- 6.5.5.4.4** A composite IBC with a fully enclosing outer casing shall be so considered that the integrity of the inner receptacle may be readily assessed following the leakproofness and hydraulic pressure tests.
- 6.5.5.4.5** IBCs of code 31HZ2 shall be limited to a capacity of not more than 1 250 liters.
- 6.5.5.4.6** The inner receptacle shall be manufactured from suitable plastics material of known specifications and be of adequate strength in relation to its capacity and its intended use. Except for recycled plastics material as defined in 1.2.1, no used material other than production residues or regrind from the same manufacturing process may be used. The material shall be adequately resistant to ageing and to degradation caused by the substance contained or, where relevant, by ultraviolet radiation. Low temperature performance shall be taken into account when appropriate. Any leakage of the substance contained shall not constitute a danger under normal conditions of carriage.
- 6.5.5.4.7** Where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the inner receptacle. Where use is made of carbon black, pigments or inhibitors, other than those used in the manufacture of the tested design type, retesting may be waived if changes in carbon black content, the pigment content or the inhibitor content do not adversely affect the physical properties of the material of construction.
- 6.5.5.4.8** Additives may be incorporated in the material of the inner receptacle to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.
- 6.5.5.4.9** The inner receptacle of IBCs type 31HZ2 shall consist of at least three plies of film.
- 6.5.5.4.10** The strength of the material and the construction of the outer casing shall be appropriate to the capacity of the composite IBC and its intended use.
- 6.5.5.4.11** The outer casing shall be free of any projection that might damage the inner receptacle.
- 6.5.5.4.12** Metal outer casing shall be manufactured of a suitable metal of adequate thickness.
- 6.5.5.4.13** Outer casings of natural wooden shall be of well seasoned wood, commercially dry and free from defects that would sufficiently lessen the strength of any part of the casing. The tops and bottoms may be made of water resistant reconstituted wood such as hardboard, particle board or other suitable type.
- 6.5.5.4.14** Outer casings of plywood shall be made of well seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would sufficiently lessen the strength of the casing. All adjacent plies shall be glued with water resistant adhesive. Other suitable materials may be

used with plywood for the construction of casings. Casing shall be firmly nailed or secured to corner posts or ends or be assembled by equally suitable devices

- 6.5.5.4.15** The walls of reconstituted wood shall be made of water resistant reconstituted wood such as hardboard, particle board or other suitable type. Other parts of the casing may be made of other suitable material.
- 6.5.5.4.16** For fibreboard outer casings, strong and good quality solid or double-faced corrugated fibreboard (single- or multiwall) shall be used appropriate to the capacity of the casing and to its intended use. The water resistance of the outer surface shall be such that the increase in mass, as determined in a test carried out over 30 minutes by the Cobb method of determining water absorption, is not greater than 155 g/m² (see ISO 535:2014). Fibreboard shall have proper bending qualities. It shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending.
- 6.5.5.4.17** The ends of fibreboard outer casing may have a wooden frame or be entirely of wood. Reinforcements of wooden battens may be used.
- 6.5.5.4.18** Manufacturing joins in the fibreboard outer casing shall be taped and glued, or lapped and stitched with metal staples. Lapped joins shall have an appropriate overlap. Where closing is effected by gluing or taping, a water resistant adhesive shall be used.
- 6.5.5.4.19** Where the outer casing is of plastics material, the relevant requirements of 6.5.5.4.6–6.5.5.4.8. apply.
- 6.5.5.4.20** The outer casing of type 31HZ2 shall enclose the inner receptacle on all sides.
- 6.5.5.4.21** Any integral pallet base forming part of an IBC or any detachable pallet shall be suitable for mechanical filling or discharging IBC filled to its maximum permissible gross mass.
- 6.5.5.4.22** Any detachable pallet or integral pallet shall be designed so as to be free of any projection that might be liable to damage IBC when filling or discharging.
- 6.5.5.4.23** The outer casing shall be secured to any detachable pallet to ensure stability in filling/discharging and carriage. Where a detachable pallet is used, its top surface shall be free from sharp protrusions that might damage the IBC.
- 6.5.5.4.24** To increase stacking performance, the strengthening devices such as timber supports may be used but be external to the inner receptacle.
- 6.5.5.4.25** Where IBCs are intended for stacking, the bearing surface shall be such as to distribute the load in a safe manner. Such IBCs shall be designed so that the load is not supported by the inner receptacle.

6.5.5.5 Fibreboard IBCs

- 6.5.5.5.1** These requirements apply to fibreboard IBCs for the carriage of solids which are filled or discharged by gravity. Fibreboard IBCs are of following code 11G.
- 6.5.5.5.2** Fibreboard IBCs shall not incorporate top lifting devices.
- 6.5.5.5.3** The body shall be made of strong and good quality solid or double-faced corrugated fibreboard (single or multiwall), appropriate to the capacity of the IBC and to its intended use. The water resistance of the outer surface shall be such that the increase in mass, as determined in a test carried out over a period of 30 minutes by the Cobb method (used for determining water absorption), is not greater than 155 g/m² (see ISO 535:2014). It shall have proper bending qualities. Fibreboard shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting or corrugated fibreboard shall be firmly glued to the facings.
- 6.5.5.5.4** The walls, including top and bottom, shall have a minimum puncture resistance of 15 J (measured according ISO 3036:1975).
- 6.5.5.5.5** Manufacturing joins in the body of IBCs shall be made with an appropriate overlap and shall be taped, glued, stitched with metal staples or fastened by other means at least equally effective. Where joins are effected by gluing or taping, a water resistant adhesive shall be used. Metal staples shall pass completely through all pieces to be fastened and formed or protected so that any inner liner cannot be abraded or punctured by them.
- 6.5.5.5.6** The liner shall be made of a suitable material. The strength of the material used and the construction of the liner shall be appropriate to the capacity of the IBC and the intended use.

Joins and closures shall be shift-proof and capable of withstanding pressures and impacts liable to occur under normal conditions of filling, discharging and carriage.

- 6.5.5.5.7** Any integrated pallet forming part of the IBC or any detachable pallet shall be suitable for mechanical filling and discharging the IBC filled to its maximum permissible gross mass.
- 6.5.5.5.8** Any detachable pallet or integral pallet shall be designed so as to be free of any projection that might be liable to damage the IBC when filling or discharging.
- 6.5.5.5.9** The body shall be secured to any detachable pallet to ensure stability in filling/discharging and carriage. The top surface of a detachable pallet shall be free from sharp projection that might damage the IBC.
- 6.5.5.5.10** Strengthening devices such as timber supports to increase stacking performance may be used but shall be external to the liner.
- 6.5.5.5.11** Where IBCs are intended for stacking, the bearing surface shall be such as to distribute the load in a safe manner.
- 6.5.5.6** Wooden IBCs
 - 6.5.5.6.1** These requirements apply to wooden IBCs for the carriage of solids which are filled or discharged by gravity. Wooden IBCs are of following codes:
 - 11C (natural wood with inner liner)
 - 11D (plywood with inner liner)
 - 11F (reconstituted wood with inner liner).
 - 6.5.5.6.2** Wooden IBCs shall not incorporate top lifting devices.
 - 6.5.5.6.3** The strength of the materials used and method of construction of the body shall be appropriate to the capacity and intended use of the IBCs.
 - 6.5.5.6.4** Natural wood shall be well seasoned , commercially dry and free from defects that would lessn the strength of any part of the IBC. Each part of the IBC shall consist of one piece or be equivalent thereto. Parts are considered equivalent to one piece when a suitable method of glued assembly is used (as for instance Lidermann joint, tongue and groove joint, ship lap or rabbet joint); or butt joint with at least 2 corrugated metal fasteners at each joint, or when other methods at least equally effective are used.
 - 6.5.5.6.5** The plywood used for the body construction shall be at least 3-ply, well seasoned made of rotary cut, slice or sawn veneer, commercially dry and free from defects that would lessen the strength of the body. All adjacent plies shall be glued with water resistant adhesive. Other suitable materials may be used with plywood for the construction of the body.
 - 6.5.5.6.6** Water resistant reconstituted wood such as hardboard, particle board or other suitable type shall be used for the construction of the body of reconstituted wood.
 - 6.5.5.6.7** The body of the IBC shall be firmly nailed or secured to corner posts or ends or be assembled by equally suitable devices.
 - 6.5.5.6.8** The liner shall be made of a suitable material. The strength of the material used and the construction of the liner shall be appropriate to the capacity of the IBC and intended use. Joins and closures shall be sift-proof and capable of withstanding pressures and impacts liable to occur under normal conditions of filling/discharging and carriage.
 - 6.5.5.6.9** Any integral base forming part of the IBC or any detachable pallet shall be suitable for mechanical filling and discharging IBC filled to its maximum permissible gross mass.
 - 6.5.5.6.10** Any detachable pallet or integral base of IBC shall be designed so as to be free from projection that might be liable to damage IBC when filling and discharging.
 - 6.5.5.6.11** In order to ensure stability in filling /discharging and carriage the body of IBC shall be secured to any detachable pallet. Where a detachable pallet is used , its top surface shall be free from sharp projection that might damage the IBC.
 - 6.5.5.6.12** In order to increase stacking performance, strengthening devices such as timber supports may be used but shall be external to the liner.
 - 6.5.5.6.13** Where the IBCs are intended for stacking, the bearing surface shall be such as to distribute the load in a safety manner for stacked IBCs

6.5.6 TESTS for IBCs

6.5.6.1 Method and frequency of tests

6.5.6.1.1 Each IBC design type shall successfully pass the tests prescribed in this Chapter before being used and being approved by competent authority allowing the allocation of the mark. An IBC design type is defined by the design, size, material and thickness, manner of construction and means of filling and discharging but may include various surface treatments. The design type also includes IBCs which differ from the design type only in their lesser external dimension.

6.5.6.1.2 Tests shall be carried out on IBCs prepared for carriage. IBCs shall be filled as indicated in the relevant sections. The substances to be carried in the IBCs may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used it shall have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total package mass, so long as they are placed so that the test results are not affected.

6.5.6.2 Design type test

6.5.6.2.1 One IBC of each design type, size, wall thickness and technology of construction shall undergo the tests listed in the order shown in 6.5.6.3.7, and as set out in 6.5.6.4–6.5.6.13. These design tests shall be carried out as required by the competent authority.

6.5.6.2.2 To prove sufficient chemical compatibility with the contained goods or standard liquids in accordance with 6.5.6.3.3 or 6.5.6.3.5 for rigid plastics IBCs of type 31H2 and for composite IBCs of types 31HH1 and 31HH2, a second IBC may be used when the IBCs are designed to be stacked. In such case both IBCs shall be subjected to a preliminary storage in accordance with 6.5.6.3.3 или 6.5.6.3.5.

6.5.6.2.3 The competent authority may permit the selective testing of IBCs which differ only in minor respects from a tested type, e.g. with small reductions in external dimensions.

6.5.6.2.4 If detachable pallets are used in the tests, the test report issued in accordance with 6.5.6.14, shall include a technical description of the pallets used.

6.5.6.3 Preparation of IBC for testing

6.5.6.3.1 Paper and fiberboard IBCs and composite IBCs with fiberboard outer casings shall be conditioned for at least 24 hours in an atmosphere having a controlled temperature and relative humidity. There are three options, one of which shall be chosen. The preferred atmosphere is $23\text{ }^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and relative humidity $50 \pm 2\%$. The two other options are $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and relative humidity of $65 \pm 2\%$ or $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and relative humidity of $65 \pm 2\%$.

Note: *Average values shall fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to $\pm 5\%$, without significant impairment of test reproducibility.*

6.5.6.3.2 Additional steps shall be taken to ascertain that the plastics material used in the manufacture of rigid plastics IBCs (types 31H1 и 31H2) and composite IBCs (Types 31HZ1 и 31HZ2), complies respectively with the requirements in 6.5.5.3.2 to 6.5.5.3.4 and 6.5.5.4.6 to 6.5.5.4.8.

6.5.6.3.3 To prove there is sufficient chemical compatibility with the contained goods, the sample IBC shall be subjected to a preliminary storage for six months, during which the samples shall remain filled with the substances they are intended to contain or with substances which are known to have at least as severe a stress-cracking, weakening or molecular degradation influence on the plastics materials in question, and after which the samples shall be submitted to the applicable tests listed in the table in 6.5.6.3.7.

6.5.6.3.4 Where the satisfactory behavior of the plastics material has been established by other means, the above compatibility test may be dispensed with. Such procedures shall be at least equivalent to the above compatibility test and recognized by the competent authority.

6.5.6.3.5 For polyethylene rigid plastics IBCs (Types 31H1 и 31H2) in accordance with 6.5.5.3, and composite IBCs with polyethylene inner receptacle (Types 31HZ1 и 31HZ2) in accordance with 6.5.5.4, chemical compatibility with filling liquids assimilated in accordance with 4.1.1.21, may be verified as follows with standard liquids (see 6.1.6).

The standard liquids are representative for the processes of deterioration on polyethylene, as there are softening through swelling, cracking under stress, molecular degradation and combination thereof.

The sufficient chemical compatibility of the package may be verified by storage of the required test samples for 21 days at 40°C with the appropriate standard liquid(s); where this standard liquid is water, storage in accordance with this procedure is not required. Storage is not required either for test samples which are used for the stacking test in case of standard liquids “wetting solution” and “acetic acid”. After this storage, the test samples shall undergo the tests prescribed in 6.5.6.4 to 6.5.6.9.

The compatibility test for tert-Butyl hydroperoxide with more than 40% peroxide content and peroxyacetic acids of Class 5.2, shall be not carried out using standard liquids. For these substances, sufficient chemical compatibility of the test samples shall be verified during a storage period of six months at ambient temperature with the substances they are intended to carry.

Results of the procedure in accordance with this paragraph from polyethylene IBCs can be approved for an equal design type, the internal surface of which is fluorinated.

6.5.6.3.6 For IBC design types, made of polyethylene, as specified in 6.5.6.3.5, which have passed the test in 6.5.6.3.5, the chemical compatibility with filling substances may also be verified by laboratory tests proving that the effect of such filling substances on the test specimens is less than that appropriate standard liquids taking into account the relevant processes of deterioration. The same conditions as those set out in 4.1.1.21.2 shall apply with respect to relative density and vapour pressure

6.5.6.3.7 Design type tests required and its sequential order

Table 6.5.6.3.7

Type of IBC	Test types									
	Vibration	Bottom lift	Top lift	Stacking	Leakproofness	Hydraulic pressure	Drop	Ttopple	Righting	Tear ^a
Metal: 11A, 11B, 11N,	-	1. ^a	2.	3.	-	-	4. ^e	-	-	-
21A, 21B, 21N,	-	1. ^a	2.	3.	4.	5.	6. ^e	-	-	-
31A, 31B, 31N	1.	2. ^a	3.	4.	5.	6.	7. ^e	-	-	-
Flexibl e ^r : 13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1, 13M2		-	X ^c	X	-	-	X	X	X	X
Rigid plastic s 11H1, 11H2,		1. ^a	2.	3.	-	-	4.	-	-	-

21H1, 21H2,		1. ^a	2.	3.	4.	5.	6.	-	-	-
31H1, 31H2	1.	2. ^a	3.	4. ^f	5.	6.	7.	-	-	-
Composite: 11HZ 1, 11HZ 2,		1. ^a	2.	3.	-	-	4. ^e	-	-	-
21HZ 1, 21HZ 2,		1. ^a	2.	3.	4.	5.	6. ^e	-	-	-
31HZ 1, 31HZ 2	1.	2. ^a	3.	4. ^f	5.	6.	7. ^e	-	-	-
Fibreboard: 11G		1.	-	2.	-	-	3.	-	-	-
Wooden: 11C, 11D, 11F		1.	-	2.	-	-	3.	-	-	-

- a When IBCs are designed for this method of filling/discharging .
- b When IBCs are designed to be stacked.
- c When IBCs are designed to be lifted from the top or side.
- d Where the required test is indicated by «X», than the tests may be carried out in any order .
- e Another IBC of the same design may be used for the drop test.
- f Another IBC of the same design may be used for the vibration test.
- g The second IBC in accordance with 6.5.6.2.2 can be used out of the sequential order direct after preliminary storage.

6.5.6.4 Bottom lift test

6.5.6.4.1 Applicability

For all fibreboard and wooden IBCs , and for all types of IBC which are fitted with means of lifting from the base, as a design type test.

6.5.6.4.2 Preparation of the IBC for test

The IBC shall be filled. The mass of the filled IBC shall be 1.25 times the maximum permissible gross mass of this IBC. A load shall be evenly distributed.

6.5.6.4.3 Method of testing

The IBC shall be raised and lowered twice by a lift truck with the forks centrally positioned and spaced at three quarters of the dimension of the base (unless the points of forks entry are fixed). The forks shall penetrate to three quarters of the base dimension in the direction of forks entry. The test shall be repeated from each possible direction of forks entry.

6.5.6.4.4 Criteria for passing the test

No permanent deformation which renders the IBC, (including the base pallet, if any) unsafe for carriage, and no loss of contents.

6.5.6.5 Top lift test

6.5.6.5.1 Applicability

For all types of IBC which are designed to be lifted from the top and for flexible IBCs designed to be lifted from the top or the side, as design type test..

6.5.6.5.2 Preparation of the IBC for test .

Metal, rigid plastics and composite IBCs shall be filled. The mass of the filled IBC shall be twice the maximum permissible gross mass. Flexible IBCs shall be filled with a representative material and then shall be loaded to six times their maximum permissible gross mass. A load shall be evenly distributed.

6.5.6.5.3 Methods of testing

Metal and flexible IBCs shall be lifted in the manner for which they are designed until clear of the floor and maintained in the position for a period of five minutes.

Rigid plastics and composite IBCs shall be lifted:

- a) by each pair of diagonally opposite lifting devices, so that the hoisting forces are applied vertically, and maintained in that position for a period of five minutes; and ;
- b) by each pair of diagonally opposite lifting devices, so that the hoisting forces are applied toward the centre at 45° to the vertical, and maintained in that position for a period of five minutes.

6.5.6.5.4 Other methods of top lift testing and preparation at least equally effective may be used for flexible IBCs.

6.5.6.5.5 Criteria for passing the test:

- a) Metal, rigid plastics and composite IBCs:
 - IBCs remains safe for normal conditions of carriage, , ,
 - there is no observable permanent deformation of the IBC (including the base pallet, if any);
 - no loss of contents
- b) Flexible IBCs: no damage to the IBC or its lifting devices which renders the IBC unsafe for carriage or filling/discharging, and no loss of contents.

6.5.6.6 Stacking test

6.5.6.6.1 Applicability

For all types of IBC which are designed to be stacked on each other, as a design type test.

6.5.6.6.2 Preparation of the IBC for test

The IBC shall be filled to its maximum permissible gross mass. If the specific gravity of the product being used for testing makes this impracticable, the IBC shall additionally be loaded so that it is tested at its maximum permissible gross mass. The load shall be evenly distributed.

6.5.6.6.3 Method of testing

- a) The IBC shall be placed on its base on level hard ground and subjected to a uniformly distributed superimposed test load (see 6.5.6.6.4). For rigid plastics IBCs of type 31H2 and composite IBCs of types 31HH1 and 31HH2, a stacking test shall be carried out with the original filling substance or a standard liquid (see Section 6.1.6) in accordance with 6.5.6.3.3 or 6.5.6.3.5 using the second IBC in accordance with 6.5.6.2.2, after the preliminary storage. IBCs shall be subjected to the test load for a period of at least:
 - 5 minutes, for metal IBCs ;
 - 28 days at 40°C for rigid plastics IBCs of types 11H2, 21H2 and 31H2 and for composite IBCs with outer casing of plastics material which bear the stacking load (Type 11HH1, 11HH2, 21HH1, 21HH2, 31HH1 и 31HH2);
 - 24 hours, for all other types of IBC;.
- b) The test load shall be applied by one of the following methods:
 - one or more IBCs of the same type filled to maximum permissible gross mass stacked on the test IBC;
 - appropriate weights of cargos loaded on to either a flat plate or a reproduction of the base of the IBC, which is stacked on the test IBC

6.5.6.6.4 Calculation of superimposed test load

The load to be placed on the IBC shall be 1,8 times the combined maximum permissible gross mass of the number of similar IBCs that may be stacked on top of the IBC during carriage.

6.5.6.6.5 Criteria for passing the test

- a) All types of IBCs other than flexible : no permanent deformation which renders the IBC including the base pallet, if any, unsafe for carriage and no loss of contents.
- b) Flexible IBC :no deterioration of the body which renders the IBC unsafe for carriage and no loss of contents.

6.5.6.7 Leakproofness

6.5.6.7.1 Applicability

For those types of IBC used for liquids or solids filled or discharged under pressure, as a design type test and periodic test.

6.5.6.7.2 Preparation of the IBC for test

The test shall be carried out before the fitting of any thermal insulation equipment. Vented closures shall either be replaced by similar non-vented closures or the vent shall be sealed.

6.5.6.7.3 Method of testing and pressure to be applied

The test shall be carried out for a period of at least 10 minutes using air at a gauge pressure of not less than 20 kPa (0,2 bar). The air tightness of the IBC shall be determined by suitable method such as by air-pressure differential test or by immersing the IBC in water or, for metal IBCs , by coating the seams and joints with a soap solution.

6.5.6.7.4 Criterion for passing the test

No leakage of air.

6.5.6.8 Hydraulic test

6.5.6.8.1 Applicability

For those types of IBCs used for liquids or for solids filled or discharged under pressure, as a design type test.

6.5.6.8.2 Preparation of the IBC for test

The test shall be carried out before the fitting of any thermal insulation equipment.

Pressure-relief devices shall be removed (or shall be rendered inoperative) and their apertures sealed,

6.5.6.8.3 Method of test passing

The test shall be carried out for a period of at least 10 minutes applying a hydraulic pressure not less than that indicated in 6.5.6.8.4. The IBCs shall not be mechanically strained during the test.

6.5.6.8.4 Pressure to be applied

6.5.6.8.4.1 Metal IBCs:

- a) for IBCs of types 21A, 21B and 21N, for packing group I solids, a 250 kPa (2,5 bar) gauge pressure;
- b) for IBCs of types 21A, 21B, 21N, 31A, 31B and 31N, for packing groups II or III substances, a 200 kPa (2 bar) gauge pressure;
- c) for IBCs of types 31A, 31B and 31N , a 65 kPa (0,65 bar). An additional test shall be carried out before the 200 kPa (2 bar) test.

6.5.6.8.4.2 Rigid plastics and composite IBC:

- a) for IBC of types 21H1, 21H2, 21HZ1 and 21HZ2 gauge pressure is 75 kPa (0,75 bar);
- b) for IBC of types 31H1, 31H2, 31HZ1 and 31HZ2: whichever is the greater of two values , the first as determined by one of the following methods:
 - the total gauge pressure measured in the IBC (i. e. the vapour pressure of the filling substance and the partial pressure of the air or other inert gases) at 55°C minus 100 kPa

multiplied by a safety factor of 1,5. This total gauge pressure shall be determined on the basis of maximum degree of filling in accordance with 4.1.1.4 and filling temperature of 15°C;

and the second as determined by the following method:

- twice the static pressure of the substance to be carried, with a minimum of twice the static pressure of water.

6.5.6.8.5 Criteria for passing the test(s):

- a) for IBCs of types 21A, 21B, 21N, 31A, 31B and 31N, when subjected to the test pressure specified in 6.5.6.8.4.1 a) or b): no leakage ;
- b) for IBCs of types 31B and 31N, when subjected to the test pressure specified in 6.5.6.8.4.1 c): no permanent deformation which renders the IBC unsafe for carriage and no leakage
- c) for rigid plastics and composite IBCs: no permanent deformation which would render the IBC unsafe for carriage and no leakage.

6.5.6.9 Drop test

6.5.6.9.1 Applicability

For all types of IBCs, as a design type test

6.5.6.9.2 Preparation of the IBC for test

- a) Metal IBC. The IBC shall be filled to not less than 95% of its maximum capacity for solids or 98% of its maximum capacity for liquids. Pressure-relief devices shall be removed or shall be rendered inoperative and their apertures plugged.
- b) Flexible IBCs: The IBC shall be filled to the maximum permissible gross mass, причем содержимое должно быть равномерно распределено. The contents shall be evenly distributed.
- c) Rigid plastics and composite IBCs. The IBC shall be filled to not less than 95% of its maximum capacity for solids or 98% of its maximum capacity for liquids. Pressure-relief devices shall be removed or rendered inoperative and their apertures plugged. Testing of IBCs shall be carried out when the temperature of the test sample and its contents has been reduced to minus 18°C. Where the test samples of composite IBCs are prepared in this way the conditioning specified in 6.5.6.3.1, may be waived. Test liquids shall be kept in the liquid state, if necessary by the addition of anti-freeze. This conditioning may be disregarded if the materials in question are of sufficient ductility and tensile strength at low temperatures.
- d) Fibreboard and wooden IBCs. The IBC shall be filled to not less than 95% of its maximum capacity.

6.5.6.9.3 Method of testing

The IBC shall be dropped on its base onto a non-resilient, horizontal, flat, massive and rigid surface in accordance with the requirements of 6.1.5.3.4, in such a manner as to ensure that the point of impact is the part of the base of the IBC considered to be the most vulnerable. IBCs of 0,45 m3 or less capacity shall be also dropped.

- a) Metal IBCs: on the most vulnerable part other than the part of the base tested in the first drop,
- b) Flexible IBCs on the most vulnerable side;
- c) Rigid plastics IBCs, fibreboard and wooden IBCs: flat on the side, flat on the top and on a corner.

The same IBCs or a different IBCs of the same design may be used for each drop.

6.5.6.9.4 Drop height

For solids and liquids, if the test is performed with the solid or liquid to be carried or with another substance having essentially the same physical characteristics.

Packing group I	Packing group II	Packing group III

1,8m	1,2 m	0,8 m

For liquids if the test is performed with water.

- a) Where the substances to be carried have a relative density not exceeding 1200 kg/m³:

Packing group II	Packing group III
1,2 m	0,8 m

- b) Where the substance to be carried have a relative density exceeding 1200 kg/m³, the drop heights shall be calculated on the basis of the relative density (d) of the substance to be carried up to the first decimal as follows:

Packing group II	Packing group III
$d \times 10^{-3} \times 1,0 \text{ m}$	$d \times 10^{-3} \times 0,67 \text{ m}$

6.5.6.9.5 Criteria for passing the test(s):

- Metal IBCs : no loss of contents.
- Flexible IBCs : no loss of contents. A slight discharge, e.g. from closures or stitch holes, upon impact shall not be considered to be a failure of the IBC provided that no further leakage occurs after the IBC has been raised clear of ground.
- Rigid plastics, composite, wooden, and fiberboard IBCs: no loss of contents. A slight discharge from a closure upon impact shall not be considered to be a failure of the IBC provided that no further leakage occurs.
- All IBC: no damage which renders the IBC unsafe to be carried for salvage or for disposal, and no loss of contents. In addition, the IBC shall be capable of being lifted by an appropriated means until clear of the floor for five minutes.

Note: The criteria in (d) apply to design types for IBCs manufactured as from 1 January 2011.

6.5.6.10 Tear test

6.5.6.10.1 Applicability

For all types of flexible IBCs, as design type test.

6.5.6.10.2 Preparation of the IBC for test.

The IBC shall be filled to no less than 95% of its capacity and its maximum permissible gross mass. The contents shall be evenly distributed.

6.5.6.10.3 Method of testing

Once the IBC is placed on the ground, a 100 mm knife score, completely penetrating the wall of a wide face, is made at a 45° angle to the principal axis of the IBC, halfway between the bottom surface and the top level of the contents. The IBC shall then be subjected to evenly distributed superimposed load equivalent to twice the maximum permissible gross mass. The load shall be applied for at least five minutes. An IBC which is designed to be lifted from the top or the side shall then, after removal of the superimposed load, be lifted clear of the floor and maintained in that position for a period of five minutes.

6.5.6.10.4 Criterion for passing test

The cut shall not propagate more than 25% of its original length.

6.5.6.11 Topple test

6.5.6.11.1 Applicability

For all types of flexible IBC, as a design type test.

6.5.6.11.2 Preparation of the IBC for test

The IBC shall be filled to no less than 95% of its capacity and its maximum permissible gross mass. The contents shall be evenly distributed.

6.5.6.11.3 Method of testing

The IBC shall be caused to topple on to any part of its top on to a rigid, non resilient, smooth, flat and horizontal surface.

6.5.6.11.4 Topple height

Packing group I	Packing group II	Packing group III
1,8 m	1,2 m	0,8 m

6.5.6.11.5 Criteria for passing the test

No loss of contents. A slight discharge, e.g. from closures or stitch holes upon impact shall not be considered to be a failure of the IBC provided that no further leakage occurs.

6.5.6.12 Righting test

6.5.6.12.1 Applicability

For all flexible IBCs designed to be lifted from the top or side, as a design type test.

6.5.6.12.2 Preparation of the IBC for test

The IBC shall be filled to no less than 95% of its capacity and its maximum permissible gross mass. The contents shall be evenly distributed.

6.5.6.12.3 Method of testing

The IBC, lying on its side, shall be lifted at a speed of at least 0,1 m/s to upright position, clear of the floor, by one lifting device or by 2 lifting devices when 4 are provided.

6.5.6.12.4 Criteria for passing test

No damage to the IBC or its lifting devices which renders the IBC unsafe for carriage or filling/discharging.

6.5.6.13 Vibration test

6.5.6.13.1 Applicability

For all IBCs used for liquids, as design type test

Note: This test applies to design types for IBCs manufactured after 01.01.2011 (see also 1.6.1.14)

6.5.6.13.2 Preparation of the IBC for test

A sample IBC shall be selected by random and shall be fitted and closed as for carriage. It shall be filled to not less than 98% of its maximum capacity.

6.5.6.13.3 The method and duration of testing

6.5.6.13.3.1 The IBC shall be placed in the center of the test machine platform with a vertical sinusoidal, double amplitude (peak-to-peak displacement) of 25 mm $\pm$ 5%. If necessary, restraining devices shall be attached to the platform to prevent the specimen from moving horizontally off the platform with restricting vertical movement.

6.5.6.13.3.2 The test shall be conducted for 60 minutes at a frequency that causes part of the base of the IBC to be momentarily raised from the vibrating platform for part of each cycle to such a degree that a metal shim can be completely inserted intermittently at, at least, one point between the base and of the IBC and the test platform. The frequency may need to be adjusted after the initial set point to prevent the packaging from going into resonance. Nevertheless, the test frequency shall continue to allow placement of the metal shim under the IBC as described in this paragraph. The continuing ability to insert the metal shim is essential to passing the test. The metal shim used for this test shall be at least 1.6 mm thick, 50 mm wide, and be of sufficient length to be inserted between the IBC and the test platform a minimum of 100 mm to perform the test.

6.5.6.13.4 Criteria for passing the test

No leakage or rupture shall be observed. In addition, no breakage or failure of structural components, such as broken welds or failed fastenings, shall be observed.

6.5.6.14 Test report .

6.5.6.14.1 A test report containing at least the following particulars shall be drawn up and shall be made available to the users of the IBC:

1. Name and address of the test facility
2. Name and address of the applicant (where appropriate).
3. A unique test report number .
4. Date of the test report
5. Manufacturer of the IBC .
6. Description of the design type (dimensions, materials, closures, thickness etc.), including method of manufacturing (e.g. blow moulding), which may include drawing (s) and/or photograph(s).
7. Maximum capacity
8. Characteristics of the contents, e.g. viscosity and relative density for liquids and particle size for solids. For rigid plastics and composite IBCs subject to the hydraulic pressure test in 6.5.6.8, the temperature of the water used;
9. Test descriptions and results,
10. The test report shall be signed with the name and status of the signatory.

6.5.6.14.2 The test report shall contain statements that the IBC prepared as for carriage, was tested in accordance with the appropriate requirements of this Chapter and that the use of other packaging methods or components may render it invalid. A copy of the test report shall be available to the competent authority.

CHAPTER 6.6

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF LARGE PACKAGINGS

6.6.1 GENERAL PROVISIONS

6.6.1.1 The requirements of this Chapter do not apply to:

- a) packagings for Class 2, except large packagings for articles, including aerosols (aerosol package);
- b) packagings for Class 6.2, except large packagings for clinical waste of UN 3291,
- c) Class 7 packages containing radioactive material.

6.6.1.2 Large packagings shall be manufactured, tested and remanufactured under a quality assurance programme which satisfies the competent authority in order to ensure that each manufactured or remanufactured large packaging meets the requirements of this Chapter.

Note: *ISO 16106:2020 (Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001)» provides acceptable guidance on procedures which may be followed.*

6.6.1.3 The specific requirements for large packagings in 6.6.4 are based on large packagings currently used. In order to take into account progress in science and technology, there is no objection to the use of large packagings having specifications different from those in 6.6.4, provided they are equally effective, acceptable to the competent authority and fulfil the requirements described in 6.6.5. Methods of testing other than those described in Annex 2 to SMGS are acceptable provided they are equivalent and are recognized by the competent authority.

6.6.1.4 Manufacturers and subsequent distributors of packagings shall provide information regarding procedures to be followed and a description of the types and dimensions of closures (including required gaskets) and any other components needed to ensure that packages as presented for carriage are capable of passing the applicable performance tests of this Chapter.

6.6.2 CODE FOR DESIGNATING TYPES OF LARGE PACKAGINGS

6.6.2.1 The code used for large packagings consists of:

- a) two Arabic numerals:
50 – for rigid large packagings;
51 – for flexible large packagings;
- b) A capital letter in Latin character indicating the nature of the material, e.g. wood, steel etc. The capital letters used shall be those shown in 6.1.2.6 or 6.5.1.4.1 b).

6.6.2.2 The letters "T" or "W" may follow the Large Packaging code. The letter "T" signifies a large salvage packaging conforming to the requirements of 6.6.5.1.9. The letter «W» signifies that the large packaging, although of the same type indicated by the code, is manufactured to a specification different from those in 6.6.4, and is considered equivalent in accordance with the requirements in 6.6.1.3.

6.6.3 MARKING

6.6.3.1 Primary marking: Each large packaging manufactured and intended for use in accordance with the provisions of Annex 2 to SMGS shall bear markings which are durable, legible and placed in a location so as to readily visible. Letters, numerals and symbols shall be at least 12 mm high and shall show:

- a) the United Nations packaging symbol . This symbol shall not be used for any purpose other than certifying that the packaging, a portable tank a flexible bulk container or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.11

For metal large packagings on which the marking is stamped or embossed, the capital letters "UN" may be applied instead of the symbol;

- b) The number "50" designating a large rigid packaging or "51" for flexible large packagings, followed by the material type in accordance with 6.1.2.6 or 6.5.1.4.1 b);
- c) A capital letter designating the packaging group for which the design type has been approved:
X – for packing groups I, II and III;

Y – for packing groups II and III;
Z – for packing group III;

- d) the month and year (last two digits) of manufacture ;
- e) the distinguishing sign of the state¹ authorizing the allocation of the mark and used on vehicles in international road traffic
- f) the name or symbol of manufacturer and other identification of the large packagings as specified by the competent authority;
- g) the staking lest load in kg. For large packaging not designed for staking the figure "0" shall be shown;
- h) maximum permissible gross mass in kilograms.

The primary marking required above shall be applied in the sequence of the subparagraphs.

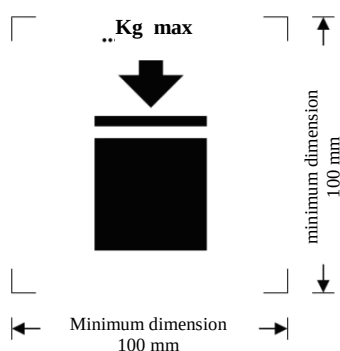
Each element of the marking applied in accordance with a) to h) shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable.

6.6.3.2 Examples of the marking

	50A/X/05 02/UA/PQRS/ 2500/1000	For a large steel packaging suitable for stacking; stacking load: 2500 kg; maximum gross mass: 1000 kg.
	50AT/Y/05/01/RUS/ABC/ 2500/1000	For a large steel salvage packaging suitable for stacking; stacking load: 2500 kg; maximum gross mass: 1000 kg.
	50H/Y/04 04/RUS/ABCD 987/ 0/800	For a large plastics packaging not suitable for stacking; stacking load maximum gross mass : 800 kg.
	51H/Z/0603/BY/19/ 0/500	For a large flexible packaging not suitable for stacking; maximum gross mass: 500 kg.

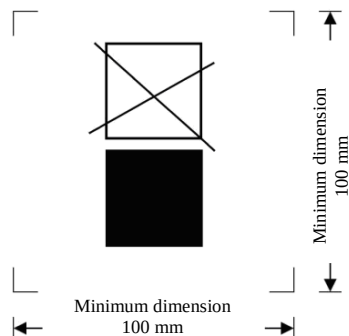
6.6.3.3 Maximum permitted stacking load shall be displayed on a symbol as shown in Figure 6.6.3.3.1 or in the Figure 6.6.3.3.2. The symbol shall be durable and clearly visible.

Figure 6.6.3.3.1



Large packagings capable of being stacked

Figure 6.6.3.3.2



Large packaging not capable of being stacked

The maximum dimension shall be: 100 x 100 mm. The letters and numbers indicating the mass shall be at least 12 mm high. The area within the printer's marks indicated by the dimensional arrows shall be square. Where dimension are not specified, all features shall be in approximate proportion to those shown. The mass marked above the symbol shall not exceed the load imposed during the design type test (see 6.6.5.3.3.4), divided by 1.8:

¹Distinguishing sign for motor vehicles in international traffic prescribed in Vienna Convention of 1949 or Vienna Convention on Road Traffic of 1968

6.6.3.4 Where a large packaging conforms to one or more than one tested large packaging design type, including one or more than one tested packaging or IBC design type, the large packaging may bear more than one mark to indicate the relevant performance test requirements that have been met. Where more than one mark appears on a large packaging, the marks shall appear in close proximity to one another and each mark shall appear in its entirety.

6.6.4 SPECIFIC REQUIREMENTS FOR LARGE PACKAGINGS

6.6.4.1 Metal large packagings

50A - steel

50B – aluminium

50N – metal (other than steel or aluminium)

6.6.4.1.1 The large packaging shall be made of suitable metal in which the weldability has been fully demonstrated. Welds shall be skillfully made and afford complete safety. Low-temperature performance shall be taken into account when appropriate.

6.6.4.1.2 Care shall be taken to avoid damage by galvanic action due to the juxtaposition of dissimilar metals.

6.6.4.2 Flexible material large packagings

51H – flexible plastics

51M – flexible paper

6.6.4.2.1 The large packaging shall be manufactured from suitable materials. The strength of the material and the construction of the flexible large packagings shall be appropriate to its capacity and intended use.

6.6.4.2.2 All materials used in the construction of flexible large packagings of types 51M shall, after complete immersion in water for not less than 24 hours, retain at least 85% of the tensile strength as measured originally on the material conditioned to equilibrium at 67% relative humidity or less.

6.6.4.2.3 Seams shall be formed by stitching, heat-sealing, glueing or any equivalent method. All stitched seam-ends shall be secured.

6.6.4.2.4 Flexible large packagings shall provide adequate resistance to ageing and deterioration caused by ultra-violet radiation or the climatic conditions, or by the substance contained, thereby rendering them appropriate to their intended use.

6.6.4.2.5 For plastics flexible large packagings where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with contents and remain effective throughout the life of the large packaging. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the tested design type, re-testing may be waived if changes in the carbon black content, the pigment content or the inhibitor content do not adversely affected the physical and mechanical properties of the material of construction.

6.6.4.2.6 Additives may be incorporated into the material of the large packaging to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.

6.6.4.2.7 When filled, the ratio of high to width of the large packaging shall be not more than 2:1.

6.6.4.3 Plastics large packagings

50H – rigid plastics

6.6.4.3.1 The large packaging shall be manufactured from suitable plastics material of known specifications and be of adequate strength in relation to its capacity and its intended use. The material shall be adequately resistant to ageing and to deterioration caused by the substance contained or, where relevant, by ultraviolet radiation. Low temperature performance shall be taken into account when appropriate. Any permeation of the substance contained shall not constitute a danger under normal conditions of carriage.

6.6.4.3.2 Where protection against ultraviolet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the outer packaging. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the tested design type, re-testing may be waived if changes in carbon black content, the pigment content or

the inhibitor content do not adversely affect the physical and mechanical properties of the material of construction.

- 6.6.4.3.3** Additives may be incorporated into the material of the large packaging to improve the resistance to ageing or to serve other purposes, provided that these do not adversely affect the physical or chemical properties of the material.

6.6.4.4 Fibreboard large packagings

50G – rigid fibreboard

- 6.6.4.4.1** Strong and good quality solid or double faced corrugated fibreboard (single or multiwall) shall be used, appropriate to capacity of the large packagings and to their intended use. The water resistance of the outer surface shall be such that the increase in mass, as determined in a test carried out over a period of 30 minutes by the Cobb method of determining water absorption, is not greater than 155 g/m² (see ISO 535:2014). It shall have proper bending qualities. Fibreboard shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting or corrugated fibreboard shall be firmly glued to the facings.
- 6.6.4.4.2** The walls, including top and bottom, shall have a minimum puncture resistance of 15 J measured according to ISO 3036:1975.
- 6.6.4.4.3** Manufacturing seams in the outer packaging of large packagings shall be made with an appropriate overlap and shall be taped, glued, stitched with metal staples or fastened by other means at least equally effective. Where joins are effected by gluing or taping, a water resistant adhesive shall be used. Metal staples shall pass completely through all pieces to be fastened and be formed or protected so that any inner liner cannot be abraded or punctured by them.
- 6.6.4.4.4** Any integral pallet base forming part of large packaging or any detachable pallet shall be suitable for mechanical filling or discharging of the large packaging filled to its maximum permissible gross mass.
- 6.6.4.4.5** The detachable pallet or integral base shall be designed so as to avoid any protrusion of the base of the large packaging that might be liable to damage when filling or discharging.
- 6.6.4.4.6** The body shall be secured to any detachable pallet to ensure stability in filling, discharging or carriage. Where the detachable pallet is used, its top surface shall be free from sharp protrusions that might damage the large packaging.
- 6.6.4.4.7** Strengthening devices such as timber supports to increase stacking performance may be used but shall be external to the liner.
- 6.6.4.4.8** Where large packagings are intended for stacking, the bearing surface shall be as to distribute the load in a safe manner

6.6.4.5 Wooden large packagings

50C – natural wood

50D - plywood

50F – reconstituted wood

- 6.6.4.5.1** The strength of the materials used and the method of construction shall be appropriate to the capacity and intended use of the large packagings.
- 6.6.4.5.2** Natural wood shall be well seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the large packagings. Each part of the large packagings shall consist of one piece or be equivalent thereof. Parts are considered equivalent to one piece when a suitable method of glued assembly is used as for instance Lindermann joint, tongue and groove joint, ship lap or rabbet joint or butt joint with at least two corrugated metal fasteners at each joint, or when other methods at least equally effective are used.
- 6.6.4.5.3** Large packagings of plywood shall be at least 3-ply. They shall be made of well seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the large packaging. All adjacent plies shall be glued with water resistant adhesive. Other suitable materials may be used with plywood for the construction of the large packaging.
- 6.6.4.5.4** Large packagings of reconstituted wood shall be made of water resistant reconstituted wood such as hard board, particle board or other suitable type.

- 6.6.4.5.5** Large packagings body shall be firmly nailed or secured to corner posts (ends) or be assembled by equally suitable devices.
- 6.6.4.5.6** Any integral bottom base forming part of a large packaging or any detachable pallet shall be suitable for mechanical filling or discharging of the large packaging filled to its maximum permissible gross mass.
- 6.6.4.5.7** A detachable pallet or integral base shall be designed so as to avoid any protrusion of the base of the large packaging that might be liable to damage when filling or discharging.
- 6.6.4.5.8** The body shall be secured to any detachable pallet to ensure stability when filling/discharging or carriage. Where a detachable pallet is used, its top surface shall be free from sharp protrusions that might damage the large packaging..
- 6.6.4.5.9** Strengthening devices such as timber supports to increase stacking performance may be used but shall be external to the liner.
- 6.6.4.5.10** Where large packagings are intended for stacking, the bearing surface shall be as to distribute the load in a safe manner.

6.6.5 TEST REQUIREMENTS FOR LARGE PACKAGINGS

6.6.5.1 Performance and frequency of test

- 6.6.5.1.1** .The design type of each large packaging shall be tested as provided in 6.6.5.3 in accordance with procedures established by the competent authority allowing the allocation of the mark and shall be approved by this competent authority.
- 6.6.5.1.2** Each large packaging design type shall successfully pass the test prescribed in this Chapter before being used. A large packaging design type is defined by the design, size, material and thickness, manner of construction and packing, but may include various surface treatments. It also includes large packagings which differ from the design type only in their lesser design height.
- 6.6.5.1.3** Tests shall be repeated on production samples at intervals established by competent authority. For such tests on fibreboard large packagings, preparation at ambient conditions is considered equivalent to the provisions of 6.6.5.2.4.
- 6.6.5.1.4** Tests shall also be repeated after each modification which alters the design, material or manner of construction of large packagings.
- 6.6.5.1.5** The competent authority may permit the selective testing of large packagings that differ only in minor respects from a tested type, e.g. smaller size of inner packagings or inner packagings of lower net mass, and large packagings which are produced with small reductions in external dimensions.
- 6.6.5.1.6** (reserved)

Note: *For the conditions for assembling different inner packagings in a large packaging and permissible variations in inner packagings, see 4.1.1.5.1.*

- 6.6.5.1.7** The competent authority may at any time require proof, by tests in accordance with this section, that serially-produced large packagings meet the requirements of the design type tests.
- 6.6.5.1.8** Provided that the validity of the test results is not affected and with the approval of the competent authority, several tests may be made on the same sample.

6.6.5.1.9 Large salvage packagings

Large salvage packagings shall be tested and marked in accordance with the provisions applicable to packagings group II large packagings intended for the carriage of solids or inner packagings, except as follows:

- a) The test substance used in performing the tests shall be water, and the large salvage packagings shall be filled to not less than 98 % of their maximum capacity. It is permissible to use additives, such as bags of lead shot, to achieve the required total package mass but they shall be placed so that the test results are not affected. In performing the drop test, the drop height may be varied in accordance with 6.6.5.3.4.4.2 b);
- b) The large salvage packagings shall, in addition, have been successfully subjected to the leakproofness test at 30 kPa. The results of this test shall be reflected in the test report, required by 6.6.5.4; and

c) Large salvage packagings shall be marked with the letter «T» as described in 6.6.2.2.

6.6.5.2 Preparation for testing

6.6.5.2.1 Tests shall be carried out on large packagings prepared as for carriage including the inner packagings or articles used. Inner packagings shall be filled to not less than 98% of their maximum capacity for liquids or 95% for solids. For large packagings where the inner packagings are designed to carry liquids and solids, separate testing is required for both liquid and solid contents. The substances in the inner packagings or the articles to be carried in the large packagings may be replaced by other material or articles except where this would invalidate the results of the tests. When other inner packagings or articles are used they shall have the same physical characteristics (masse etc.) as the inner packagings or articles to be carried. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total mass, so long as they are placed so that the test results are not affected

6.6.5.2.2 In the drop tests for liquids, when other substance is used, it shall be of similar relative density and viscosity to those of the substance being carried. Water may also be used for the liquid drop test under the conditions in 6.6.5.3.4.4.

6.6.5.2.3 Large packagings made of plastics material and large packagings containing inner packagings of plastic material – other than bags intended to contain solids or articles – shall be drop tested when the temperature of the test sample and its contents has been reduced to -18°C or lower. This conditioning may be disregarded if the materials in question are of sufficient ductility and tensile strength at low temperatures. Where test sample are prepared in this way, the conditioning in 6.6.5.2.4, may be waived. Test liquids shall be kept in the liquid state by the addition of anti-freeze if necessary.

6.6.5.2.4 Large packagings of fibreboard shall be conditioned for at least 24 hours in an atmosphere having a controlled temperature and relative humidity (r.h). There are three options, one of which shall be chosen.

The preferred atmosphere is $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and $50 \pm 2\%$ r.h. The two other options are $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and $65 \pm 2\%$ r.h. or $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and $65 \pm 2\%$ r.h.

Note: *Average values shall fall within these limits. Short term fluctuations and measurement limitations may cause individual measurements may vary by up to $\pm 5\%$ relative humidity without significant impairment of the test reproducibility.*

6.6.5.3 Test types

6.6.5.3.1 Bottom lift test

6.6.5.3.1.1 Applicability

For all types of large packagings which are fitted with means of lifting from the base, as design type test.

6.6.5.3.1.2 Preparation of large packaging for test

The large packaging shall be loaded to 1.25 times its maximum permissible gross mass, the load being evenly distributed.

6.6.5.3.1.3 Method of testing.

The large packaging shall be raised and lowered twice by lift truck with the forks centrally positioned and spaced at three quarters of the dimension of the side of entry (unless the points of entry are fixed). The forks shall penetrate to three quarters of the direction of entry. The test shall be repeated from each possible direction of entry.

6.6.5.3.1.4 Criteria for passing the test.

No permanent deformation which renders the large packaging unsafe for carriage and no loss of contents.

6.6.5.3.2 Top lift test

6.6.5.3.2.1 Applicability

For types of large packagings which are intended to be lifted from the top and fitted with means of lifting, as a design type test.

6.6.5.3.2.2 Preparation of large packaging for test

The large packaging shall be loaded to twice its maximum permissible gross mass. A flexible large packaging shall be loaded to six times its maximum permissible gross mass. The load shall be evenly distributed

6.6.5.3.2.3 Method of testing

The large packaging shall be lifted in the manner for which it is designed until clear of the floor and maintained in that position for a period of 5 minutes.

6.6.5.3.2.4 Criteria for passing the test

- a) All types of large packagings other than flexible large packagings: no permanent deformation which renders the large packaging (including the base pallet, if any) unsafe for carriage and loss of contents.
- b) Flexible large packagings: no damage to the large packaging or its lifting devices which renders the large packaging unsafe for carriage or handling and loss of contents.

6.6.5.3.3 Stacking test

6.6.5.3.3.1 Applicability

For all types of large packagings which are designed to be stacked on each other, as a design type test.

6.6.5.3.3.2 Preparation of large packaging for test

The large packaging shall be filled to its maximum permissible gross mass.

6.6.5.3.3.3 Method of testing

The large packaging shall be placed on its base on level hard ground and subjected to a uniformly distributed superimposed test load (see 6.6.5.3.3.4) for a period of at least five minutes, large packagings of wood, fibreboard and plastics materials for a period of 24 h.

6.6.5.3.3.4 Calculation of superimposed test load

The load to be placed on the large packagings shall be 1.8 times the combined maximum permissible gross mass of the number of similar large packagings that may be stacked on top of the large packagings during carriage.

6.6.5.3.3.5 Criteria for passing the test

- a) All types of large packaging other than flexible large packagings: no permanent deformation which renders the large packaging (including the base pallet, if any) unsafe for carriage and no loss of contents.
- b) Flexible large packagings: no deterioration of the body which renders the large packaging unsafe for carriage and loss of contents.

6.6.5.3.4 Drop test

6.6.5.3.4.1 Applicability

For all types of large packagings as design type test

6.6.5.3.4.2 Preparation of large packaging for testing

The large packaging shall be filled in accordance with 6.6.5.2.1.

6.6.5.3.4.3 Method of testing

The large packaging shall be dropped onto a non resilient, horizontal, flat, massive and rigid surface in conformity with the requirements of 6.1.5.3.4, in such a manner as to ensure that the point of impact is the most vulnerable part of the base of the large packaging.

6.6.5.3.4.4 Drop height

Note: *Large packagings for substances and articles of Class 1 shall be tested at the packing group II performance level.*

- 6.6.5.3.4.4.1** For inner packagings containing solid or liquid substances or articles, if the test is performed with the solid, liquid or articles to be carried, or with another substance or article having essentially the same characteristics:

Packing group I	Packing group II	Packing group III
1,8 m	1,2 m	0,8 m

- 6.6.5.3.4.4.2** For inner packagings containing liquids if the test is performed with water:

- a) Where the substances to be carried have a relative density not exceeding 1200 kg/m³:

Packing group I	Packing group II	Packing group III
1,8 m	1,2 m	0,8 m

- b) Where the substances to be carried have a relative density exceeding 1200 kg/m³, the drop height shall be calculated on the basis of the relative density (d) of the substance to be carried, rounded up to the first decimal, as follows:

Packing group I	Packing group II	Packing group III
$d \times 10^{-3} \times 1,5(\text{m})$	$d \times 10^{-3} \times 1,0 (\text{m})$	$d \times 10^{-3} \times 0,67 (\text{m})$

6.6.5.3.4.5 Criteria for passing the test

- 6.6.5.3.4.5.1** The large packaging shall not exhibit any damage liable to affect safety during carriage. There shall be no leakage of the filling substance from inner packaging(s) or article(s).

- 6.6.5.3.4.5.2** No rupture is permitted in large packagings for articles of Class 1 which would permit the spillage of loose explosive substances or articles from the large packaging.

- 6.6.5.3.4.5.3** Where a large packaging undergoes a drop test, the sample passes the test if the entire contents are retained even if the closure is no longer sift-proof.

6.6.5.4 Certification and test report

- 6.6.5.4.1** In respect of each design type of large packaging a certificate and mark (as in 6.6.3) shall be issued attesting that the design type including its equipment meets the test requirements.

- 6.6.5.4.2** A test report containing at least the following particulars shall be drawn up and shall be made available to the users of the large packaging:

1. Name and address of the test facility;
2. Name and address of applicant (where appropriate);
3. A unique test report identification;
4. Date of the test report;
5. Manufacturer of the large packaging;
6. Description of the large packaging design type (e.g. dimensions, materials, closures, thickness, etc) and/or photograph(s);
7. Maximum capacity/maximum permissible gross mass;
8. Characteristics of test contents, e.g. types and descriptions of inner packagings or articles used;
9. Test descriptions and results;
10. The test report shall be signed with the name and status of the signatory.

- 6.6.5.4.3** The test report shall contain statements that the large packaging prepared as for carriage was tested in accordance with the appropriate provisions of this Chapter and that the use of other packaging methods or components may render it invalid. A copy of the test report shall be available to the competent authority.

CHAPTER 6.7

REQUIREMENTS FOR THE DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF PORTABLE TANKS AND MULTIPLE ELEMENT GAS CONTAINERS (UN MEGCs)

Note 1: For fixed tanks (tank-vehicles), demountable tanks and tank-containers (except tank-containers constructed in conformance with ISO 1496-3:1995 and instructions on demountable tanks T1-T23, T50, T75) and tank swap bodies, with shells made of metallic materials, and battery-wagons and multiple element gas containers (MEGCs), other than UN MEGCs, see Chapter 6.8; for vacuum-operated waste tanks, see Chapter 6.10; for tank-wagons designed to be operated on 1520 mm gauge railways, see Chapter 6.20.

Note 2: The requirements of this Chapter also apply to portable tanks with shells made of fibre-reinforced plastics (FRP) to the extent indicated in Chapter 6.9.

Note 3: This Chapter also applies to tank-containers constructed in conformance with ISO 1496-3:1995 and instructions on demountable tanks T1-T23, T50, T75.

6.7.1 APPLICATION AND GENERAL REQUIREMENTS

6.7.1.1 The requirements of this Chapter apply to portable tanks intended for the carriage of dangerous goods, and to MEGCs intended for the carriage of non-refrigerated gases of Class 2, by all modes of carriage. In addition to the requirements of this Chapter, unless otherwise specified, the applicable requirements of the International Convention for Safe Containers (CSC) 1972, as amended, shall be fulfilled by any multimodal portable tank or MEGC which meets the definition of a "container" within the terms of that Convention. Additional requirements may apply to offshore portable tanks or MEGCs that are handled in open seas.

6.7.1.2 The technical requirements of this Chapter may be varied by alternative arrangements. These alternative arrangements shall offer a level of safety not less than that given by the requirements of this Chapter with respect to the compatibility with substances carried and the ability of the portable tank or MEGC to withstand impact, loading and fire conditions. For international carriage, the portable tanks or MEGCs manufactured in accordance with alternative arrangement shall be approved by the appropriate competent authorities.

6.7.1.3 When a substance is not assigned a portable tank instruction (T1 to T23, T50 or T75) in Column (10) of Table A of in Chapter 3.2, interim approval for carriage may be issued by the competent authority of the country of origin. The approval shall be included in the documentation of the consignment and contain as a minimum the information normally provided in the portable tank instructions and the conditions under which the substance shall be carried.

6.7.2 REQUIREMENTS FOR THE DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF PORTABLE TANKS INTENDED FOR THE CARRIAGE OF SUBSTANCES OF CLASS 1 AND CLASSES 3 TO 9

6.7.2.1 Definitions

For the purposes of this section:

Test pressure - the maximum gauge pressure at the top of the shell during the hydraulic pressure test equal to not less than 1.5 times the design pressure. The minimum test pressure for portable tanks intended for specific substances is specified in the applicable portable tank instruction in 4.2.5.2.6.

Maximum allowable working pressure (MAWP) – the pressure equals, at least, to the highest of the two following values, measured in the shell top:

- a) The maximum effective gauge pressure allowed in the shell during filling or discharge; or
- b) The maximum effective pressure allowed in the shell and not higher than the sum of:
 - the absolute vapour pressure (in bar) of the substance at 65 °C, minus 1 bar; and
 - the partial pressure (in bar) of air or other gases in the ullage space being determined by a maximum ullage temperature of 65 °C and a liquid expansion due to an increase in mean bulk temperature of Δt :

$$\Delta t = t_r - t_f,$$

where

t_r – maximum mean bulk temperature of liquid en route, °C;

t_f – filling temperature, °C.

Design pressure – the pressure to be used in calculations required by a recognized pressure vessel code. The design pressure shall be not less than the highest of the following pressures:

- a) The maximum effective gauge pressure allowed in the shell during filling or discharge; or
- b) The sum of:
 - the absolute vapour pressure (in bar) of the substance at 65 °C, minus 1 bar; and
 - the partial pressure (in bar) of air or other gases in the ullage space being determined by a maximum ullage temperature of 65 °C and a liquid expansion due to an increase in mean bulk temperature of Δt ; and
 - pressure determined on the basis of the static forces specified in 6.7.2.2.12, but not less than 0.35 bar; or
- c) Two thirds of the minimum test pressure specified in the appropriate portable tank instruction in 4.2.5.2.6;

Design temperature range for the shell shall be –40 °C to 50 °C for substances carried under ambient conditions. For the other substances handled under high temperature conditions the design temperature shall be not less than the maximum temperature of the substance during filling, discharge or carriage. More severe design temperatures shall be considered for portable tanks subjected to severe climatic conditions¹;

Leakproofness test – a test using gas subjecting the shell and its service equipment to an effective internal pressure of not less than 25% of the MAWP

Shell – the part of the portable tank which retains the substance intended for carriage (tank proper), including openings and their closures, but does not include service equipment or external structural equipment;

Maximum permissible gross mass (MPGM) – the sum of the tare mass of the portable tank and the heaviest load authorized for carriage;

Service equipment – measuring instruments and filling, discharge, venting, safety, heating, cooling and insulating devices;

Structural equipment – the reinforcing, fastening, protective and stabilizing elements external to the shell;

Fine grain steel – a steel which has a ferritic grain size of 6 or finer when determined in accordance with ASTM E 112-96 or as defined in document No 33A1 of the List;

Mild steel – a steel with a guaranteed minimum tensile strength of 360 N/mm² to 440 N/mm² and a guaranteed minimum elongation at fracture conforming to 6.7.2.3.3.3;

Reference steel – a steel with a tensile strength of 370 N/mm² and an elongation at fracture of 27%;

Alternative arrangement – an approval granted by the competent authority for a portable tank or MEGC that has been designed, constructed or tested to technical requirements or testing methods other than those specified in this Chapter:

Offshore portable tank – a portable tank specially designed for repeated use for carriage to, from and between offshore facilities. An offshore portable tank is designed and constructed in accordance with the guidelines for the approval of containers handled in open seas specified by the International Maritime Organization in document MSC/Circ.860;

Portable tank – a multimodal tank used for the carriage of substances of Class 1 and Classes 3 to 9. The portable tank includes a shell fitted with service equipment and structural equipment necessary for the carriage of dangerous substances. The portable tank shall be capable of being filled and discharged without the removal of its structural equipment. It shall possess stabilizing elements external to the shell, and shall be capable of being lifted when full. It shall be designed primarily to be loaded onto a vehicle, wagon or sea-going or inland navigation

¹ For carriage to the Russian Federation or in transit through the territory of the Russian Federation in the period from 01.11 to 01.04 the design temperature range shall be from – 50 °C to + 50 °C.

vessel and shall be equipped with skids, mountings or accessories to facilitate mechanical handling. Tank-vehicles, tank-wagons, non-metallic tanks (except FRP portable tanks, see Chapter 6.9) and intermediate bulk containers (IBCs) are not considered to fall within the definition for portable tanks

Fusible element – a non-reclosable pressure relief device that is thermally actuated;

6.7.2.2 General design and construction requirements

6.7.2.2.1 Shells shall be designed and constructed in accordance with the requirements of a pressure vessel code recognized by the competent authority. Shells shall be made of metallic materials suitable for forming. The materials shall in principle conform to national or international material standards. For welded shells only a material whose weldability has been fully demonstrated shall be used. Welds shall be skilfully made and afford leakage safety. When the manufacturing process or the materials make it necessary, the shells shall be suitably heat-treated to guarantee adequate toughness in the weld and in the heat affected zones. In choosing the material, the design temperature range shall be taken into account with respect to risk of brittle fracture, to stress corrosion cracking and to resistance to impact. When fine grain steel is used, the guaranteed value of the yield strength shall be not more than 460 MPa and the guaranteed value of the upper limit of the tensile strength shall be not more than 725 MPa according to the material specification. Aluminium may only be used as a construction material when indicated in a portable tank special provision assigned to a specific substance in Column (11) of Table A of Chapter 3.2 or when approved by the competent authority. When aluminium is authorized, it shall be insulated to prevent significant loss of physical properties when subjected to a heat load of 110 kW/m² for a period of not less than 30 minutes. The insulation shall remain effective at all temperatures less than 649 °C and shall be jacketed with a material with a melting point of not less than 700 °C.

Portable tank materials shall be suitable for the external environment in which they may be carried.

6.7.2.2.2 Portable tank shells, fittings, and pipework shall be constructed from materials which are:

- a) Substantially immune to attack by the substance(s) intended to be carried; or
- b) Properly passivated or neutralized by chemical reaction; or
- c) Lined with corrosion-resistant material directly bonded to the shell or attached by equivalent means

6.7.2.2.3 Gaskets shall be made of materials not subject to attack by the substance(s) intended to be carried.

6.7.2.2.4 When shells are lined, the lining shall be substantially immune to attack by the substance(s) intended to be carried, homogeneous, non porous, free from perforations, sufficiently elastic and compatible with the thermal expansion characteristics of the shell. The lining of every shell, shell fittings and piping shall be continuous, and shall extend around the face of any flange. Where external fittings are welded to the tank, the lining shall be continuous through the fitting and around the face of external flanges.

6.7.2.2.5 Joints and seams in the lining shall be made by fusing the material together or by other equally effective means.

6.7.2.2.6 Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.

6.7.2.2.7 The materials of the portable tank, including any devices, gaskets, linings and accessories, shall not adversely affect the substance(s) intended to be carried in the portable tank.

6.7.2.2.8 Portable tanks shall be designed and constructed with supports to provide a secure base during carriage and with suitable lifting and tie-down attachments.

6.7.2.2.9 Portable tanks shall be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of filling/discharge and carriage. The design shall demonstrate that the effects of fatigue, caused by repeated application of these loads through the expected life of the portable tank, have been taken into account.

6.7.2.2.9.1 For portable tanks that are intended for use offshore, the dynamic stresses imposed by handling in open seas shall be taken into account.

- 6.7.2.2.10** A shell which is to be equipped with a vacuum-relief device shall be designed to withstand, without permanent deformation, an external pressure of not less than 0.21 bar above the internal pressure. The vacuum-relief device shall be set to relieve at a vacuum setting not greater than minus (–) 0.21 bar unless the shell is designed for a higher external over pressure, in which case the vacuum-relief pressure of the device to be fitted shall be not greater than the tank design vacuum pressure. A shell used for the carriage of solid substances (powdery or granular) of packing groups II or III only, which do not liquefy during carriage, may be designed for a lower external pressure, subject to the approval of the competent authority. In this case, the vacuum valve shall be set to relieve at this lower pressure. A shell that is not to be fitted with a vacuum-relief device shall be designed to withstand, without permanent deformation an external pressure of not less than 0.4 bar above the internal pressure.
- 6.7.2.2.11** Vacuum-relief devices used on portable tanks intended for the carriage of substances meeting the flash-point criteria of Class 3, including elevated temperature substances carried at or above their flash-point, shall prevent the immediate passage of flame into the shell, or the portable tank shall have a shell capable of withstanding, without leakage an internal explosion resulting from the passage of flame into the shell.
- 6.7.2.2.12** Portable tanks and their fastenings shall, under the maximum permissible load, be capable of absorbing the following separately applied static forces:
- a) In the direction of travel: twice the MPGM multiplied by the acceleration due to gravity (g)²;
 - b) Horizontally at right angles to the direction of travel: the MPGM (when the direction of travel is not clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration due to gravity (g)²
 - c) Vertically upwards: the MPGM multiplied by the acceleration due to gravity (g)²; and
 - d) Vertically downwards: twice the MPGM (total loading including the effect of gravity) multiplied by the acceleration due to gravity (g)².
- 6.7.2.2.13** Under each of the forces in 6.7.2.2.12, the safety factor to be observed shall be as follows:
- a) For metals having a clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed yield strength; or
 - b) For metals with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2% relative permanent elongation and, for austenitic steels, the 1% relative permanent elongation.
- 6.7.2.2.14** The values of yield strength or relative yield strength shall be the values according to national or international material standards. When austenitic steels are used, the specified minimum values of yield strength or proof strength according to the material standards may be increased by up to 15% when these greater values are attested in the material inspection certificate. When no material standard exists for the metal in question, the value of yield strength or relative yield strength used shall be approved by the competent authority.
- 6.7.2.2.15** Portable tanks shall be capable of being electrically earthed when intended for the carriage of substances meeting the flash-point criteria of Class 3 including elevated temperature substances carried at or above their flash-point. Measures shall be taken to prevent dangerous electrostatic discharge.
- 6.7.2.2.16** When required for certain substances by the applicable portable tank instruction indicated in Column 10 of Table A of Chapter 3.2 and described in 4.2.5.2.6 or by a portable tank special provision indicated in Column 11 of Table A of Chapter 3.2 and described in 4.2.5.3, portable tanks shall be provided with additional protection, which may take the form of additional shell thickness or a higher test pressure, the additional shell thickness or higher test pressure being determined in the light of the inherent risks associated with the carriage of the substances concerned.
- 6.7.2.2.17** Thermal insulation directly in contact with the shell intended for substances carried at high temperature shall have an ignition temperature at least 50 °C higher than the maximum design
- 6.7.2.3 Design criteria**
- 6.7.2.3.1** Shells shall be of a design capable of being stress-analysed mathematically or experimentally by resistance strain gauges, or by other methods approved by the competent authority.

² For calculation purposes $g = 9.81 \text{ m/s}^2$.

- 6.7.2.3.2** Shells shall be designed and constructed to withstand a hydraulic test pressure not less than 1.5 times the design pressure. Specific requirements are laid down for certain substances in the applicable portable tank instruction indicated in Column (10) of Table A of Chapter 3.2 and described in 4.2.5.2.6 or by a portable tank special provision indicated in Column (11) of Table A of Chapter 3.2 and described in 4.2.5.3. Attention is drawn to the minimum shell thickness requirements specified in 6.7.2.4.1 to 6.7.2.4.10.
- 6.7.2.3.3** For metals exhibiting a clearly defined yield point or characterized by a guaranteed proof strength (0.2% proof strength, generally, or 1% proof strength for austenitic steels) the primary membrane stress σ (sigma) in the shell shall not exceed 0.75 Re or 0.50 Rm, whichever is lower, at the test pressure, where:
- Re - yield strength in MPa, or 0.2% proof strength or, for austenitic steels, 1% proof strength;
- Rm – minimum tensile strength in MPa.
- 6.7.2.3.3.1** The values of Re and Rm to be used shall be the specified minimum values according to national or inter- national material standards. When austenitic steels are used, the specified minimum values for Re and Rm according to the material standards may be increased by up to 15% when greater values are attested in the material inspection certificate. When no material standard exists for the metal in question, the values of Re and Rm used shall be approved by the competent authority or its authorized body.
- 6.7.2.3.3.2** Steels which have a Re/Rm ratio of more than 0.85 are not allowed for the construction of welded shells. The values of Re and Rm to be used in determining this ratio shall be the values specified in the material inspection certificate.
- 6.7.2.3.3.3** Steels used in the construction of shells shall have an elongation at fracture, (in %) of not less than 10 000/Rm with an absolute minimum of 16% for fine grain steels and 20% for other steels. Aluminium and aluminium alloys used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/6Rm with an absolute minimum of 12%.
- 6.7.2.3.3.4** For the purpose of determining actual values for materials, it shall be noted that for sheet metal, the axis of the tensile test specimen shall be at right angles (transversely) to the direction of rolling. The permanent elongation at fracture shall be measured on test specimens of rectangular cross sections in accordance with ISO 6892:1998 using a 50 mm gauge length.
- 6.7.2.4 Minimum shell thickness**
- 6.7.2.4.1** The minimum shell thickness shall be the greater thickness based on:
- a) The minimum thickness determined in accordance with the requirements of 6.7.2.4.2 to 6.7.2.4.10;
 - b) The minimum thickness determined in accordance with the recognized pressure vessel code including the requirements in 6.7.2.3; and
 - c) The minimum thickness specified in the applicable portable tank instruction indicated in Column (10) of Table A of Chapter 3.2 and described in 4.2.5.2.6 or by a portable tank special provision indicated in Column (11) of Table A of Chapter 3.2 and described in 4.2.5.3.
- 6.7.2.4.2** The cylindrical portions, ends (heads) and manhole covers of shells not more than 1.80 m in diameter shall be not less than 5 mm thick in the reference steel or of equivalent thickness in the metal to be used. Shells more than 1.80 m in diameter shall be not less than 6 mm thick in the reference steel or of equivalent thickness in the metal to be used, except that for powdered or granular solid substances of packing group II or III the minimum thickness requirement may be reduced to not less than 5 mm thick in the reference steel or of equivalent thickness in the metal to be used.
- 6.7.2.4.3** When additional protection against shell damage is provided, portable tanks with test pressures less than 2.65 bar may have the minimum shell thickness reduced, in proportion to the protection provided, as approved by the competent authority. However, shells not more than 1.80 m in diameter shall be not less than 3 mm thick in the reference steel or of equivalent thickness in the metal to be used. Shells more than 1.80 m in diameter shall be not less than 4 mm thick in the reference steel or of equivalent thickness in the metal to be used.
- 6.7.2.4.4** The cylindrical portions, ends (heads) and manhole covers of all shells shall be not less than 3 mm thick regardless of the material of construction.

6.7.2.4.5 The additional protection (referred to in 6.7.2.4.3) may be provided by overall external structural protection, such as suitable "sandwich" construction with the outer sheathing (jacket) secured to the shell, double wall construction or by enclosing the shell in a complete framework with longitudinal and transverse structural members.

6.7.2.4.6 The equivalent thickness of a metal other than the thickness prescribed for the reference steel (see 6.7.2.4.2) shall be determined using the following formula

$$e_1 = \frac{21,4e_0}{\sqrt[3]{Rm_1 \times A_1}}$$

where:

- e_1 – required equivalent thickness (in mm) of the metal to be used;
- e_0 – minimum thickness (in mm) of the reference steel specified in the applicable portable tank instruction indicated in Column (10) of Table A of Chapter 3.2 and described in 4.2.5.2.6 or by a portable tank special provision indicated in Column (11) of Table A of Chapter 3.2 and described in 4.2.5.3;
- Rm_1 – guaranteed minimum tensile strength (in MPa) of the metal to be used (see 6.7.2.3.3);
- A_1 – guaranteed minimum elongation at fracture (in %) of the metal to be used according to national or international standards.

6.7.2.4.7 When in the applicable portable tank instruction in 4.2.5.2.6, a minimum thickness of 8 mm or 10 mm is specified, it shall be noted that these thicknesses are based on the properties of the reference steel and a shell diameter of 1.80 m. When a metal other than mild steel (see 6.7.2.1) is used or the shell has a diameter of more than 1.80 m, the thickness shall be determined using the following formula:

$$e_1 = \frac{21,4e_0d_1}{\sqrt[3]{Rm_1 \times A_1}}$$

where:

- e_1 – required equivalent thickness (in mm) of the metal to be used;
- e_0 – minimum thickness (in mm) of the reference steel specified in the applicable portable tank instruction indicated in Column (10) of Table A of Chapter 3.2 and described in 4.2.5.2.6 or by a portable tank special provision indicated in Column (11) of Table A of Chapter 3.2 and described in 4.2.5.3;
- d_1 – diameter of the shell (in m), but not less than 1.80 m
- Rm_1 – guaranteed minimum tensile strength (in MPa) of the metal to be used (see 6.7.2.3.3);
- A_1 – guaranteed minimum elongation at fracture (in %) of the metal to be used according to national or international standards.

6.7.2.4.8 All parts of the shell shall have a minimum thickness as determined by 6.7.2.4.2 to 6.7.2.4.4. This thickness shall be exclusive of any corrosion allowance.

6.7.2.4.9 When mild steel is used (see 6.7.2.1), calculation using the formula in 6.7.2.4.6 is not required

6.7.2.4.10 There shall be no sharp change of plate thickness at the attachment of the ends (heads) to the cylindrical portion of the shell.

6.7.2.5 Service equipment

6.7.2.5.1 Service equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during filling/discharging and carriage. When the connection between the frame and the shell allows relative movement between the sub-assemblies, the equipment shall be so fastened as to permit such movement without risk of damage to working parts. The external discharge fittings (pipe sockets, shut-off devices), the internal stop-valve and its seating shall be protected against the danger of being wrenched off by external forces. The filling and discharging devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening

- 6.7.2.5.2** All openings in the shell, intended for filling or discharging the portable tank shall be fitted with (a manually operated) stop-valve located as close to the shell as reasonably practicable. Other openings, except for openings leading to venting or pressure-relief devices, shall be equipped with either a stop-valve or another suitable means of closure located as close to the shell as reasonably practicable.
- 6.7.2.5.3** All portable tanks shall be fitted with a manhole or other inspection openings of a suitable size to allow for internal inspection and adequate access for maintenance and repair of the interior. Compartmented portable tanks shall have a manhole or other inspection openings for each compartment.
- 6.7.2.5.4** As far as reasonably practicable, external fittings shall be grouped together. For insulated portable tanks, top fittings shall be surrounded by a spill collection reservoir with suitable drains.
- 6.7.2.5.5** Each connection to a portable tank shall be clearly marked to indicate its function.
- 6.7.2.5.6** Each stop-valve or other means of closure shall be designed and constructed to a rated pressure not less than the MAWP of the shell taking into account the temperatures expected during carriage. All stop-valves with screwed spindles shall close by a clockwise motion of the hand wheel.
- For other stop-valves the position (open and closed) and direction of closure shall be clearly indicated. All stop-valves shall be designed to prevent unintentional opening.
- 6.7.2.5.7** Moving parts, such as covers, components of closures, etc., shall be made of protected corrodible steel when they are liable to come into contact (frictional or percussive) with aluminium portable tanks intended for the carriage of substances meeting the flash-point criteria of Class 3 including elevated temperature substances carried at or above their flash-point.
- 6.7.2.5.8** Piping shall be designed, constructed and installed so as to avoid the risk of damage due to thermal expansion (contraction), mechanical shock and vibration. All piping shall be of a suitable metallic material. Welded pipe joints shall be used wherever possible.
- 6.7.2.5.9** Joints in copper tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than 525 °C. The joints shall not decrease the strength of the tubing as may happen when cutting threads.
- 6.7.2.5.10** The burst pressure of all piping and pipe fittings shall be not less than the highest of four times the MAWP of the shell or four times the pressure to which it may be subjected in service by the action of a pump or other device (except pressure-relief devices).
- 6.7.2.5.11** Ductile metals shall be used in the construction of valves and accessories.
- 6.7.2.5.12** The heating system shall be designed or controlled so that a substance cannot reach a temperature at which the pressure in the tank exceeds its MAWP or causes other hazards (e.g. dangerous thermal decomposition).
- 6.7.2.5.13** The heating system shall be designed or controlled so that power for internal heating elements shall not be available unless the heating elements are completely submerged. The temperature at the surface of the heating elements for internal heating equipment, or the temperature at the shell for external heating equipment shall, in no case, exceed 80% of the autoignition temperature (in °C) of the substance carried.
- 6.7.2.5.14** If an electrical heating system is installed inside the tank, it shall be equipped with an earth leakage circuit breaker with a releasing current of less than 100 mA.
- 6.7.2.5.15** Electrical switch cabinets mounted to tanks shall not have a direct connection to the tank interior and shall provide protection of at least the equivalent of type IP 56 according to IEC 144 or IEC 529.
- 6.7.2.6** Bottom openings
- 6.7.2.6.1** Certain substances shall not be carried in portable tanks with bottom openings. When the applicable portable tank instruction identified in Column (10) of Table A of Chapter 3.2 and described in 4.2.5.2.6 indicates that bottom openings are prohibited there shall be no openings below the liquid level of the shell when it is filled to its maximum permissible filling limit. It is allowed to close the existing opening by internally and externally welding one plate to the shell.

6.7.2.6.2 Bottom discharge outlets for portable tanks carrying certain solid, crystallizable or highly viscous substances shall be equipped with not less than two serially fitted and mutually independent shut-off devices. The design of the equipment shall meet the requirements of the competent authority or its authorized body and shall include:

- a) An external stop-valve, fitted as close to the shell as reasonably practicable, and so designed as to prevent any unintended opening through impact or other inadvertent act; and
- b) A liquid tight closure at the end of the discharge pipe, which may be a bolted blank flange or a screw cap.

6.7.2.6.3 Every bottom discharge outlet, except as provided in 6.7.2.6.2, shall be equipped with 3 serially fitted and mutually independent shut-off devices. The design of the equipment shall be to the satisfaction of the competent authority or its authorized body and include:

- a) A self-closing internal stop-valve, that is a stop-valve within the shell or within a welded flange or its companion flange, such that:
 - The control devices for the operation of the valve are designed so as to prevent any unintended opening through impact or other inadvertent act;
 - The valve may be operable from above or below;
 - If possible, the setting of the valve (open or closed) shall be capable of being verified from the ground;
 - Except for portable tanks having a capacity of not more than 1 000 litres, it shall be possible to close the valve from an accessible position of the portable tank that is remote from the valve itself; and
 - The valve shall continue to be effective in the event of damage to the external device for controlling the operation of the valve;
- b) An external stop-valve fitted as close to the shell as reasonably practicable; and
- c) A liquid tight closure at the end of the discharge pipe, (eg. may be a bolted blank flange or a screw cap).

6.7.2.6.4 For a lined shell, the internal stop-valve required by 6.7.2.6.3 (a) may be replaced by an additional external stop-valve. The manufacturer shall satisfy the requirements of the competent authority or its authorized body

6.7.2.7 Safety-relief devices

6.7.2.7.1 All portable tanks shall be fitted with at least one pressure-relief device. All relief devices shall be designed, constructed and marked in such a way as to meet the requirements of the competent authority or its authorized body.

6.7.2.8 Pressure-relief devices

6.7.2.8.1 Every portable tank with a capacity not less than 1 900 litres and every independent compartment of a portable tank with a similar capacity, shall be provided with one or more pressure-relief devices of the spring-loaded type and may in addition have a frangible disc or fusible element in parallel with the spring-loaded devices except when prohibited by reference to 6.7.2.8.3 in the appropriated portable tank instruction in 4.2.5.2.6.

The pressure-relief devices shall have sufficient capacity to prevent rupture of the shell due to over pressurization or vacuum resulting from filling, discharging, or from heating of the contents

6.7.2.8.2 Pressure-relief devices shall be designed to prevent the entry of foreign matter, the leakage of liquid and the development of any dangerous excess pressure.

6.7.2.8.3 When required for certain substances by the applicable portable tank instruction indicated in Column (10) of Table A of Chapter 3.2 and described in 4.2.5.2.6, portable tanks shall have a pressure-relief device approved by the competent authority. Unless a portable tank in dedicated service is fitted with an approved relief device constructed of materials compatible with the substance carried, the relief device shall comprise a frangible disc preceding a spring-loaded pressure-relief device. When a frangible disc is inserted in series with the required pressure-relief device, the space between the frangible disc and the pressure-relief device shall be provided with a pressure gauge or suitable tell-tale indicator for the detection of disc rupture, pin-holing, or leakage which could cause a malfunction of the pressure-relief system. The frangible disc shall rupture at a nominal pressure 10% above the start to discharge pressure of the relief device.

- 6.7.2.8.4** Every portable tank with a capacity less than 1 900 litres shall be fitted with a pressure-relief device which may be a frangible disc when this disc complies with the requirements of 6.7.2.11.1. When no spring-loaded pressure-relief device is used, the frangible disc shall be set to rupture at a nominal pressure equal to the test pressure. In addition, fusible elements conforming to 6.7.2.10.1 may also be used.
- 6.7.2.8.5** When the shell is fitted for pressure discharge, the inlet line shall be provided with a suitable pressure-relief device set to operate at a pressure not higher than the MAWP of the shell, and a stop-valve shall be fitted as close to the shell as reasonably practicable.
- 6.7.2.9 Setting of pressure-relief devices**
- 6.7.2.9.1** The pressure-relief devices shall be set in operation only in conditions of excessive rise in temperature, since the shell shall not be subject to undue rise of pressure during normal conditions of carriage (see 6.7.2.12.2).
- 6.7.2.9.2** The required pressure-relief device shall be set to start-to-discharge at a nominal pressure of 5/6 of the test pressure for shells having a test pressure of not more than 4.5 bar and 110% of 2/3 of the test pressure for shells having a test pressure of more than 4.5 bar. After discharge the device shall close at a pressure not less than 90% of the pressure at which the discharge starts. The device shall remain closed at all lower pressures. This requirement does not prevent the use of vacuum-relief or combination pressure-relief and vacuum-relief devices.
- 6.7.2.10 Fusible elements**
- 6.7.2.10.1** Fusible elements shall operate at a temperature between 100 °C and 149 °C on condition that the pressure in the shell at the fusing temperature will be not more than the test pressure. They shall be placed at the top of the shell with their inlets in the vapour space and they shall not be shielded from external heat. Fusible elements shall not be used on portable tanks with a test pressure which exceeds 2.65 bar unless specified by special provision TP 36 in Column (11) of Table A of Chapter 3.2. Fusible elements used on portable tanks intended for the carriage of high-temperature substances shall be designed to be set in operation at a temperature higher than the maximum temperature that will be experienced during carriage and shall meet the requirements of the competent authority or its authorized body.
- 6.7.2.11 Frangible discs**
- 6.7.2.11.1** Except as specified in 6.7.2.8.3, frangible discs shall be set to rupture at a nominal pressure equal to the test pressure within the design temperature range. The requirements of 6.7.2.5.1 and 6.7.2.8.3 shall be taken in consideration if frangible discs are used.
- 6.7.2.11.2** Frangible discs shall be appropriate for the vacuum pressures which may be produced in the portable tank.
- 6.7.2.12 Capacity of pressure-relief devices**
- 6.7.2.12.1** The spring-loaded pressure-relief device required by 6.7.2.8.1 shall have a minimum cross sectional flow area equal to 792 mm² which is an equivalent to an orifice of 31.75 mm diameter. Vacuum-relief devices, when used, shall have a cross sectional flow area not less than 284 mm².
- 6.7.2.12.2** The combined delivery capacity of the pressure relief system in condition of complete fire engulfment of the portable tank shall be sufficient to limit the pressure in the shell to 20% above the start-to-discharge pressure of the pressure limiting device. The reduction of the capacity of the pressure relief- devices shall be taken into account when a device to prevent the passage of the flame and the frangible discs are available. Emergency pressure-relief devices may be used to achieve the full relief capacity prescribed. These devices may be fusible, spring loaded or frangible disc components, or a combination of spring-loaded and frangible disc devices. The total required capacity of the relief devices may be determined using the formula in 6.7.2.12.2.1 or the table in 6.7.2.12.2.3.
- 6.7.2.12.2.1** To determine the total required capacity of the relief devices, which shall be regarded as being the sum of the individual capacities of all the contributing devices, the following formula shall be used:

$$Q = 12,4 \frac{FA^{0,82}}{LC} \sqrt{\frac{ZT}{M}}$$

where:

Q – minimum required rate of discharge in cubic meters of air per second at standard conditions: 1 bar and 0 °C (273 K); m³ /s;

F – is a insulation coefficient with the following value:

for uninsulated shells F = 1;

for insulated shells $F = U(649 - t_H)/13,6$, but in no case is less than 0,25 where:

U – heat transfer coefficient of the insulation, in kW/(·m²·K-1), at 38 °C;

t_H – actual temperature of the substance during filling, (in °C); when this temperature is unknown, let t = 15 °C;

The value of F given above for insulated shells may be taken provided that the insulation is in accordance with 6.7.2.12.2.4;

A – total external surface area of shell in m²;

Z – the gas compressibility factor in the accumulating condition (when this factor is unknown, let Z =1.0);

T – absolute temperature in Kelvin (°C + 273) above the pressure-relief devices in the accumulating condition;;

L – the latent heat of vaporization of the liquid, in kJ/kg, in the accumulating condition;

M – molecular mass of the discharged gas

C – a constant which is derived from one of the following formulae as a function of the ratio k of specific heats:

$$k = \frac{C_p}{C_v}$$

where: c_p – is the specific heat at constant pressure; and
c_v – is the specific heat at constant volume.

when k > 1:

$$C = \sqrt{k \left(\frac{2}{k+1} \right)^{\frac{k+1}{k-1}}}$$

when k = 1 or is unknown:

$$C = \frac{1}{e} = 0,607$$

where: e – is the mathematical constant 2,7183.

C may also be taken from the following table:

k	C	k	C	k	C
1,00	0,607	1,26	0,660	1,52	0,704
1,02	0,611	1,28	0,664	1,54	0,707
1,04	0,615	1,30	0,667	1,56	0,710
1,06	0,620	1,32	0,671	1,58	0,713
1,08	0,624	1,34	0,674	1,60	0,716
1,10	0,628	1,36	0,678	1,62	0,719
1,12	0,633	1,38	0,681	1,64	0,722
1,14	0,637	1,40	0,685	1,66	0,725
1,16	0,641	1,42	0,688	1,68	0,728
1,18	0,645	1,44	0,691	1,70	0,731
1,20	0,649	1,46	0,695	2,00	0,770
1,22	0,652	1,48	0,698	2,20	0,793
1,24	0,656	1,50	0,701		

6.7.2.12.2.2 As an alternative to the formula above, shells designed for the carriage of liquids may have their relief devices sized in accordance with the table in 6.7.2.12.2.3. This table assumes an insulation value of $F = 1$ and shall be adjusted accordingly when the shell is insulated. Other values used in determining this table are:

$$M = 86,7 \quad T = 394 \text{ K} \quad L = 334,94 \text{ кДж/кг} \quad C = 0,607 \quad Z = 1$$

6.7.2.12.2.3 Minimum required rate of discharge of relief devices Q , (in m^3/s) expressed in cubic meters per air under standard ambient conditions: pressure of 1 bar and 0°C (273 K)

Exposed area A (m^2)	Rate of discharge Q , m^3/s	Exposed area A (m^2)	Rate of discharge Q , m^3/s
2	0.230	37.5	2.539
3	0.320	40	2.677
4	0.405	42.5	2.814
5	0.487	45	2.949
6	0.565	47.5	3.082
7	0.641	50	3.215
8	0.715	52.5	3.346
9	0.788	55	3.476
10	0.859	57.5	3.605
12	0.998	60	3.733
14	1.132	62.5	3.860
16	1.263	65	3.987
18	1.391	67.5	4.112
20	1.517	70	4.236
22.5	1.670	75	4.483
25	1.821	80	4.726
27.5	1.969	85	4.967
30	2.115	90	5.206
32.5	2.258	95	5.442
35	2.400	100	5.676

6.7.2.12.2.4 Insulation systems shall be approved by the competent authority or its authorized body. In all cases, insulation systems approved for this purpose shall:

- a) Remain effective at all temperatures up to 649°C ; and
- a) Be jacketed with a material having a melting point of 700°C or greater.

6.7.2.13 Marking of pressure-relief devices

6.7.2.13.1 Every pressure-relief device shall be clearly and permanently marked with the following particulars:

- a) The pressure (in bar or kPa) or temperature (in $^\circ\text{C}$) at which it is set to discharge;
- b) The allowable tolerance at the discharge pressure for spring-loaded devices;
- c) The reference temperature corresponding to the rated pressure for frangible discs;
- d) The allowable temperature tolerance for fusible elements;
- e) The rated flow capacity of the spring-loaded pressure relief devices, frangible discs or fusible elements in standard cubic meters of air per second (m^3/s); and
- f) The cross sectional flow areas of the spring loaded pressure-relief devices, frangible discs and fusible elements in mm^2 .

When practicable, the following information shall also be shown::

- g) The manufacturer's name and relevant catalogue number of the device.

6.7.2.13.2 The rated flow capacity marked on the spring-loaded pressure-relief devices shall be determined according to ISO 4126-1:2004 and ISO 4126-7:2004.

6.7.2.14 Connections to pressure-relief devices

- 6.7.2.14.1** Connections to pressure-relief devices shall be of sufficient size to enable the required discharge of vapour or gas to pass unrestricted to the safety device. No stop-valve shall not be installed between the shell and the pressure-relief devices except where duplicate devices are provided for maintenance or other reasons and the stop-valves serving the devices actually in use are locked open or the stop-valves are interlocked so that at least one of the duplicate devices is always in use. There shall be no obstruction in an opening leading to a vent or pressure-relief device which might restrict or cut-off the flow from the shell to that device. Vents or pipes from the pressure-relief device outlets, when used, shall deliver the relieved vapour or liquid to the atmosphere in conditions of minimum back-pressure on the relieving devices.
- 6.7.2.15 Siting of pressure-relief devices**
- 6.7.2.15.1** Each pressure-relief device inlet shall be situated on top of the shell in a position as near the longitudinal and transversal axis of the shell as reasonably practicable. All pressure-relief device inlets shall under maximum filling conditions be situated in the vapour space of the shell and the devices shall be so arranged as to ensure the escaping vapour is discharged unrestrictedly. For flammable substances, the escaping vapour shall be directed away from the shell in such a manner that it cannot impinge upon the shell. Protective devices which deflect the flow of vapour are permissible provided the required relief-device capacity is not reduced.
- 6.7.2.15.2** Arrangements shall be made to prevent access to the pressure-relief devices by unauthorized persons and to protect the devices from damage caused by the portable tank overturning
- 6.7.2.16 Gauging devices**
- 6.7.2.16.1** Glass level-gauges and gauges made of other fragile material, which are in direct communication with the contents of the tank shall not be used.
- 6.7.2.17 Portable tank supports, frameworks, lifting and tie-down attachments**
- 6.7.2.17.1** Portable tanks shall be designed and constructed with a support structure to provide a secure base during carriage. The forces specified in 6.7.2.2.12 and the safety factor specified in 6.7.2.2.13 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable
- 6.7.2.17.2** The combined stresses caused by portable tank mountings (e.g. cradles, framework, etc.) and portable tank lifting and tie-down attachments shall not cause excessive stress in any portion of the shell. Permanent lifting and tie-down attachments shall be fitted to all portable tanks. Preferably they shall be fitted to the portable tank supports but may be secured to reinforcing plates located on the shell at the points of support.
- 6.7.2.17.3** In the design of supports and frameworks the effects of environmental corrosion shall be taken into account
- 6.7.2.17.4** Forklift pockets shall be capable of being closed off. The means of closing forklift pockets shall be a permanent part of the framework or permanently attached to the framework. Single compartment portable tanks with a length less than 3.65 m need not have closed off forklift pockets provided that:
- a) The shell including all the fittings are well protected from being hit by the forklift blades; and
 - b) The distance between the centres of the forklift pockets is at least half of the maximum length of the portable tank.
- 6.7.2.17.5** When portable tanks are not protected during carriage, according to 4.2.1.2, the shells and service equipment shall be protected against damage to the shell and service equipment resulting from lateral or longitudinal impact or overturning. External fittings shall be protected so as to preclude the release of the shell contents upon impact or overturning of the portable tank on its fittings. Examples of protection include:
- a) Protection against lateral impact (which may consist of longitudinal bars protecting the shell on both sides at the level of the median line);
 - b) Protection of the portable tank against overturning (which may consist of reinforcement rings or bars fixed across the frame);
 - c) Protection against rear impact (which may consist of a bumper or frame);
 - d) Protection of the shell against damage from impact or overturning by use of an ISO frame in accordance with ISO 1496-3:1995.

6.7.2.18 Design approval

6.7.2.18.1 The competent authority or its authorized body shall issue a design approval certificate for any new design of a portable tank. This certificate shall attest that a portable tank has been surveyed by that authority, is suitable for its intended purpose and meets the requirements of this Chapter and where appropriate, the provisions for substances provided in Chapter 4.2 and in Table A of Chapter 3.2. When a series of portable tanks are manufactured without change in the design, the certificate shall be valid for the entire series. The certificate shall refer to the prototype test report, the substances or group of substances allowed to be carried, the materials of construction of the shell and lining (when applicable) and an approval number. The approval number shall consist of the distinguishing sign or mark of the State in whose territory the approval was granted, indicated by the distinguishing sign used on vehicles in international road traffic³, and a registration number. Any alternative arrangements according to 6.7.1.2 shall be indicated on the certificate. A design approval may serve for the approval of smaller portable tanks made of materials of the same kind and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

6.7.2.18.2 The prototype test report for the design approval shall include at least the following:

- a) The results of the applicable framework test specified in ISO 1496-3:1995;
- b) The results of the initial inspection and test according to 6.7.2.19.3; and
- c) The results of the impact test in 6.7.2.19.1, when applicable.

6.7.2.19 Inspection and testing

6.7.2.19.1 Portable tanks meeting the definition of container in the International Convention for Safe Containers (CSC), 1972, as amended, shall not be used unless they are successfully qualified by subjecting a representative prototype of each design to the dynamic, longitudinal impact test prescribed in the Manual of Tests and Criteria, Part IV, Section 41.

6.7.2.19.2 The shell and items of equipment of each portable tank shall be inspected and tested before being put into service for the first time (initial inspection and test) and thereafter at not more than five-year intervals (periodic inspections and tests) with an intermediate periodic inspection and test at 2.5 year intervals. These inspections and tests may be performed within 3 months of the specified date. An exceptional inspection and test shall be performed regardless of the date of the last periodic inspection and test when necessary according to 6.7.2.19.7.

6.7.2.19.3 The initial inspection and test of a portable tank shall include a check of the design characteristics, an internal and external examination of the portable tank and its fittings with due regard to the substances to be carried, and a pressure test. Before the portable tank is placed into service, a leakproofness test and a check of the satisfactory operation of all service equipment shall also be performed. When the shell and its fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.2.19.4 The 5-year periodic inspection and test shall include an internal and external examination and, as a general rule, a hydraulic pressure test. For tanks only used for the carriage of solid substances, other than toxic or corrosive substances that do not liquefy during carriage, the hydraulic pressure test may be replaced by a suitable pressure test at 1.5 times the MAWP, subject to competent authority approval. Sheathing, thermal insulation and the like shall be removed only to the extent required for reliable appraisal of the condition of the portable tank. When the shell and equipment have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test

6.7.2.19.5 The intermediate 2.5 year periodic inspection and test shall at least include an internal and external examination of the portable tank and its fittings with due regard to the substances intended to be carried, a leakproofness test and a check of the satisfactory operation of all service equipment. Sheathing, thermal insulation and the like shall be removed only to the extent required for reliable appraisal of the condition of the portable tank. For portable tanks intended for the carriage of a single substance, the 2.5 year internal examination may be waived or substituted by other test methods or inspection procedures specified by the competent authority or its authorized body.

³ Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

- 6.7.2.19.6** Inspection and test of portable tanks and filling after the date of expiry of the last periodic inspection and test
- 6.7.2.19.6.1** A portable tank may not be filled and offered for carriage after the date of expiry of the last periodic inspection and test as required by 6.7.2.19.2. However, a portable tank filled prior to the date of expiry of the last periodic inspection and test may be carried for a period not to exceed three months beyond the date of expiry of the last periodic test or inspection. In addition, a portable tank may be carried after the date of expiry of the last periodic test and inspection:
- a) After emptying but before cleaning, for purposes of performing the next required test or inspection prior to refilling; and
 - b) Unless otherwise approved by the competent authority, for a period not to exceed six months beyond the date of expiry of the last periodic test or inspection, in order to allow the return of dangerous goods for proper disposal or recycling. Reference to this exemption shall be mentioned in the transport document.
- 6.7.2.19.6.2** Except as provided for in 6.7.2.19.6.1, portable tanks which have missed the timeframe for their scheduled 5 year or 2.5-year periodic inspection and test may only be filled and offered for carriage if a new 5-year periodic inspection and test is performed according to 6.7.2.19.4.
- 6.7.2.19.7** The exceptional inspection and test is necessary when the portable tank shows evidence of damaged or corroded areas, or leakage, or other conditions that indicate a deficiency that could affect the integrity of the portable tank. The extent of the exceptional inspection and test shall depend on the amount of damage or deterioration of the portable tank. It shall include at least the 2.5 year inspection and test according to 6.7.2.19.5.
- 6.7.2.19.8** The internal and external examinations shall ensure that:
- a) The shell is inspected for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the portable tank unsafe for carriage; The wall thickness shall be verified by appropriate measurement if this inspection indicates a reduction of wall thickness.
 - b) The piping, valves, heating/cooling system, and gaskets are inspected for corroded areas, defects, or any other conditions, including leakage, that might render the portable tank unsafe for filling, discharge or carriage;
 - c) Devices for tightening manhole covers are operative and there is no leakage at manhole covers or gaskets;
 - d) Missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;
 - e) All emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;
 - f) Linings, if any, are inspected in accordance with criteria outlined by the lining manufacturer;
 - g) Required markings on the portable tank are legible and in accordance with the applicable requirements; and
 - h) The framework, supports and arrangements for lifting the portable tank are in a satisfactory condition.
- 6.7.2.19.9** The inspections and tests in 6.7.2.19.1, 6.7.2.19.3, 6.7.2.19.4, 6.7.2.19.5 and 6.7.2.19.7 shall be performed or witnessed by an expert approved by the competent authority or its authorized body. When the pressure test is a part of the inspection and test, the test pressure shall be the one indicated on the data plate of the portable tank. While under pressure, the portable tank shall be inspected for any leaks in the shell, piping or equipment.
- 6.7.2.19.10** In all cases when cutting, burning or welding operations on the shell have been effected, that work shall be to the approval of the competent authority or its authorized body taking into account the pressure vessel code used for the construction of the shell. A pressure test to the original test pressure shall be performed after the work is completed.
- 6.7.2.19.11** When evidence of any unsafe condition is discovered, the portable tank shall not be returned to service until it has been corrected and the test is repeated and passed.
- 6.7.2.20** **Marking**

6.7.2.20.1 Every portable tank shall be fitted with a corrosion resistant metal plate permanently attached to the portable tank in a conspicuous place readily accessible for inspection. When for reasons of portable tank arrangements the plate cannot be permanently attached to the shell, the shell shall be marked with at least the information required by the pressure vessel code. As a minimum, at least the following information shall be marked on the plate (by stamping or by any other similar method):

- a) Owner information
 - 1) Owner's registration number;
- b) Manufacturing information
 - 1) Country of manufacture;
 - 2) Year of manufacture;
 - 3) Manufacturer's name or mark;
 - 4) Manufacturer's serial number;
- c) Approval information:
 - 1) The United Nations packaging symbol



This symbol shall not be used for any purpose other than certifying that a packaging, a flexible bulk container, a portable tank or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.11;

- 2) Approval country;
 - 3) Authorized body for the design approval;
 - 4) Design approval number;
 - 5) Letters "AA", if the design was approved under alternative arrangements (see 6.7.1.2);
 - 6) Pressure vessel code to which the shell is designed;
- d) Pressures
 - 1) MAWP (in bar gauge or kPa gauge)⁴;
 - 2) Test pressure (in bar gauge or kPa gauge)
 - 3) Initial pressure test date (month and year);
 - 4) Identification mark of the initial pressure test witness;
 - 5) External design pressure⁵ (in bar gauge or kPa gauge)⁴;
 - 6) MAWP for heating/cooling system (in bar gauge or kPa gauge)⁴ (when applicable);
- e) Temperatures
 - 1) Design temperature range (in °C)⁴;
- f) Materials
 - 1) Shell material(s) and material standard reference(s);
 - 2) Equivalent thickness in reference steel (in mm)⁴;
 - 3) Lining material (when applicable);
- g) Capacity
 - 1) Tank water capacity at 20 °C (in litres);

This indication is to be followed by the symbol "S" when the shell is divided by surge plates into sections of not more than 7 500 litres capacity;
 - 2) Water capacity of each compartment at 20 °C (in litres)⁴ (when applicable, for multi-compartment tanks).

This indication is to be followed by the symbol "S" when the compartment is divided by surge plates into sections of not more than 7 500 litres capacity;

⁴ The measuring unit used shall be indicated.

⁵ See 6.7.2.2.10.

h) Periodic inspections and tests

- 1) Type of the most recent periodic test (2.5-year, 5-year or exceptional);
- 2) Date of the most recent periodic test (month and year);
- 3) Test pressure (in bar gauge or kPa gauge)⁴ of the most recent periodic test (if applicable);
- 4) identification mark of the authorized body who performed or witnessed the most recent test.

Figure 6.7.2.20.1: Example of identification plate marking

Owner's registration number			
MANUFACTURING INFORMATION			
Country of manufacture			
Year of manufacture			
Manufacturer			
Manufacturer's serial number			
APPROVAL INFORMATION			
	Approval country		
	Authorized body for design approval		
	Design approval number		AA" (if applicable)
Shell design code (pressure vessel code)			
PRESSURES			
MAWP		bar or kPa	
Test pressure		bar or kPa	
Initial pressure test date:	(mm/yyyy)	Witness stamp:	
External design pressure		bar or kPa	
MAWP for heating/cooling system (when applicable)		bar or kPa	
TEMPERATURES			
Design temperature range		°C	to °C
MATERIALS			
Shell material(s) and material standard reference(s)			
Equivalent thickness in reference steel		mm	
Lining material (when applicable)			
CAPACITY			
Tank water capacity at 20 °C		litres	"S" (if applicable)
Water capacity of compartment_at 20 °C (when applicable, for multi-compartment tanks)		litres	"S" (if applicable)
PERIODIC INSPECTIONS / TESTS			
Test type	Test date	Witness stamp and test pressure	Test type
	(mm/yyyy)	bar or kPa	(mm/yyyy)

a Test pressure if applicable.

6.7.2.20.2 The following particulars shall be durably marked either on the portable tank itself or on a metal plate firmly secured to the portable tank:

- 1) Name of the operator
- 2) Maximum permissible gross mass (MPGM) _____ kg
- 3) _____ unladen (tare) mass kg
- 4) Portable tank instruction in accordance with 4.2.5.2.6

Note: For the identification of the substances being carried, see also Part 5.

6.7.2.20.3. If a portable tank is designed and approved for handling in open seas, the words "OFFSHORE PORTABLE TANK" shall be marked on the identification plate.

6.7.3 REQUIREMENTS FOR THE DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF PORTABLE TANKS INTENDED FOR THE CARRIAGE OF NON-REFRIGERATED LIQUEFIED GASES

Note: These requirements also apply to portable tanks intended for the carriage of chemicals under pressure (UN Nos. 3500, 3501, 3502, 3503, 3504 and 3505).

6.7.3.1 Definitions

For the purposes of this section:

Maximum allowable working pressure (MAWP) - a pressure that shall be not less than the highest of the following pressures measured at the top of the shell while in operating position, but in no case less than 7 bar:

The maximum effective gauge pressure allowed in the shell during filling or discharge; or

The maximum effective gauge pressure to which the shell is designed, which shall be:

- for a non-refrigerated liquefied gas listed in the portable tank instruction T50 in 4.2.5.2.6, the MAWP (in bar) given in T50 portable tank instruction for that gas;
- for other non-refrigerated liquefied gases, not less than the sum of:
 - the absolute vapour pressure (in bar) of the non-refrigerated liquefied gas at the design reference temperature minus 1 bar; and
 - the partial pressure (in bar) of air or other gases in the ullage space being determined by the design reference temperature and the liquid phase expansion due to an increase of the mean bulk temperature of Δt :

$$\Delta t = t_r - t_f$$

Where t_r = maximum mean bulk temperature, °C;

t_f = filling temperature, °C,

for chemicals under pressure, the MAWP (in bar) given in T 50 portable tank instruction for the liquefied gas portion of the propellants listed in T 50 in 4.2.5.2.6;

Test pressure – the maximum gauge pressure at the top of the shell during the pressure test

Design pressure – the pressure to be used in calculations required by a recognized pressure vessel code. The design pressure shall be not less than the highest of the following pressures:

a) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

b) The sum of:

- the maximum effective gauge pressure to which the shell is designed as defined in (b) of the MAWP definition (see above); and

- a head pressure determined on the basis of the static forces specified in 6.7.3.2.9, but not less than 0.35 bar;

Design temperature range for the shell shall be –40 °C to 50 °C for non-refrigerated liquefied gases carried under ambient conditions. More severe design temperatures shall be considered for portable tanks subjected to severe climatic conditions⁶;

⁶ For carriage to the Russian Federation or in transit through the territory of the Russian Federation in the period from 01.11 to 01.04 the design temperature range shall be from – 50 °C to + 50 °C.

Leakproofness test – a test using gas subjecting the shell and its service equipment to an effective internal pressure of not less than 25% of the MAWP

Shell – the part of the portable tank which retains the non-refrigerated liquefied gas intended for carriage (tank proper), including openings and their closures, but does not include service equipment or external structural equipment;

Maximum permissible gross mass (MPGM) – the sum of the tare mass of the portable tank and the heaviest load authorized for carriage;

Service equipment – measuring instruments and filling, discharge, venting, safety and insulating devices;

Structural equipment – the reinforcing, fastening, protective and stabilizing members external to the shell;

Reference steel – a steel with a tensile strength of 370 MPa and an elongation at fracture of 27%;

Mild steel – a steel with a guaranteed minimum tensile strength of 360 MPa to 440 MPa and a guaranteed minimum elongation at fracture conforming to 6.7.3.3.3

Filling density – the average mass of non-refrigerated liquefied gas per litre of shell capacity (kg/l). The filling density is given in portable tank instruction T50 in 4.2.5.2.6;

Design reference temperature – the temperature at which the vapour pressure of the contents is determined for the purpose of calculating the MAWP. The design reference temperature shall be less than the critical temperature of the non-refrigerated liquefied gas or liquefied gas propellants of chemicals under pressure intended to be carried to ensure that the gas at all times is liquefied. This value for each portable tank type is as follows:

- a) Shell with a diameter of 1.5 metres or less: 65 °C;
- b) Shell with a diameter of more than 1.5 metres:
 - without insulation or sun shield: 60 °C;
 - with sun shield (see 6.7.3.2.12): 55 °C; and
 - with insulation (see 6.7.3.2.12) : 50 °C;

Alternative arrangement – an approval granted by the competent authority for a portable tank or MEGC that has been designed, constructed or tested to technical requirements or testing methods other than those specified in this Chapter;

Portable tank – a multimodal tank having a capacity of more than 450 litres used for the carriage of non-refrigerated liquefied gases of Class 2. The portable tank includes a shell fitted with service equipment and structural equipment necessary for the carriage of gases. The portable tank shall be capable of being filled and discharged without the removal of its structural equipment. It shall possess stabilizing members external to the shell, and shall be capable of being lifted when full. It shall be designed primarily to be loaded onto a vehicle, wagon or sea-going or inland navigation vessel and shall be equipped with skids, mountings or accessories to facilitate mechanical handling. Tank-vehicles, tank-wagons, non-metallic tanks, intermediate bulk containers (IBCs), gas cylinders and large receptacles are not considered to fall within the definition for portable tanks;

6.7.3.2 General design and construction requirements

- 6.7.3.2.1** Shells shall be designed and constructed in accordance with the requirements of a pressure vessel code recognized by the competent authority. Shells shall be made of steel suitable for forming. The materials shall in principle conform to national or international material standards. For welded shells, only a material whose weldability has been fully demonstrated shall be used. Welds shall be skilfully made and afford complete safety. When the manufacturing process or the materials make it necessary, the shells shall be suitably heat-treated to guarantee adequate toughness in the weld and in the heat affected zones. In choosing the material the design temperature range shall be taken into account with respect to risk of brittle fracture, to stress corrosion cracking and to resistance to impact. When fine grain steel is used, the guaranteed value of the yield strength shall be not more than 460 MPa and the guaranteed value of the upper limit of the tensile strength shall be not more than 725 MPa according to the material specification. Portable tank materials shall be suitable for the external environment in which they may be carried.

- 6.7.3.2.2** Portable tank shells, fittings and pipework shall be constructed of materials which are:
- Substantially immune to attack by the non-refrigerated liquefied gas(es) intended to be carried; or
 - Properly passivated or neutralized by chemical reaction.
- 6.7.3.2.3** Gaskets shall be made of materials compatible with the non-refrigerated liquefied gas(es) intended to be carried.
- 6.7.3.2.4** Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.
- 6.7.3.2.5** The materials of the portable tank, including any devices, gaskets, and accessories, shall not adversely affect the non-refrigerated liquefied gas(es) intended for carriage in the portable tank.
- 6.7.3.2.6** Portable tanks shall be designed and constructed with supports to provide a secure base during carriage and with suitable lifting and tie-down attachments.
- 6.7.3.2.7** Portable tanks shall be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of handling and carriage. The design shall demonstrate that the effects of fatigue, caused by repeated application of these loads through the expected life of the portable tank, have been taken into account.
- 6.7.3.2.8** Shells shall be designed to withstand an external pressure of at least 0.4 bar (gauge pressure) above the internal pressure without permanent deformation. When the shell is to be subjected to a significant vacuum before filling or during discharge it shall be designed to withstand an external pressure of at least 0.9 bar (gauge pressure) above the internal pressure and shall be proven at that pressure.
- 6.7.3.2.9** Portable tanks and their fastenings shall, under the maximum permissible load, be capable of absorbing the following separately applied static forces:
- In the direction of travel: twice the MPGM multiplied by the acceleration due to gravity (g)⁷;
 - Horizontally at right angles to the direction of travel: the MPGM (when the direction of travel is not clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration due to gravity (g)⁷;
 - Vertically upwards: the MPGM multiplied by the acceleration due to gravity (g)⁷; and
 - Vertically downwards: twice the MPGM (total loading including the effect of gravity) multiplied by the acceleration due to gravity (g)⁷.
- 6.7.3.2.10** Under each of the forces in 6.7.3.2.9, the safety factor to be observed shall be as follows:
- For steels having a clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed yield strength; or
 - For steels with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2% proof strength and, for austenitic steels, the 1% proof strength.
- 6.7.3.2.11** The values of yield strength or proof strength shall be the values according to national or international material standards. When austenitic steels are used, the specified minimum values of yield strength and proof strength according to the material standards may be increased by up to 15% when these greater values are attested in the material inspection certificate. When no material standard exists for the steel in question, the value of yield strength or proof strength used shall be approved by the competent authority
- 6.7.3.2.12** When the shells intended for the carriage of non-refrigerated liquefied gases are equipped with thermal insulation, the thermal insulation systems shall satisfy the following requirements:
- It shall consist of a shield covering not less than the upper third but not more than the upper half of the surface of the shell and separated from the shell by an air space about 40 mm across;
 - It shall consist of a complete cladding of adequate thickness of insulating materials protected so as to prevent the ingress of moisture and damage under normal conditions of carriage and so as to provide a heat transfer coefficient of not more than 0.67 ($W \cdot m^{-2} \cdot K^{-1}$);

⁷ For calculation purposes $g = 9.81 \text{ m/s}^2$

c) When the protective covering is so closed as to be gas-tight, a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas tightness of the shell or of its items of equipment; and

d) The thermal insulation shall not inhibit access to the fittings and discharge devices.

6.7.3.2.13 Portable tanks intended for the carriage of flammable non-refrigerated liquefied gases shall be capable of being electrically earthed

6.7.3.3 Design criteria

6.7.3.3.1 Shells shall be of a circular cross-section.

6.7.3.3.2 Shells shall be designed and constructed to withstand a test pressure not less than 1.3 times the design pressure. The shell design shall take into account the minimum MAWP values provided in portable tank instruction T50 in 4.2.5.2.6 for each non-refrigerated liquefied gas intended for carriage. Attention is drawn to the minimum shell thickness requirements for these shells specified in 6.7.3.4.

6.7.3.3.3 For steels exhibiting a clearly defined yield point or characterized by a guaranteed proof strength (0.2% proof strength, generally, or 1% proof strength for austenitic steels) the primary membrane stress σ (sigma) in the shell shall not exceed 0.75 Re or 0.50 Rm, whichever is lower, at the test pressure,

where:

Re = yield strength in MPa, or 0.2% proof strength or, for austenitic steels, 1% proof stress;

Rm = minimum tensile strength in MPa.

6.7.3.3.3.1 The values of Re and Rm to be used shall be the specified minimum values according to national or international material standards. When austenitic steels are used, the specified minimum values for Re and Rm according to the material standards may be increased by up to 15% when these greater values are attested in the material inspection certificate. When no material standard exists for the steel in question, the values of Re and Rm used shall be approved by the competent authority or its authorized body.

6.7.3.3.3.2 Steels which have a Re/Rm ratio of more than 0.85 are not allowed for the construction of welded shells. The values of Re and Rm to be used in determining this ratio shall be the values specified in the material inspection certificate.

6.7.3.3.3.3 Steels used in the construction of shells shall have an elongation at fracture, (in %), of not less than 10 000/Rm with an absolute minimum of 16% for fine grain steels and 20% for other steels.

6.7.3.3.3.4 For the purpose of determining actual values for materials, it shall be noted that for sheet metal, the axis of the tensile test specimen shall be at right angles (transversely) to the direction of rolling. The permanent elongation at fracture shall be measured on test specimens of rectangular cross sections in accordance with ISO 6892:1998 using a 50 mm gauge length.

6.7.3.4 Minimum shell thickness

6.7.3.4.1 The minimum shell thickness shall be the greater thickness based on:

a) The minimum thickness determined in accordance with the requirements in 6.7.3.4; and

b) The minimum thickness determined in accordance with the recognized pressure vessel code including the requirements in 6.7.3.3.

In addition, any relevant portable tank special provision indicated in Column (11) of Table A of Chapter 3.2 and described in 4.2.5.3 shall be taken into account.

6.7.3.4.2 The cylindrical portions, ends (heads) and manhole covers of shells of not more than 1.80 m in diameter shall be not less than 5 mm thick in the reference steel or of equivalent thickness in the steel to be used. Shells of more than 1.80 m in diameter shall be not less than 6 mm thick in the reference steel or of equivalent thickness in the steel to be used.

6.7.3.4.3 The cylindrical portions, ends (heads) and manhole covers of all shells shall be not less than 4 mm thick regardless of the material of construction.

6.7.3.4.4 The equivalent thickness of a steel other than the thickness prescribed for the reference steel in 6.7.3.4.2 shall be determined using the following formula:

$$e_1 = \frac{21,4e_0}{\sqrt[3]{Rm_1 \times A_1}}$$

where:

- e1 – required equivalent thickness of the steel to be used, (in mm);
- e0 – minimum thickness for the reference steel specified in 6.7.3.4.2, (in mm);
- Rm1 – guaranteed minimum tensile strength of the steel to be used (see 6.7.3.3.3) (in MPa);
- A₁ – guaranteed minimum elongation at fracture of the steel to be used according to national or international standards, (in %)

- 6.7.3.4.5** In no case shall the shell wall thickness and the thickness of other parts of the shell be less than that prescribed in 6.7.3.4.1 to 6.7.3.4.3. This thickness shall be exclusive of any corrosion allowance
- 6.7.3.4.6** When mild steel is used (see 6.7.3.1), calculation using the formula in 6.7.3.4.4 is not required.
- 6.7.3.4.7** There shall be no sharp change of plate thickness at the attachment of the ends (heads) to the cylindrical portion of the shell.
- 6.7.3.5 Service equipment**
 - 6.7.3.5.1** Service equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during filling/discharging and carriage. When the connection between the frame and the shell allows relative movement between the sub-assemblies, the equipment shall be so fastened as to permit such movement without risk of damage to working parts. The external discharge fittings (pipe sockets, shut-off devices), the internal stop-valve and its seating shall be protected against the danger of being wrenched off by external forces. The filling and discharge devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening.
 - 6.7.3.5.2** All openings with a diameter of more than 1.5 mm in shells of portable tanks, except openings for pressure- relief devices, inspection openings and closed bleed holes, shall be fitted with at least three mutually independent shut-off devices in series, the first being an internal stop-valve, excess flow valve or equivalent device, the second being an external stop-valve and the third being a blank flange or equivalent device.
 - 6.7.3.5.2.1** When a portable tank is fitted with an excess flow valve, the excess flow valve shall be so fitted that its seating is inside the shell or inside a welded flange or, when fitted externally, its mountings shall be designed so that in the event of impact its effectiveness shall be maintained. The excess flow valves shall be selected and fitted so as to close automatically when the rated flow specified by the manufacturer is reached. Connections and accessories leading to or from such a valve shall have a capacity for a flow more than the rated flow of the excess flow valve.
 - 6.7.3.5.3** For filling and discharge openings, the first shut-off device shall be an internal stop-valve and the second shall be a stop-valve placed in an accessible position on each discharge and filling pipe.
 - 6.7.3.5.4** For filling and discharge bottom openings of portable tanks intended for the carriage of flammable and/or toxic non-refrigerated liquefied gases or chemicals under pressure the internal stop-valve shall be a quick closing safety device which closes automatically in the event of unintended movement of the portable tank during filling or discharge or fire engulfment. Except for portable tanks having a capacity of not more than 1 000 litres, it shall be possible to operate this device by remote control.
 - 6.7.3.5.5** In addition to filling, discharge and gas pressure equalizing orifices, shells may have openings in which gauges, thermometers and manometers can be fitted. Connections for such instruments shall be made by suitable welded nozzles or pockets and not be screwed connections through the shell
 - 6.7.3.5.6** All portable tanks shall be fitted with manholes or other inspection openings of suitable size to allow for internal inspection and adequate access for maintenance and repair of the interior
 - 6.7.3.5.7** External fittings shall be grouped together so far as reasonably practicable.
 - 6.7.3.5.8** Each connection on a portable tank shall be clearly marked to indicate its function

- 6.7.3.5.9** Each stop-valve or other means of closure shall be designed and constructed to a rated pressure not less than the MAWP of the shell taking into account the temperatures expected during carriage. All stop-valves with a screwed spindle shall close by a clockwise motion of the handwheel. For other stop-valves the position (open and closed) and direction of closure shall be clearly indicated. All stop-valves shall be designed to prevent unintentional opening.
- 6.7.3.5.10** Piping shall be designed, constructed and installed so as to avoid the risk of damage due to thermal expansion (contraction), mechanical shock and vibration. All piping shall be of suitable metallic material. Welded pipe joints shall be used wherever possible.
- 6.7.3.5.11** Joints in copper tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than 525 °C. The joints shall not decrease the strength of tubing as may happen when cutting threads.
- 6.7.3.5.12** The burst pressure of all piping and pipe fittings shall be not less than the highest of four times the MAWP of the shell or four times the pressure to which it may be subjected in service by the action of a pump or other device (except pressure-relief devices).
- 6.7.3.5.13** Ductile metals shall be used in the construction of valves and accessories.
- 6.7.3.6 Bottom openings**
- 6.7.3.6.1** Certain non-refrigerated liquefied gases shall not be carried in portable tanks with bottom openings when portable tank instruction T50 in 4.2.5.2.6 indicates that bottom openings are not allowed. There shall be no openings below the liquid level of the shell when it is filled to its maximum permissible filling limit.
- 6.7.3.7 Pressure-relief devices**
- 6.7.3.7.1** Portable tanks shall be provided with one or more spring-loaded pressure-relief devices. The pressure-relief devices shall open automatically at a pressure not less than the MAWP and be fully open at a pressure equal to 110% of the MAWP. These devices shall, after discharge, close at a pressure not lower than 10% below the pressure at which discharge starts and shall remain closed at all lower pressures. The pressure-relief devices shall be of a type that will resist dynamic forces including liquid surge. Frangible discs not in series with a spring-loaded pressure-relief device are not permitted.
- 6.7.3.7.2** Pressure-relief devices shall be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.
- 6.7.3.7.3** Portable tanks intended for the carriage of certain non-refrigerated liquefied gases identified in portable tank instruction T50 in 4.2.5.2.6 shall have a pressure-relief device approved by the competent authority. Unless a portable tank in dedicated service is fitted with an approved relief device constructed of materials compatible with the load, such device shall comprise a frangible disc preceding a spring-loaded device. The space between the frangible disc and the device shall be provided with a pressure gauge or a suitable tell-tale indicator. This arrangement permits the detection of disc rupture, pinholing or leakage which could cause a malfunction of the pressure-relief device. The frangible discs shall rupture at a nominal pressure 10% above the start-to-discharge pressure of the relief device
- 6.7.3.7.4** In the case of multi-purpose portable tanks, the pressure-relief devices shall open at a pressure indicated in 6.7.3.7.1 for the gas having the highest maximum allowable pressure of the gases allowed to be carried in the portable tank.
- 6.7.3.8 Capacity of relief devices**
- 6.7.3.8.1** The combined delivery capacity of the relief devices shall be sufficient that, in the event of total fire engulfment, the pressure (including accumulation) inside the shell does not exceed 120% of the MAWP. Spring-loaded relief devices shall be used to achieve the full relief capacity prescribed. In the case of multi-purpose tanks, the combined delivery capacity of the pressure-relief devices shall be taken for the gas which requires the highest delivery capacity of the gases allowed to be carried in portable tanks.

6.7.3.8.1.1 To determine the total required capacity of the relief devices, which shall be regarded as being the sum of the individual capacities of the several devices, the following formula⁸ shall be used:

$$Q = 12,4 \frac{FA^{0,82}}{LC} \sqrt{\frac{ZT}{M}}$$

where:

Q – minimum required rate of discharge in cubic metres of air per second (m³/s) at standard conditions: 1 bar and 0 °C (273 K)

F – is a coefficient with the following value

for uninsulated shells F = 1;

for insulated shells: $F = U(649 - t_h)/13,6$, but in no case is less than 0.25 (The value of F given above for insulated shells may be taken provided that the insulation is in accordance with 6.7.3.8.1.2;)

where:

U – heat transfer coefficient of the insulation, in kW/(·m²·K⁻¹), at 38 °C,

t_h – actual temperature of the non-refrigerated liquefied gas during filling (°C); when this temperature is unknown, let t=15 °C;

A – total external surface area of shell in square metres;

Z – the gas compressibility factor in the accumulating condition (when this factor is unknown, let Z=1.0);

T – absolute temperature in Kelvin (°C + 273) above the pressure relief devices in the accumulating condition

L – the latent heat of vaporization of the liquid, in kJ/kg, in the accumulating condition;

M – molecular mass of the discharged gas;

C – a constant which is derived from one of the following formulae as a function of the ratio k of specific heats

$$k = \frac{C_p}{C_v},$$

where

c_p is the specific heat at constant pressure; and

c_v is the specific heat at constant volume.

When $k > 1$:

$$C = \sqrt{k \left(\frac{2}{k+1} \right)^{\frac{k+1}{k-1}}},$$

when $k = 1$ or k is unknown:

$$C = \frac{1}{\sqrt{e}} = 0,607$$

where e is the mathematical constant 2.7183.

⁸ This formula applies only to non-refrigerated liquefied gases which have critical temperatures well above the temperature at the accumulating condition. For gases which have critical temperatures near or below the temperature at the accumulating condition, the calculation of the pressure-relief device delivery capacity shall consider further thermodynamic properties of the gas (see for example CGA S-1.2-2003 "Pressure Relief Device Standards – Part 2 – Cargo and Portable Tanks for Compressed Gases").

C may also be taken from the following table

k	C	k	C	k	C
1,00	0,607	1,26	0,660	1,52	0,704
1,02	0,611	1,28	0,664	1,54	0,707
1,04	0,615	1,30	0,667	1,56	0,710
1,06	0,620	1,32	0,671	1,58	0,713
1,08	0,624	1,34	0,674	1,60	0,716
1,10	0,628	1,36	0,678	1,62	0,719
1,12	0,633	1,38	0,681	1,64	0,722
1,14	0,637	1,40	0,685	1,66	0,725
1,16	0,641	1,42	0,688	1,68	0,728
1,18	0,645	1,44	0,691	1,70	0,731
1,20	0,649	1,46	0,695	2,00	0,770
1,22	0,652	1,48	0,698	2,20	0,793
1,24	0,656	1,50	0,701		

Note: This formula applies only to non-refrigerated liquefied gases which have critical temperatures well above the temperature at the accumulating condition. For gases which have critical temperatures near or below the temperature at the accumulating condition, the calculation of the pressure-relief device delivery capacity shall consider further thermodynamic properties of the gas (see, for example Document 53 of the List).

6.7.3.8.1.2 Insulation systems, used for the purpose of reducing the venting capacity, shall be approved by the competent authority or its authorized body. In all cases, insulation systems approved for this purpose shall:

- a) Remain effective at all temperatures up to 649 °C; and
- b) Be jacketed with a material having a melting point of 700 °C or greater.

6.7.3.9 Marking of pressure-relief devices

6.7.3.9.1 Every pressure-relief device shall be plainly and permanently marked with the following particulars:

- a) The pressure (in bar or kPa) at which it is set to discharge;
- b) The allowable tolerance at the discharge pressure for spring-loaded devices;
- c) The reference temperature corresponding to the rated pressure for frangible discs;
- d) The rated flow capacity of the device in standard cubic metres of air per second (m³/s); and
- e) The cross sectional flow areas of the spring loaded pressure-relief devices and frangible discs in mm².

When practicable, the following information shall also be shown:

- f) The manufacturer's name and relevant catalogue number of the device.

6.7.3.9.2 The rated flow capacity marked on the pressure-relief devices shall be determined according to ISO 4126- 1:2004 and ISO 4126-7:2004

6.7.3.10 Connections to pressure-relief devices

6.7.3.10.1 Connections to pressure-relief devices shall be of sufficient size to enable the required discharge to pass unrestricted to the safety device. No stop-valve shall be installed between the shell and the pressure-relief devices except when duplicate devices are provided for maintenance or other reasons and the stop-valves serving the devices actually in use are locked open or the stop-valves are interlocked so that at least one of the duplicate devices is always operable and capable of meeting the requirements of 6.7.3.8. There shall be no obstruction in an opening leading to a vent or pressure-relief device which might restrict or cut-off the flow from the shell to that device. Vents from the pressure-relief devices, when used, shall deliver the relieved vapour or liquid to the atmosphere in conditions of minimum back-pressure on the relieving device.

6.7.3.11 Siting of pressure-relief devices

6.7.3.11.1 Each pressure-relief device inlet shall be situated on top of the shell in a position as near the longitudinal and transverse centre of the shell as reasonably practicable. All pressure relief device inlets shall under maximum filling conditions be situated in the vapour space of the shell and the devices shall be so arranged as to ensure that the escaping vapour is discharged

unrestrictedly. For flammable non-refrigerated liquefied gases, the escaping vapour shall be directed away from the shell in such a manner that it cannot impinge upon the shell. Protective devices which deflect the flow of vapour are permissible provided the required relief-device capacity is not reduced.

- 6.7.3.11.2** Arrangements shall be made to prevent access to the pressure-relief devices by unauthorized persons and to protect the devices from damage caused by the portable tank overturning.

6.7.3.12 Gauging devices

- 6.7.3.12.1** Portable tanks shall be designed and constructed with a support structure to provide a secure base during carriage. The forces specified in 6.7.3.2.9 and the safety factor specified in 6.7.3.2.10 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable.

6.7.3.13 Portable tank supports, frameworks, lifting and tie-down attachments

- 6.7.3.13.1** Portable tanks shall be designed and constructed with a support structure to provide a secure base during carriage. The forces specified in 6.7.3.2.9 and the safety factor specified in 6.7.3.2.10 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable.

- 6.7.3.13.2** The combined stresses caused by portable tank mountings (e.g. cradles, frameworks, etc.) and portable tank lifting and tie-down attachments shall not cause excessive stress in any portion of the shell. Permanent lifting and tie-down attachments shall be fitted to all portable tanks. Preferably they shall be fitted to the portable tank supports but may be secured to reinforcing plates located on the shell at the points of support.

- 6.7.3.13.3** In the design of supports and frameworks the effects of environmental corrosion shall be taken into account.

- 6.7.3.13.4** Forklift pockets shall be capable of being closed off. The means of closing forklift pockets shall be a permanent part of the framework or permanently attached to the framework. Single compartment portable tanks with a length less than 3.65 m need not have closed off forklift pockets provided that:

- a) The shell and all the fittings are well protected from being hit by the forklift blades; and
- b) The distance between the centres of the forklift pockets is at least half of the maximum length of the portable tank.

- 6.7.3.13.5** When portable tanks are not protected during carriage, according to 4.2.2.3, the shells and service equipment shall be protected against damage to the shell and service equipment resulting from lateral or longitudinal impact or overturning. External fittings shall be protected so as to preclude the release of the shell contents upon impact or overturning of the portable tank on its fittings. Examples of protection include

- a) Protection against lateral impact which may consist of longitudinal bars protecting the shell on both sides at the level of the median line;
- b) Protection of the portable tank against overturning (reinforcement rings or bars fixed across the frame)
- c) Protection against rear impact (bumper or frame);
- d) Protection of the shell against damage from impact or overturning (frame in accordance with ISO 1496-3:1995);

6.7.3.14 Design approval

The competent authority or its authorized body shall issue a design approval certificate for any new design of a portable tank. This certificate shall attest that a portable tank has been surveyed by that authority, is suitable for its intended purpose and meets the requirements of this Chapter and where appropriate the provisions for gases provided in portable tank instruction T 50 in 4.2.5.2.6. When a series of portable tanks are manufactured without change in the design, the certificate shall be valid for the entire series. The certificate shall refer to the prototype test report, the gases allowed to be carried, the materials of construction of the shell and an approval number. The approval number shall consist of the distinguishing sign or mark of the State in whose territory the approval was granted, indicated by the distinguishing sign

used on vehicles in international road traffic⁹, and a registration number. Any alternative arrangements according to 6.7.1.2 shall be indicated on the certificate. A design approval may serve for the approval of smaller portable tanks made of materials of the same kind and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

6.7.3.14.2 The prototype test report for the design approval shall include at least the following:

- a) The results of the applicable framework test specified in ISO 1496-3:1995;
- b) The results of the initial inspection and test in 6.7.3.15.3; and
- c) The results of the impact test in 6.7.3.15.1, when applicable.

6.7.3.15 Inspection and testing

6.7.3.15.1 Portable tanks meeting the definition of container in the International Convention for Safe Containers (CSC), 1972, as amended, shall not be used unless they are successfully qualified by subjecting a representative prototype of each design to the Dynamic, Longitudinal Impact Test prescribed in the Manual of Tests and Criteria, Part IV, Section 41.

6.7.3.15.2 The shell and items of equipment of each portable tank shall be inspected and tested before being put into service for the first time (initial inspection and test) and thereafter at not more than five-year intervals (5 year periodic inspection and test) with an intermediate periodic inspection and test (2.5 year periodic inspection and test) midway between the 5 year periodic inspections and tests. The 2.5 year inspection and test may be performed within 3 months of the specified date. An exceptional inspection and test shall be performed regardless of the last periodic inspection and test when necessary according to 6.7.3.15.7.

6.7.3.15.3 The initial inspection and test of a portable tank shall include a check of the design characteristics, an internal and external examination of the portable tank and its fittings with due regard to the non-refrigerated liquefied gases to be carried, and a pressure test referring to the test pressures according to 6.7.3.3.2. The pressure test may be performed as a hydraulic test or by using another liquid or gas with the agreement of the competent authority or its authorized body. Before the portable tank is placed into service, a leakproofness test and a test of the satisfactory operation of all service equipment shall also be performed. When the shell and its fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test. All welds subject to full stress level in the shell shall be inspected during the initial test by radiographic, ultrasonic, or another suitable non-destructive test method. This does not apply to the jacket.

6.7.3.15.4 The 5 year periodic inspection and test shall include an internal and external examination and, as a general rule, a hydraulic pressure test. Sheathing, thermal insulation and the like shall be removed only to the extent required for reliable appraisal of the condition of the portable tank. When the shell and equipment have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.3.15.5 The intermediate 2.5 year periodic inspection and test shall at least include an internal and external examination of the portable tank and its fittings with due regard to the non-refrigerated liquefied gases intended to be carried, a leakproofness test and a check of the satisfactory operation of all service equipment. Sheathing thermal and insulation shall be removed only to the extent required for reliable appraisal of the condition of the portable tank. For portable tanks intended for the carriage of a single non-refrigerated liquefied gas, the 2.5 year internal examination may be waived or substituted by other test methods or inspection procedures specified by the competent authority or its authorized body.

6.7.3.15.6 Inspection and test of portable tanks and filling after the date of expiry of the last periodic inspection and test

6.7.3.15.6.1 A portable tank may not be filled and offered for carriage after the date of expiry of the last 5 year or 2.5 year periodic inspection and test as required by 6.7.3.15.2. However a portable tank filled prior to the date of expiry of the last periodic inspection and test may be carried for a period not to exceed three months beyond the date of expiry of the last periodic test or inspection. In addition, a portable tank may be carried after the date of expiry of the last periodic test and inspection:

⁹ *Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.*

- a) After emptying but before cleaning, for purposes of performing the next required test or inspection prior to refilling; and
- b) Unless otherwise approved by the competent authority, for a period not to exceed six months beyond the date of expiry of the last periodic test or inspection, in order to allow the return of dangerous goods for proper disposal or recycling. Reference to this exemption shall be mentioned in the consignment note.

6.7.3.15.6.2 Except as provided for in 6.7.3.15.6.1, portable tanks which have missed the timeframe for their scheduled 5 year or 2.5-year periodic inspection and test may only be filled and offered for carriage if a new 5-year periodic inspection and test is performed according to 6.7.3.15.4.

6.7.3.15.7 The exceptional inspection and test is necessary when the portable tank shows evidence of damaged or corroded areas, or leakage, or other conditions that indicate a deficiency that could affect the integrity of the portable tank. The extent of the exceptional inspection and test shall depend on the amount of damage or deterioration of the portable tank. It shall include at least the 2.5 year inspection and test according to 6.7.3.15.5.

6.7.3.15.8 The internal and external examinations shall ensure that:

- a) The shell is inspected for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the portable tank unsafe for carriage;
- b) The piping, valves, and gaskets are inspected for corroded areas, defects, or any other conditions, including leakage, that might render the portable tank unsafe for filling, discharge or carriage; The wall thickness shall be verified by appropriate measurement if this inspection indicates a reduction of wall thickness;
- c) Devices for tightening manhole covers are operative and there is no leakage at manhole covers or gaskets;
- d) Missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;
- e) All emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;
- e) Required markings on the portable tank are legible and in accordance with the applicable requirements; and
- f) The framework, the supports and the arrangements for lifting the portable tank are in satisfactory condition.

6.7.3.15.9 The inspections and tests in 6.7.3.15.1, 6.7.3.15.3, 6.7.3.15.4, 6.7.3.15.5 and 6.7.3.15.7 shall be performed or witnessed by an expert approved by the competent authority or its authorized body. When the pressure test is a part of the inspection and test, the test pressure shall be the one indicated on the data plate of the portable tank. While under pressure, the portable tank shall be inspected for any leaks in the shell, piping or equipment.

6.7.3.15.10 In all cases when cutting, burning or welding operations on the shell have been effected, that work shall be to the approval of the competent authority or its authorized body taking into account the pressure vessel code used for the construction of the shell. A pressure test to the original test pressure shall be performed after the work is completed.

6.7.3.15.11 When evidence of any unsafe condition is discovered, the portable tank shall not be returned to service until it has been corrected and the pressure test is repeated and passed.

6.7.3.16 Marking

6.7.3.16.1 Every portable tank shall be fitted with a corrosion resistant metal plate permanently attached to the portable tank in a conspicuous place readily accessible for inspection. When for reasons of portable tank arrangements the plate cannot be permanently attached to the shell, the shell shall be marked with at least the information required by the pressure vessel code. As a minimum, at least the following information shall be marked on the plate (by stamping or by any other similar method):

- a) Owner information
 - 1) Owner's registration number

- b) Manufacturing information
- 1) Country of manufacture;
 - 2) Year of manufacture;
 - 3) Manufacturer's name or mark;
 - 4) Manufacturer's serial number;

c) Approval information

- (1) The United Nations packaging symbol



This symbol shall not be used for any purpose other than certifying that a packaging, a portable tank, flexible bulk container or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.11

- 2) Approval country;
- 3) Authorized body for the design approval;
- 4) Design approval number;
- 5) Letters "AA", if the design was approved under alternative arrangements (see 6.7.1.2);
- 6) Pressure vessel code to which the shell is designed;

d) Pressures

- 1) MAWP (in bar gauge or kPa gauge)¹⁰;
- 2) Test pressure (in bar gauge or kPa gauge)¹⁰;
- 3) Initial pressure test date (month and year);
- 4) Identification mark of the initial pressure test witness;
- 5) External design pressure¹¹ (in bar gauge or kPa gauge)¹⁰;

e) Temperatures

- 1) Design temperature range (in °C)¹⁰
- 2) Design reference temperature (in °C)¹⁰

f) Materials

- 1) Shell material(s) and material standard reference(s);
- 2) Equivalent thickness in reference steel (in mm)¹⁰;

g) Capacity

- 1) Tank water capacity at 20 °C (in litres)¹⁰;

h) Periodic inspections and tests

- 1) Type of the most recent periodic test (2.5-year, 5-year or exceptional);
- 2) Date of the most recent periodic test (month and year);
- 3) Test pressure (in bar gauge or kPa gauge)¹⁰ of the most recent periodic test (if applicable);
- 4) Identification mark of the authorized body who performed or witnessed the most recent test

Figure 6.7.3.16.1: Example of identification plate marking

Owner's registration number	
MANUFACTURING INFORMATION	
Country of manufacture	
Year of manufacture	
Manufacturer	
Manufacturer's serial number	
APPROVAL INFORMATION	
Approval country	
Authorized body for design approval	
Design approval number	"AA" (if applicable)
Shell design code (pressure vessel)	

¹⁰ The measuring unit used shall be indicated.

¹¹ See 6.7.3.2.8

PRESSURES							
MAWP				bar or kPa			
Test pressure				bar or kPa			
Initial pressure test		(mm/yyy)		Witness stamp:			
External design pressure				bar or kPa			
TEMPERATURES							
Design temperature range				°C		to °C	
Design reference temperature				°C			
MATERIALS							
Shell material(s) and material standard reference(s)							
Equivalent thickness in reference				mm			
CAPACITY							
Tank water capacity at 20 °C				litres			
PERIODIC INSPECTIONS / TESTS							
T e	Test date	Witness stamp and test pressure ^a		Test type	Test date	Witness stamp and test pressure ^a	
	(mm/yyyy)	bar or kPa			(mm/yyyy)	bar or kPa	

^a Test pressure if applicable.

6.7.3.16.2 The following information shall be durably marked either on the portable tank itself or on a metal plate firmly secured to the portable tank

Name of the operator

Name of non-refrigerated liquefied gas(es) permitted for carriage

Maximum permissible load mass for each non-refrigerated liquefied gas permitted_kg

Maximum permissible gross mass (MPGM)_____kg

Unladen (tare) mass_____kg

Portable tank instruction in accordance with 4.2.5.2.6

Note: For the identification of the non-refrigerated liquefied gases being carried, see also Part 5.

6.7.3.16.3 If a portable tank is designed and approved for handling in open seas, the words "OFFSHORE PORTABLE TANK" shall be marked on the identification plate.

6.7.3 REQUIREMENTS FOR THE DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF PORTABLE TANKS INTENDED FOR THE CARRIAGE OF REFRIGERATED LIQUEFIED GASES

6.7.4.1 Definitions

For the purposes of this section:

Holding time – the time that will elapse from the establishment of the initial filling condition (from the moment of valves closure) until the pressure has risen (due to heat influx) to the lowest set pressure of the pressure limiting device(s);

Test pressure – the maximum gauge pressure at the top of the shell during the pressure test.

Maximum allowable working pressure (MAWP) – the maximum effective gauge pressure permissible at the top of the shell of a loaded portable tank in its operating position including the highest effective pressure during filling and discharge;

Leakproofness test – a test using gas subjecting the shell and its service equipment, to an effective internal pressure not less than 90% of the MAWP;.

Shell – the part of the portable tank which retains the refrigerated liquefied gas intended for carriage, including openings and their closures, but does not include service equipment or external structural equipment;

Maximum permissible gross mass (MPGM) – the sum of the tare mass of the portable tank and the heaviest load authorized for carriage;

Service equipment – controlling and measuring instruments and filling, discharge, venting, safety, pressurizing, cooling and thermal insulation devices.

Structural equipment – the reinforcing, fastening, protective and stabilizing members external to the shell;

Jacket – the outer insulation cover or cladding which may be part of the insulation system.

Reference steel – a steel with a tensile strength of 370 N/mm² and an elongation at fracture of 27%;

Minimum design temperature – the temperature which is used for the design and construction of the shell not higher than the lowest (coldest) temperature (service temperature) of the contents during normal conditions of filling, discharge and carriage

Alternative arrangement – an approval granted by the competent authority for a portable tank or MEGC that has been designed, constructed or tested to technical requirements or testing methods other than those specified in this Chapter;.

Portable tank – a thermally insulated multimodal tank having a capacity of more than 450 litres fitted with service equipment and structural equipment necessary for the carriage of refrigerated liquefied gases. The portable tank shall be capable of being filled and discharged without the removal of its structural equipment. It shall possess stabilizing members external to the tank, and shall be capable of being lifted when full. It shall be designed primarily to be loaded onto a vehicle, wagon or sea-going or inland navigation vessel and shall be equipped with skids, mountings or accessories to facilitate mechanical handling. Tank-vehicles, tank-wagons, non-metallic tanks, intermediate bulk containers (IBCs), gas cylinders and large receptacles are not considered to fall within the definition for portable tanks;

Tank – construction which normally consists of either:

a) A jacket and one or more inner shells where the space between the shell(s) and the jacket is exhausted of air (vacuum insulation) and may incorporate a thermal insulation system; or

b) A jacket and an inner shell with an intermediate layer of solid thermally insulating material (e.g. solid foam);

6.7.4.2 General design and construction requirements

6.7.4.2.1 Shells shall be designed and constructed in accordance with the requirements of a pressure vessel code recognized by the competent authority. Shells and jackets shall be made of metallic materials suitable for forming. Non-metallic materials may be used for the attachments and supports between the shell and jacket, provided their material properties at the minimum design temperature are proven to be sufficient. The materials shall in principle conform to national or international material standards. For welded shells and jackets only materials whose weldability has been fully demonstrated shall be used. Welds shall be skilfully made and afford complete safety. When the manufacturing process or the materials make it necessary, the shell shall be suitably heat treated to guarantee adequate toughness in the weld and in the heat affected zones. In choosing the material, the minimum design temperature shall be taken into account with respect to risk of brittle fracture, to hydrogen embrittlement, to stress corrosion cracking and to resistance to impact. When fine grain steel is used, the guaranteed value of the yield strength shall be not more than 460 MPa and the guaranteed value of the upper limit of the tensile strength shall be not more than 725 MPa in accordance with the material specifications. Portable tank materials shall be suitable for the external environment in which they may be carried.

6.7.4.2.2 Any part of a portable tank, including fittings, gaskets and pipe-work, which can be expected normally to come into contact with the refrigerated liquefied gas carried shall be compatible with that refrigerated liquefied gas

6.7.4.2.3 Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.

6.7.4.2.4 The thermal insulation system shall include a complete covering of the shell(s) with effective insulating materials. External insulation shall be protected by a jacket so as to prevent the ingress of moisture and other damage under normal carriage conditions.

6.7.4.2.5 When a jacket is so closed as to be gas-tight, a device shall be provided to prevent any dangerous pressure from developing in the insulation space

- 6.7.4.2.6** Portable tanks intended for the carriage of refrigerated liquefied gases having a boiling point below minus (–)182 °C at atmospheric pressure shall not include materials which may react with oxygen or oxygen enriched atmospheres in a dangerous manner, when located in parts of the thermal insulation when there is a risk of contact with oxygen or with oxygen enriched fluid.
- 6.7.4.2.7** Insulating materials shall not deteriorate unduly in service.
- 6.7.4.2.8** A reference holding time shall be determined for each refrigerated liquefied gas intended for carriage in a portable tank
- 6.7.4.2.8.1** The reference holding time shall be determined by a method recognized by the competent authority on the basis of the following:
- a) The effectiveness of the insulation system, determined in accordance with 6.7.4.2.8.2;
 - b) The lowest set pressure of the pressure limiting device(s);
 - c) The initial filling conditions;
 - d) An assumed ambient temperature of 30 °C;
 - e) The physical properties of the individual refrigerated liquefied gas intended to be carried.
- 6.7.4.2.8.2** The effectiveness of the insulation system shall be determined by type testing the portable tank in accordance with a procedure recognized by the competent authority. This test shall consist of either:
- a) A constant pressure test (for example at atmospheric pressure) when the loss of refrigerated liquefied gas is measured over a period of time. In this case variations in atmospheric pressure shall be taken into account. or
 - b) A closed system test when the rise in pressure in the shell is measured over a period of time
- When performing either tests corrections shall be made for any variation of the ambient temperature from the assumed ambient temperature reference value of 30 °C.
- Note:** For the determination of the actual holding time before each journey, refer to 4.2.3.7.
- 6.7.4.2.9** The jacket of a vacuum-insulated double-wall tank shall have either an external design pressure not less than 100 kPa (1 bar) gauge pressure calculated in accordance with a recognized technical code or a calculated critical collapsing pressure of not less than 200 kPa (2 bar) gauge pressure. Internal and external reinforcements may be included in calculating the ability of the jacket to resist the external pressure.
- 6.7.4.2.10** Portable tanks shall be designed and constructed with supports to provide a secure base during carriage and with suitable lifting and tie-down attachments.
- 6.7.4.2.11** Portable tanks shall be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of handling and carriage. The design shall demonstrate that the effects of fatigue, caused by repeated application of these loads through the expected life of the portable tank, have been taken into account.
- 6.7.4.2.12** Portable tanks and their fastenings under the maximum permissible load shall be capable of absorbing the following separately applied static forces:
- a) In the direction of travel: twice the MPGM multiplied by the acceleration due to gravity (g)¹²;
 - b) Horizontally at right angles to the direction of travel: the MPGM (when the direction of travel is not clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration due to gravity (g)¹²;
 - c) Vertically upwards: the MPGM multiplied by the acceleration due to gravity (g)¹²; and
 - d) Vertically downwards: twice the MPGM (total loading including the effect of gravity) multiplied by the acceleration due to gravity (g)¹².
- 6.7.4.2.13** Under each of the forces in 6.7.4.2.12, the safety factor to be observed shall be as follows:
- a) For materials having a clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed yield strength; and

¹² For calculation purposes $g = 9.81 \text{ m/s}^2$.

- b) For materials with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2% proof strength or, in case of austenitic steels, the 1% proof strength.

6.7.4.2.14 The values of yield strength or proof strength shall be the values according to national or international material standards. When austenitic steels are used, the specified minimum values according to the material standards may be increased by up to 15% when greater values are attested in the material inspection certificate. When no material standard exists for the metal in question, or when non-metallic materials are used the values of yield strength or proof strength shall be approved by the competent authority.

6.7.4.2.15 Portable tanks intended for the carriage of flammable refrigerated liquefied gases shall be capable of being electrically earthed.

6.7.4.3 Design criteria

6.7.4.3.1 Shells shall be of a circular cross section.

6.7.4.3.2 Shells shall be designed and constructed to withstand a test pressure not less than 1.3 times the MAWP. For shells with vacuum insulation the test pressure shall not be less than 1.3 times the sum of the MAWP and 100 kPa (1 bar). In no case shall the test pressure be less than 300 kPa (3 bar) (gauge pressure). Attention is drawn to the minimum shell thickness requirements, specified in 6.7.4.4.2 to 6.7.4.4.7.

6.7.4.3.3 For metals exhibiting a clearly defined yield point or characterized by a guaranteed proof strength (0.2% proof strength, generally, or 1% proof strength for austenitic steels) the primary membrane stress σ (sigma) in the shell shall not exceed 0.75 Re or 0.50 Rm, (whichever is lower), at the test pressure, where:

Re = yield strength in MPa, or 0.2% proof strength or, for austenitic steels, 1% proof strength;

Rm = minimum tensile strength in MPa.

6.7.4.3.3.1 The values of Re and Rm to be used shall be the specified minimum values according to national or international material standards. When austenitic steels are used, the specified minimum values for Re and Rm according to the material standards may be increased by up to 15% when greater values are attested in the material inspection certificate. When no material standard exists for the metal in question, the values of Re and Rm used shall be approved by the competent authority or its authorized body.

6.7.4.3.3.2 Steels which have a Re/Rm ratio of more than 0.85 are not allowed for the construction of welded shells. The values of Re and Rm to be used in determining this ratio shall be the values specified in the material inspection certificate.

6.7.4.3.3.3 Steels used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/Rm with an absolute minimum of 16% for fine grain steels and 20% for other steels. Aluminium and aluminium alloys used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/6Rm with an absolute minimum of 12%.

6.7.4.3.3.4 For the purpose of determining actual values for materials, it shall be noted that for sheet metal, the axis of the tensile test specimen shall be at right angles to the direction of rolling. The permanent elongation at fracture shall be measured on test specimens of rectangular cross sections in accordance with ISO 6892:1998 using a 50 mm gauge length.

6.7.4.4 Minimum shell thickness

6.7.4.4.1 The minimum shell thickness shall be the greater thickness based on:

- a) The minimum thickness determined in accordance with the requirements in 6.7.4.4.2 to 6.7.4.4.7; or
- b) The minimum thickness determined in accordance with the recognized pressure vessel code including the requirements in 6.7.4.3.

6.7.4.4.2 Shells of not more than 1.80 m in diameter shall be not less than 5 mm thick in the reference steel or of equivalent thickness in the metal to be used. Shells of more than 1.80 m in diameter shall be not less than 6 mm thick in the reference steel or of equivalent thickness in the metal to be used.

6.7.4.4.3 Shells of vacuum-insulated tanks of not more than 1.80 m in diameter shall be not less than 3 mm thick in the reference steel or of equivalent thickness in the metal to be used. Such shells of

more than 1.80 m in diameter shall be not less than 4 mm thick in the reference steel or of equivalent thickness in the metal to be used.

6.7.4.4.4 For vacuum-insulated tanks, the aggregate thickness of the jacket and the shell shall correspond to the minimum thickness prescribed in 6.7.4.4.2, the thickness of the shell itself being not less than the minimum thickness prescribed in 6.7.4.4.3.

6.7.4.4.5 Shells shall be not less than 3 mm thick regardless of the material of construction.

6.7.4.4.6 The equivalent thickness of a metal other than the thickness prescribed for the reference steel in 6.7.4.4.2 and 6.7.4.4.3 shall be determined using the following formula:

$$e_1 = \frac{21,4e_0}{\sqrt[3]{Rm_1 \times A_1}}$$

where:

e_1 = required equivalent thickness of the metal to be used, in mm;

e_0 = minimum thickness of the reference steel specified in 6.7.4.4.2 and 6.7.4.4.3, in mm; Rm_1 = guaranteed minimum tensile strength of the metal to be used (see 6.7.4.3.3), in MPa;

A_1 = guaranteed minimum elongation at fracture of the metal to be used according to national or international standards, in %.

6.7.4.4.7 In no case shall the wall thickness be less than that prescribed in 6.7.4.4.1 to 6.7.4.4.5. All parts of the shell shall have a minimum thickness as determined by 6.7.4.4.1 to 6.7.4.4.6. This thickness shall be exclusive of any corrosion allowance.

6.7.4.4.8 There shall be no sharp change of plate thickness at the attachment of the ends (heads) to the cylindrical portion of the shell.

6.7.4.5 Service equipment

6.7.4.5.1 Service equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during handling and carriage. When the connection between the frame and the tank or the jacket and the shell allows relative movement, the equipment shall be so fastened as to permit such movement without risk of damage to working parts. The external discharge fittings (pipe sockets, shut-off devices), the stop-valve and its seating shall be protected against the danger of being wrenched off by external forces. The filling and discharge devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening.

6.7.4.5.2 Each filling and discharge opening in portable tanks used for the carriage of flammable refrigerated liquefied gases shall be fitted with at least three mutually independent shut-off devices in series, the first being a stop-valve situated as close as reasonably practicable to the jacket, the second being a stop-valve and the third being a blank flange or equivalent device. The shut-off device closest to the jacket shall be a quick closing device, which closes automatically in the event of unintended movement of the portable tank during filling or discharge or fire engulfment. This device shall also be possible to operate by remote control.

6.7.4.5.3 Each filling and discharge opening in portable tanks used for the carriage of non-flammable refrigerated liquefied gases shall be fitted with at least two mutually independent shut-off devices in series, the first being a stop-valve situated as close as reasonably practicable to the jacket, the second a blank flange or equivalent device..

6.7.4.5.4 For sections of piping which can be closed at both ends and where liquid product can be trapped, a method of automatic pressure relief shall be provided to prevent excess pressure build-up within the piping.

6.7.4.5.5 Vacuum insulated tanks need not have an opening for inspection.

6.7.4.5.6 External fittings shall be grouped together so far as reasonably practicable.

6.7.4.5.7 Each connection on a portable tank shall be clearly marked to indicate its function.

6.7.4.5.8 Each stop-valve or other means of closure shall be designed and constructed to a rated pressure not less than the MAWP of the shell taking into account the temperature expected during carriage. All stop-valves with a screwed spindle shall be closed by a clockwise motion of the handwheel. In the case of other stop- valves the position (open and closed) and direction of

closure shall be clearly indicated. All stop-valves shall be designed to prevent unintentional opening.

- 6.7.4.5.9** When pressure-building units are used, the liquid and vapour connections to that unit shall be provided with a valve as close to the jacket as reasonably practicable to prevent the loss of contents in case of damage to the pressure-building unit.
- 6.7.4.5.10** Piping shall be designed, constructed and installed so as to avoid the risk of damage due to thermal expansion (contraction), mechanical shock and vibration. All piping shall be of a suitable material. To prevent leakage due to fire, only steel piping and welded joints shall be used between the jacket and the connection to the first closure of any outlet. The method of attaching the closure to this connection shall be to the satisfaction of the competent authority or its authorized body. Elsewhere pipe joints shall be welded when necessary.
- 6.7.4.5.11** Joints in copper tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than 525 °C. The joints shall not decrease the strength of the tubing as may happen when cutting threads.
- 6.7.4.5.12** The materials of construction of valves and accessories shall have satisfactory properties at the lowest operating temperature of the portable tank.
- 6.7.4.5.13** The burst pressure of all piping and pipe fittings shall be not less than the highest of four times the MAWP of the shell or four times the pressure to which it may be subjected in service by the action of a pump or other device (except pressure-relief devices).

6.7.4.6 Pressure-relief devices

- 6.7.4.6.1** Every shell shall be provided with not less than two independent spring-loaded pressure-relief devices. The pressure-relief devices shall open automatically at a pressure not less than the MAWP and be fully open at a pressure equal to 110% of the MAWP. These devices shall, after discharge, close at a pressure not lower than 90% of the pressure at which discharge starts and shall remain closed at all lower pressures. The pressure-relief devices shall be of the type that will resist dynamic forces including fluctuation in liquid level.
- 6.7.4.6.2** Shells for non-flammable refrigerated liquefied gases and hydrogen may in addition have frangible discs in parallel with the spring-loaded devices as specified in 6.7.4.7.2 and 6.7.4.7.3.
- 6.7.4.6.3** Pressure-relief devices shall be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.
- 6.7.4.6.4** Pressure-relief devices shall be approved by the competent authority or its authorized body.

6.7.4.7 Capacity and setting of pressure-relief devices

- 6.7.4.7.1** In the case of the loss of vacuum in a vacuum-insulated tank or of loss of 20% of the insulation of a tank insulated with solid materials, the combined capacity of all pressure-relief devices installed shall be sufficient so that the pressure (including accumulation) inside the shell does not exceed 120% of the MAWP.
- 6.7.4.7.2** For non-flammable refrigerated liquefied gases (except oxygen) and hydrogen, this capacity may be achieved by the use of frangible discs in parallel with the required safety-relief devices. Frangible discs shall rupture at nominal pressure equal to the test pressure of the shell.
- 6.7.4.7.3** Under the circumstances described in 6.7.4.7.1 and 6.7.4.7.2 together with complete fire engulfment the combined capacity of all pressure-relief devices installed shall be sufficient to limit the pressure in the shell to the test pressure..
- 6.7.4.7.4** The required capacity of the relief devices shall be calculated in accordance with a well-established technical code recognized by the competent authority¹³.
- 6.7.4.8** Marking of pressure-relief devices
- 6.7.4.8.1** Every pressure-relief device shall be plainly and permanently marked with the following particulars:
 - a) The pressure at which it is set to discharge (in bar or kPa);
 - b) The allowable tolerance at the discharge pressure for spring-loaded devices;
 - c) The reference temperature corresponding to the rated pressure for frangible discs;

¹³ See for example CGA S-1.2-2003 "Pressure Relief Device Standards – Part 2 – Cargo and Portable Tanks for Compressed Gases".

- d) The rated flow capacity of the device in standard cubic meters of air per second (m³/s);
- e) The cross sectional flow areas of the spring loaded pressure-relief devices and frangible discs in mm².

When practicable, the following information shall also be shown:

- f) The manufacturer's name and relevant catalogue number of the device.

6.7.4.8.2 The rated flow capacity marked on the pressure-relief devices shall be determined according to ISO 4126- 1:2004 and ISO 4126-7:2004.

6.7.4.9 Connections to pressure-relief devices

6.7.4.9.1 Connections to pressure-relief devices shall be of sufficient size to enable the required volume of discharge vapour and/or gas to pass unrestricted to the safety device. No stop-valve shall be installed between the shell and the pressure-relief devices except when duplicate devices are provided for maintenance or other reasons and the stop-valves serving the devices actually in use are locked open or the stop-valves are interlocked so that the requirements of 6.7.4.7 are always fulfilled. There shall be no obstruction in an opening leading to a vent or pressure-relief device which might restrict or cut-off the flow from the shell to that device. Pipework to vent the vapour or liquid from the outlet of the pressure-relief devices, when used, shall deliver the relieved vapour or liquid to the atmosphere in conditions of minimum back-pressure on the relieving device.

6.7.4.10 Siting of pressure-relief devices

6.7.4.10.1 Each pressure-relief device inlet shall be situated on top of the shell in a position as near the longitudinal and transverse centre of the shell as reasonably practicable. All pressure-relief device inlets shall under maximum filling conditions be situated in the vapour space of the shell and the devices shall be so arranged as to ensure that the escaping vapour is discharged unrestrictedly. For refrigerated liquefied gases, the escaping vapour shall be directed away from the tank and in such a manner that it cannot impinge upon the tank. Protective devices which deflect the flow of vapour are permissible provided the required relief-device capacity is not reduced.

6.7.4.10.2 Arrangements shall be made to prevent access to the devices by unauthorized persons and to protect the devices from damage caused by the portable tank overturning.

6.7.4.11 Gauging devices

6.7.4.11.1 Unless a portable tank is intended to be filled by weight, it shall be equipped with one or more gauging devices. Glass level-gauges and gauges made of other fragile material, which are in direct communication with the contents of the shell shall not be used.

6.7.4.11.2 A connection for a vacuum gauge shall be provided in the jacket of a vacuum-insulated portable tank.

6.7.4.12 Portable tank supports, frameworks, lifting and tie-down attachments

6.7.4.12.1 Portable tanks shall be designed and constructed with a support structure to provide a secure base during carriage. The forces specified in 6.7.4.2.12 and the safety factor specified in 6.7.4.2.13 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable

6.7.4.12.2 The combined stresses caused by portable tank mountings (e.g. cradles, frameworks, etc.) and portable tank lifting and tie-down attachments shall not cause excessive stress in any portion of the tank. Permanent lifting and tie-down attachments shall be fitted to all portable tanks. Preferably they shall be fitted to the portable tank supports but may be secured to reinforcing plates located on the tank at the points of support.

6.7.4.12.3 In the design of supports and frameworks the effects of environmental corrosion shall be taken into account.

6.7.4.12.4 Forklift pockets shall be capable of being closed off. The means of closing forklift pockets shall be a permanent part of the framework or permanently attached to the framework. Single compartment portable tanks with a length less than 3.65 m need not have closed off forklift pockets provided that:

- a) The tank and all the fittings are well protected from being hit by the forklift blades; and

- b) The distance between the centres of the forklift pockets is at least half of the maximum length of the portable tank.

6.7.4.12.5. When portable tanks are not protected during carriage, according to 4.2.3.3, the shells and service equipment shall be protected against damage to the shell and service equipment resulting from lateral or longitudinal impact or overturning. External fittings shall be protected so as to preclude the release of the shell contents upon impact or overturning of the portable tank on its fittings. Examples of protection include:

- a) Protection against lateral impact which may consist of longitudinal bars protecting the shell on both sides at the level of the median line;
- b) Protection of the portable tank against overturning which may consist of reinforcement rings or bars fixed across the frame;
- c) Protection against rear impact which may consist of a bumper or frame;
- d) Protection of the shell against damage from impact or overturning by use of an ISO frame in accordance with ISO 1496-3:1995;
- e) Protection of the portable tank from impact or overturning by a vacuum insulation jacket.

6.7.4.13 Design approval

6.7.4.13.1 The competent authority or its authorized body shall issue a design approval certificate for any new design of a portable tank. This certificate shall attest that a portable tank has been surveyed by that authority, is suitable for its intended purpose and meets the requirements of this Chapter. When a series of portable tanks are manufactured without change in the design, the certificate shall be valid for the entire series. The certificate shall refer to the prototype test report, the refrigerated liquefied gases allowed to be carried, the materials of construction of the shell and jacket and an approval number. The approval number shall consist of the distinguishing sign or mark of the State in whose territory the approval was granted, indicated by the distinguishing sign used on vehicles in international road traffic¹⁴, and a registration number. Any alternative arrangements according to 6.7.1.2 shall be indicated on the certificate. A design approval may serve for the approval of smaller portable tanks made of materials of the same kind and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

6.7.4.13.2 The prototype test report for the design approval shall include at least the following:

- a) The results of the applicable frame-work test specified in ISO 1496-3:1995;
- b) The results of the initial inspection and test in 6.7.4.14.3; and
- c) The results of the impact test in 6.7.4.14, when applicable.

6.7.4.14 Inspection and testing

6.7.4.14.1 Portable tanks meeting the definition of container in the International Convention for Safe Containers (CSC), 1972, as amended, shall not be used unless they are successfully qualified by subjecting a representative prototype of each design to the Dynamic, Longitudinal Impact Test prescribed in the Manual of Tests and Criteria, Part IV, Section 41.

6.7.4.14.2 The shell and items of equipment of each portable tank shall be inspected and tested before being put into service for the first time (initial inspection and test) and thereafter at not more than five-year intervals (5 year periodic inspection and test) with an intermediate periodic inspection and test (2.5 year periodic inspection and test) midway between the 5 year periodic inspections and tests. The 2.5 year inspection and test may be performed within 3 months of the specified date. An exceptional inspection and test shall be performed regardless of the last periodic inspection and test when necessary according to 6.7.4.14.7.

6.7.4.14.3 The initial inspection and test of a portable tank shall include a check of the design characteristics, an internal and external examination of the portable tank shell and its fittings with due regard to the refrigerated liquefied gases to be carried, and a pressure test referring to the test pressures according to 6.7.4.3.2. The pressure test may be performed as a hydraulic test or by using another liquid or gas with the agreement of the competent authority or its

¹⁴ *Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.*

authorized body. Before the portable tank is placed into service, a leakproofness test and a check of the satisfactory operation of all service equipment shall also be performed. When the shell and its fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test. All welds subject to full stress level shall be inspected during the initial test by radiographic, ultrasonic, or another suitable non-destructive test method. This does not apply to the jacket.

- 6.7.4.14.4** The inspections and tests shall include an external examination of the portable tank and its fittings with due regard to the refrigerated liquefied gases carried, a leakproofness test, a check of the satisfactory operation of all service equipment and a vacuum reading, when applicable. In the case of non-vacuum insulated tanks, the jacket and insulation shall be removed during periodic inspections and tests but only to the extent necessary for a reliable appraisal.
- 6.7.4.14.5** (reserved)
- 6.7.4.14.6** Inspection and test of portable tanks and filling after the date of expiry of the last periodic inspection and test
- 6.7.4.14.6.1** A portable tank may not be filled and offered for carriage after the date of expiry of the last 5 year or 2.5 year periodic inspection and test as required by 6.7.4.14.2. However a portable tank filled prior to the date of expiry of the last periodic inspection and test may be carried for a period not to exceed three months beyond the date of expiry of the last periodic test or inspection. In addition, a portable tank may be carried after the date of expiry of the last periodic test and inspection:
- a) After emptying but before cleaning, for purposes of performing the next required test or inspection prior to refilling; and
 - b) Unless otherwise approved by the competent authority, for a period not to exceed six months beyond the date of expiry of the last periodic test or inspection, in order to allow the return of dangerous goods for proper disposal or recycling. Reference to this exemption shall be mentioned in the consignment note.
- 6.7.4.14.6.2** Except as provided for in 6.7.4.14.6.1, portable tanks which have missed the timeframe for their scheduled 5 year or 2.5-year periodic inspection and test may only be filled and offered for carriage if a new 5-year periodic inspection and test is performed according to 6.7.4.14.4.
- 6.7.4.14.7** The exceptional inspection and test is necessary when the portable tank shows evidence of damaged or corroded areas, leakage, or any other conditions that indicate a deficiency that could affect the integrity of the portable tank. The extent of the exceptional inspection and test shall depend on the amount of damage or deterioration of the portable tank. It shall include at least the 2.5 year inspection and test according to 6.7.4.14.4.
- 6.7.4.14.8** The internal examination during the initial inspection and test shall ensure that the shell is inspected for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, that might render the portable tank unsafe for carriage.
- 6.7.4.14.9** The external examination shall ensure that:
- a) The external piping, valves, pressurizing/cooling systems when applicable and gaskets are inspected for corroded areas, defects, or any other conditions, including leakage, that might render the portable tank unsafe for filling, discharge or carriage;
 - b) There is no leakage at any manhole covers or gaskets;
 - c) Missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;
 - d) All emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;
 - e) Required markings on the portable tank are legible and in accordance with the applicable requirements; and
 - f) The framework, the supports and the arrangements for lifting the portable tank are in satisfactory condition.
- 6.7.4.14.10** The inspections and tests in 6.7.4.14.1, 6.7.4.14.3, 6.7.4.14.4, 6.7.4.14.4.5 and 6.7.4.14.7 shall be performed or witnessed by an expert approved by the competent authority or its authorized body. When the pressure test is a part of the inspection and test, the test pressure shall be the

one indicated on the data plate of the portable tank. While under pressure, the portable tank shall be inspected for any leaks in the shell, piping or equipment.

6.7.4.14.11 In all cases when cutting, burning or welding operations on the shell of a portable tank have been effected, that work shall be to the approval of the competent authority or its authorized body taking into account the pressure vessel code used for the construction of the shell. A pressure test to the original test pressure shall be performed after the work is completed.

6.7.4.14.12 When evidence of any unsafe condition is discovered, the portable tank shall not be returned to service until it has been corrected and the test is repeated and passed.

6.7.4.15 Marking

6.7.4.15.1 Every portable tank shall be fitted with a corrosion resistant metal plate permanently attached to the portable tank in a conspicuous place readily accessible for inspection. When for reasons of portable tank arrangements the plate cannot be permanently attached to the shell, the shell shall be marked with at least the information required by the pressure vessel code. As a minimum, at least the following information shall be marked on the plate by stamping or by any other similar method:

- a) Owner information
 - 1) Owner's registration number;
- b) Manufacturing information
 - 1) Country of manufacture;
 - 2) Year of manufacture;
 - 3) Manufacturer's name or mark;
 - 4) Manufacturer's serial number
- c) Approval information

- 1) The United Nations packaging symbol



This symbol shall not be used for any purpose other than certifying that a packaging, a flexible bulk container, a portable tank or an MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.11;

- 2) Approval country;
 - 3) Authorized body for the design approval;
 - 4) Design approval number;
 - 5) Letters "AA", if the design was approved under alternative arrangements (see 6.7.1.2);
 - 6) Pressure vessel code to which the shell is designed;
- d) Pressures
 - 1) MAWP (in bar gauge or kPa gauge)¹⁵
 - 2) Test pressure (in bar gauge or kPa gauge)¹⁵;
 - 3) Initial pressure test date (month and year);
 - 4) Identification mark of the initial pressure test witness;
- e) Temperatures
 - 1) Minimum design temperature (in °C)¹⁵;
- f) Materials
 - 1) Shell material(s) and material standard reference(s);
 - 2) Equivalent thickness in reference steel (in mm)¹⁵;
- g) Capacity:
 - 1) Tank water capacity at 20 °C (in litres)¹⁵;
- h) Insulation
 - 1) Either "Thermally insulated" or "Vacuum insulated" (as applicable);
 - 2) Effectiveness of the insulation system (heat influx) (in Watts)¹⁵;

¹⁵ The measuring unit used shall be indicated.

- i) Holding times – for each refrigerated liquefied gas permitted to be carried in the portable tank;
 - 1) Name, in full, of the refrigerated liquefied gas;
 - 2) Reference holding time (in days or hours)¹⁵;
 - 3) Initial pressure (in bar gauge or kPa gauge)¹⁵;
 - 4) Maximum allowable mass of gas filled (in kg)¹⁵;
- j) Periodic inspections and tests
 - 1) Type of the most recent periodic test (2.5-year, 5-year or exceptional);
 - 2) Date of the most recent periodic test (month and year);
 - 3) Identification mark of the authorized body who performed or witnessed the most recent test.

Figure 6.7.4.15.1: Example of identification plate marking

Owner's registration number					
MANUFACTURING INFORMATION					
Country of manufacture					
Year of manufacture					
Manufacturer					
Manufacturer's serial number					
APPROVAL INFORMATION					
C	Approval country				
	Authorized body for design approval				
	Design approval number		"AA" (if applicable)		
Shell design code (pressure vessel code)					
PRESSURES					
MAWP		bar or kPa			
Test pressure		bar or kPa			
Initial pressure test date::	(mm/yyyy)	Witness stamp:			
TEMPERATURES					
Minimum design temperature		°C			
MATERIALS					
Shell material(s) and material standard reference(s)					
Equivalent thickness in reference steel		mm			
CAPACITY					
Tank water capacity at 20 °C		litres			
INSULATION					
Thermally insulated" or "Vacuum insulated" (as applicable)					
Heat influx		Watts			
HOLDING TIMES					
Refrigerated liquefied gas(es)	Reference holding time	Initial pressure	Degree of filling		
	days or	bar or kPa	kg		
PERIODIC INSPECTIONS / TESTS					
Test type	Test date	Witness stamp	Test type	Test date	Witness stamp
	(mm/yyyy)			(mm/yyyy)	

- 6.7.4.15.2** The following particulars shall be durably marked either on the portable tank itself or on a metal plate firmly secured to the portable tank.
- 1) Name of the owner and the operator
 - 2) Name of the refrigerated liquefied gas being carried (and minimum mean bulk temperature)
 - 3) Maximum permissible gross mass (MPGM) kg
 - 4) Unladen (tare) mass kg
 - 5) Actual holding time for gas being carried days (or hours)
 - 6) Portable tank instruction in accordance with 4.2.5.2.6
- Note:** For the identification of the refrigerated liquefied gas(es) being carried, see also Part 5.
- 6.7.4.15.3** If a portable tank is designed and approved for handling in open seas, the words "OFFSHORE PORTABLE TANK" shall be marked on the identification plate.
- 6.7.5** **RRQUIREMENTS FOR THE DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF UN MULTIPLE-ELEMENT GAS CONTAINERS (MEGCs) INTENDED FOR THE CARRIAGE OF NON REFRIGERATED GASES**
- 6.7.5.1** **Definitions**
- For the purposes of this section:
- Leakproofness test** - a test using gas subjecting the elements and the service equipment of the MEGC to an effective internal pressure of not less than 20% of the test pressure;
- Manifold** - an assembly of piping and valves connecting the filling and/or discharge openings of the elements;
- UN multiple-element gas containers (MEGCs)** - multimodal assemblies of cylinders, tubes and bundles of cylinders which are interconnected by a manifold and which are assembled within a framework. The MEGC includes service equipment and structural equipment necessary for the carriage of gases.
- Maximum permissible gross mass (MPGM)** - the sum of the tare mass of the MEGC and the heaviest load authorized for carriage;
- Structural equipment** - the reinforcing, fastening, protective and stabilizing members external to the elements;
- Service equipment** - measuring instruments and filling, discharge, venting and safety devices;
- Alternative arrangement** - an approval granted by the competent authority for a portable tank or MEGC that has been designed, constructed or tested to technical requirements or testing methods other than those specified in this Chapter;
- Elements** - cylinders, tubes or bundles of cylinders
- 6.7.5.2** **General design and construction requirements**
- 6.7.5.2.1** The MEGC shall be capable of being filled and discharged without the removal of its structural equipment. It shall possess stabilizing members external to the elements to provide structural integrity for handling and carriage. MEGCs shall be designed and constructed with supports to provide a secure base during carriage and with lifting and tie-down attachments which are adequate for lifting the MEGC including when filled to its maximum permissible gross mass. The MEGC shall be designed to be loaded onto a vehicle, wagon or sea-going or inland navigation vessel and shall be equipped with skids, mountings or accessories to facilitate mechanical handling.
- 6.7.5.2.2** MEGCs shall be designed, manufactured and equipped in such a way as to withstand all conditions to which they will be subjected during normal conditions of handling and carriage. The design shall take into account the effects of dynamic loading and fatigue.
- 6.7.5.2.3.** Elements of an MEGC shall be made of seamless steel or composite construction and be constructed and tested according to 6.2.1 and 6.2.2. All of the elements in an MEGC shall be of the same design type.

- 6.7.5.2.4** Elements of MEGCs, fittings and pipework shall be:
- a) compatible with the substances intended to be carried (see ISO 11114-1:2020 and ISO 11114-2:2021); or
 - b) properly passivated or neutralized by chemical reaction.
- 6.7.5.2.5** Contact between dissimilar metals which could result in damage by galvanic action shall be avoided.
- 6.7.5.2.6** The materials of the MEGC, including any devices, gaskets, and accessories, shall not adversely affect the gas(es) intended for carriage in the MEGC.
- 6.7.5.2.7** MEGCs shall be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of handling and carriage. The design shall demonstrate that the effects of fatigue, caused by repeated application of these loads through the expected life of the multiple-element gas container, have been taken into account.
- 6.7.5.2.8** MEGCs and their fastenings shall, under the maximum permissible load, be capable of withstanding the following separately applied static forces:
- a) in the direction of travel: twice the MPGM multiplied by the acceleration due to gravity (g)¹⁶;
 - b) horizontally at right angles to the direction of travel: the MPGM (when the direction of travel is not clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration due to gravity (g)¹⁶;
 - c) vertically upwards: the MPGM multiplied by the acceleration due to gravity (g)¹⁶; and
 - d) vertically downwards: twice the MPGM (total loading including the effect of gravity) multiplied by the acceleration due to gravity (g)¹⁶.
- 6.7.5.2.9** Under the forces defined in 6.7.5.2.8, the stress at the most severely stressed point of the elements shall not exceed the values given in either the relevant standards of 6.2.2.1 or, if the elements are not designed, constructed and tested according to those standards, in the technical code or standard recognized or approved by the competent authority of the country of use (see 6.2.5).
- 6.7.5.2.10** Under each of the forces in 6.7.5.2.8, the safety factor for the framework and fastenings to be observed shall be as follows:
- a) for steels having a clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed yield strength; or
 - b) for steels with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2% proof strength and, for austenitic steels, the 1% proof strength.
- 6.7.5.2.11** MEGCs intended for the carriage of flammable gases shall be capable of being electrically earthed.
- 6.7.5.2.12** The elements shall be secured in a manner that prevents undesired movement in relation to the structure (cradle, framework or other one) , and the concentration of harmful localized stresses.
- 6.7.5.3 Service equipment**
- 6.7.5.3.1** Service equipment shall be configured or designed to prevent damage that could result in the release of the pressure receptacle contents during normal conditions of handling and carriage. When the connection between the frame and the elements allows relative movement between the sub-assemblies, the equipment shall be so fastened as to permit such movement without damage to working parts. The manifolds, the discharge fittings (pipe sockets, shut-off devices), and the stop-valves shall be protected from being wrenched off by external forces. Manifold piping leading to shut-off valves shall be sufficiently flexible to protect the valves and the piping from shearing, or releasing the pressure receptacle contents. The filling and discharge devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening.
- 6.7.5.3.2** Each element intended for the carriage of toxic gases (gases of groups T, TF, TC, TO, TFC and TOC) shall be fitted with a valve. The manifold for liquefied toxic gases (gases of classification codes 2T, 2TF, 2TC, 2TO, 2TFC and 2TOC) shall be so designed that the elements can be

¹⁶ For calculation purposes $g = 9.81 \text{ m/s}^2$

filled separately and be kept isolated by a valve capable of being sealed. For the carriage of flammable gases (gases of group F), the elements shall be divided into groups of not more than 3 000 litres each isolated by a valve.

6.7.5.3.3 For filling and discharge openings of the MEGC, two valves in series shall be placed in an accessible position on each discharge and filling pipe. One of the valves may be a non-return valve. The filling and discharge devices may be fitted to a manifold. For sections of piping which can be closed at both ends and where a liquid product can be trapped, a pressure-relief valve shall be provided to prevent excessive pressure build-up. The main isolation valves on an MEGC shall be clearly marked to indicate their directions of closure. Each stop-valve or other means of closure shall be designed and constructed to withstand a pressure equal to or greater than 1.5 times the test pressure of the MEGC. All stop-valves with screwed spindles shall close by a clockwise motion of the handwheel. For other stop-valves, the position (open and closed) and direction of closure shall be clearly indicated. All stop-valves shall be designed and positioned to prevent unintentional opening. Ductile metals shall be used in the construction of valves or accessories

6.7.5.3.4 Piping shall be designed, constructed and installed so as to avoid damage due to expansion and contraction, mechanical shock and vibration. Joints in tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than 525 °C. The rated pressure of the service equipment and of the manifold shall be not less than 2/3 of the test pressure of the elements.

6.7.5.4 Pressure-relief devices

6.7.5.4.1 The elements of MEGCs used for the carriage of UN No. 1013 carbon dioxide and UN No. 1070 nitrous oxide shall be divided into groups of not more than 3 000 litres each isolated by a valve. Each group shall be fitted with one or more pressure relief devices. If so required by the competent authority of the country of use, MEGCs for other gases shall be fitted with pressure relief devices as specified by that competent authority.

6.7.5.4.2 When pressure relief devices are fitted, every element or group of elements of an MEGC that can be isolated shall then be fitted with one or more pressure relief devices. Pressure relief devices shall be of a type that will resist dynamic forces including liquid surge and shall be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

6.7.5.4.3 MEGCs used for the carriage of certain non-refrigerated gases identified in portable tank instruction T50 (see 4.2.5.2.6) may have a pressure-relief device as required by the competent authority of the country of use. Unless an MEGC in dedicated service is fitted with an approved pressure relief device constructed of materials compatible with the gas carried, such a device shall comprise a frangible disc preceding a spring-loaded device. The space between the frangible disc and the spring-loaded device may be equipped with a pressure gauge or a suitable telltale indicator. This arrangement permits the detection of disc rupture, pin-holing or leakage which could cause a malfunction of the pressure relief device. The frangible disc shall rupture at a nominal pressure 10% above the start-to-discharge pressure of the spring-loaded device.

6.7.5.4.4 In the case of multi-purpose MEGCs used for the carriage of low-pressure liquefied gases, the pressure-relief devices shall open at a pressure as specified in 6.7.3.7.1 for the gas having the highest maximum allowable working pressure of the gases allowed to be carried in the MEGC.

6.7.5.5 Capacity of pressure relief devices

6.7.5.5.1 The combined delivery capacity of the pressure relief devices when fitted shall be sufficient that, in the event of total fire engulfment of the MEGC, the pressure (including accumulation) inside the elements does not exceed 120% of the set pressure of the pressure relief device. The formula provided in CGA (Compressed Gas Association) S-1.2- 2003 "Pressure Relief Device Standards – Part 2 – Cargo and Portable Tanks for Compressed Gases" shall be used to determine the minimum total flow capacity for the system of pressure relief devices. CGA (Compressed Gas Association) S-1.1-2003 "Pressure Relief Device Standards – Part 1 – Cylinders for Compressed Gases" may be used to determine the relief capacity of individual elements. Spring-loaded pressure relief devices may be used to achieve the full relief capacity prescribed in the case of low pressure liquefied gases. In the case of multi-purpose MEGCs, the combined delivery capacity of the pressure-relief devices shall be taken for the gas which requires the highest delivery capacity of the gases allowed to be carried in the MEGC.

6.7.5.5.2 To determine the total required capacity of the pressure relief devices installed on the elements

for the carriage of liquefied gases, the thermodynamic properties of the gas shall be considered (see, for example, CGA (Compressed Gas Association) S-1.2-2003 "Pressure Relief Device Standards – Part 2 – Cargo and Portable Tanks for Compressed Gases" for low pressure liquefied gases and CGA (Compressed Gas Association) S-1.1-2003 "Pressure Relief Device Standards – Part 1 – Cylinders for Compressed Gases" for high pressure liquefied gases).

6.7.5.6 Marking of pressure-relief devices

6.7.5.6.1 Pressure relief devices shall be clearly and permanently marked with the following:

- a) the manufacturer's name and relevant catalogue number;
- b) the set pressure and/or the set temperature;
- c) the date of the last test;
- d) The cross sectional flow areas of the spring loaded pressure-relief devices and frangible discs in mm².

6.7.5.6.2 The rated flow capacity marked on spring loaded pressure relief devices for low pressure liquefied gases shall be determined according to ISO 4126-1:2004 and ISO 4126-7:2004.

6.7.5.7 Connections to pressure-relief devices

6.7.5.7.1 Connections to pressure-relief devices shall be of sufficient size to enable the required discharge to pass unrestricted to the pressure relief device. No stop-valve shall be installed between the element and the pressure-relief devices, except when duplicate devices are provided for maintenance or other reasons, and the stop-valves serving the devices actually in use are locked open, or the stop-valves are interlocked so that at least one of the duplicate devices is always operable and capable of meeting the requirements of 6.7.5.5. There shall be no obstruction in an opening leading to or leaving from a vent or pressure-relief device which might restrict or cut-off the flow from the element to that device. The opening through all piping and fittings shall have at least the same flow area as the inlet of the pressure relief device to which it is connected. The nominal size of the discharge piping shall be at least as large as that of the pressure relief device outlet. Vents from the pressure-relief devices, when used, shall deliver the relieved vapour or liquid to the atmosphere in conditions of minimum back-pressure on the relieving device.

6.7.5.8 Siting of pressure-relief devices

6.7.5.8.1 Each pressure relief device shall, under maximum filling conditions, be in communication with the vapour space of the elements for the carriage of liquefied gases. The devices, when fitted, shall be so arranged as to ensure that the escaping vapour is discharged upwards and unrestrictedly as to prevent any impingement of escaping gas or liquid upon the MEGC, its elements or personnel. For flammable, pyrophoric and oxidizing gases, the escaping gas shall be directed away from the element in such a manner that it cannot impinge upon the other elements. Heat resistant protective devices which deflect the flow of gas are permissible provided the required pressure relief device capacity is not reduced.

6.7.5.8.2 Arrangements shall be made to prevent access to the pressure-relief devices by unauthorized persons and to protect the devices from damage caused by the MEGC overturning.

6.7.5.9 Gauging devices

6.7.5.9.1 When an MEGC is intended to be filled by mass, it shall be equipped with one or more gauging devices. Level-gauges made of glass or other fragile material shall not be used.

6.7.5.10 MEGC supports, frameworks, lifting and tie-down attachments

6.7.5.10.1 MEGCs shall be designed and constructed with a support structure to provide a secure base during carriage. The forces specified in 6.7.5.2.8 and the safety factor specified in 6.7.5.2.10 shall be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable.

6.7.5.10.2 Permanent lifting and tie-down attachments shall be fitted to all MEGCs. The combined stresses caused by element mountings, cradles, frameworks, and the MEGC lifting and tie-down attachments shall not cause excessive stress in any element. In no case shall mountings or attachments be welded onto the elements.

6.7.5.10.3 In the design of supports and frameworks, the effects of environmental corrosion shall be taken into account.

6.7.5.10.4 When MEGCs are not protected during carriage, according to 4.2.4.3, the elements and service equipment shall be protected against damage resulting from lateral or longitudinal impact or

overturning. External fittings (manifold in particular) shall be protected so as to preclude the release of the elements' contents upon impact or overturning of the MEGC.

Examples of protection include

- a) protection against lateral impact (longitudinal bars protecting the shell on both sides on the midline
- b) protection against overturning (reinforcement rings or bars fixed across the frame);
- c) protection against rear impact (a bumper or frame);
- d) protection of the shell against damage from impact or overturning (a frame in accordance with the relevant provisions of ISO 1496-3:1995).

6.7.5.11 Design approval

6.7.5.11.1 The competent authority or its authorized body shall issue a design approval certificate for any new design of an MEGC. This certificate shall attest that the MEGC has been surveyed by that authority, is suitable for its intended purpose and meets the requirements of this Chapter, the applicable provisions for gases of Chapter 4.1 and of packing instruction P 200. When a series of MEGCs are manufactured without change in the design, the certificate shall be valid for the entire series. The certificate shall refer to the prototype test report, the materials of construction of the manifold, the standards to which the elements are made and an approval number. The approval number shall consist of the distinguishing sign or mark of the country granting the approval, indicated by the distinguishing sign used on vehicles in international road traffic¹⁷, and a registration number. Any alternative arrangements according to 6.7.1.2 shall be indicated on the certificate. A design approval may serve for the approval of smaller MEGCs made of materials of the same type and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

6.7.5.11.2 The prototype test report for the design approval shall include at least the following:

- a) the results of the applicable framework test specified in ISO1496-3:1995;
- b) the results of the initial inspection and test specified in 6.7.5.12.3;
- c) the results of the impact test specified in 6.7.5.12.1; and
- d) certification documents verifying that the cylinders and tubes comply with the applicable standards.

6.7.5.12 Inspection and testing

6.7.5.12.1 MEGCs meeting the definition of container in the International Convention for Safe Containers (CSC), 1972, as amended, shall not be used unless they are successfully qualified by subjecting a representative prototype of each design to the dynamic, longitudinal impact test prescribed in the Manual of Tests and Criteria, Part IV, Section 41.

6.7.5.12.2 The elements and items of equipment of each MEGC shall be inspected and tested before being put into service for the first time (initial inspection and test). Thereafter, MEGCs shall be inspected at no more than five-year intervals (5 year periodic inspection). An exceptional inspection and test shall be performed, regardless of the last periodic inspection and test, when necessary according to 6.7.5.12.5.

6.7.5.12.3 The initial inspection and test of an MEGC shall include a check of the design characteristics, an external examination of the MEGC and its fittings with due regard to the gases to be carried, and a pressure test performed at the test pressures according to packing instruction P 200 of 4.1.4.1. The pressure test of the manifold may be performed as a hydraulic test or by using another liquid or gas with the agreement of the competent authority or its authorized body. Before the MEGC is placed into service, a leakproofness test and a test of the satisfactory operation of all service equipment shall also be performed. When the elements and their fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.5.12.4 The 5-year periodic inspection and test shall include an external examination of the structure,

¹⁷ *Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.*

the elements and the service equipment in accordance with 6.7.5.12.6. The elements and the piping shall be tested at the periodicity specified in packing instruction P 200 and in accordance with the provisions described in 6.2.1.6. When the elements and equipment have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.7.5.12.5 An exceptional inspection and test is necessary when the MEGC shows evidence of damaged or corroded areas, leakage, or other conditions that indicate a deficiency that could affect the integrity of the MEGC. The extent of the exceptional inspection and test shall depend on the amount of damage or deterioration of the MEGC. It shall include at least the examinations required under 6.7.5.12.6.

6.7.5.12.6 The examinations shall ensure that:

- a) the elements are inspected externally for pitting, corrosion, abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the MEGC unsafe for carriage;
- b) the piping, valves, and gaskets are inspected for corroded areas, defects, and other conditions, including leakage, that might render the MEGC unsafe for filling, discharge or carriage;
- c) missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;
- d) all emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;
- e) required markings on the MEGC are legible and in accordance with the applicable requirements; and
- f) the framework, the supports and the arrangements for lifting the MEGC are in satisfactory condition.

6.7.5.12.7 The inspections and tests in 6.7.5.12.1, 6.7.5.12.3, 6.7.5.12.4 and 6.7.5.12.5 shall be performed or witnessed by a body authorized by the competent authority. When the pressure test is a part of the inspection and test, the test pressure shall be the one indicated on the data plate of the MEGC. While under pressure, the MEGC shall be inspected for any leaks in the elements, piping or equipment.

6.7.5.12.8 When evidence of any unsafe condition is discovered, the MEGC shall not be returned to service until it has been corrected and the applicable tests and verifications are passed.

6.7.5.13 Marking

6.7.5.13.1 Every MEGC shall be fitted with a corrosion resistant metal plate permanently attached to the MEGC in a conspicuous place readily accessible for inspection. The metal plate shall not be affixed to the elements. The elements shall be marked in accordance with Chapter 6.2. As a minimum, at least the following information shall be marked on the plate (by stamping or by any other similar method):

- a) Owner information
 - 1) Owner's registration number;
- b) Manufacturing information
 - 1) Country of manufacture;
 - 2) Year of manufacture;
 - 3) Manufacturer's name or mark;
 - 4) Manufacturer's serial number;;
- c) Approval information
 - 1) The United Nations packaging symbol



This symbol shall not be used for any purpose other than certifying that a packaging, a flexible bulk container, a portable tank or an MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.11;

- 2) Approval country;

- 3) Authorized body for the design approval;
 - 4) Design approval number;
 - 5) Letters "AA", if the design was approved under alternative arrangements (see 6.7.1.2);
- d) Pressures
- 1) Test pressure (in bar gauge)¹⁸;
 - 2) Initial pressure test date (month and year);
 - 3) Identification mark of the initial pressure test witness;
- e) Temperatures:
- 1) Design temperature range, in °C¹⁸;
- f) Elements / Capacity
- 1) Number of elements;
 - 2) Total water capacity, in litres¹⁸;
- f) Periodic inspections and tests
- 1) Type of the most recent periodic test (5-year or exceptional);
 - 2) Date of the most recent periodic test (month and year);
 - 3) Identification mark of the authorized body who performed or witnessed the most recent test.

Figure 6.7.5.13.1: Example of identification plate marking

Owner's registration number					
MANUFACTURING INFORMATION					
Country of manufacture					
Year of manufacture					
Manufacturer					
Manufacturer's serial number					
APPROVAL INFORMATION					
Approval country					
Authorized body for design approval					
Design approval number					
"AA" (if applicable)					
PRESSURES					
Test pressure					
bar					
Initial pressure test date: (mm/yyyy)					
Witness stamp :					
TEMPERATURES					
Design temperature range					
°C -to °C					
ELEMENTS / CAPACITY					
Number of elements					
Total water capacity					
liters					
PERIODIC INSPECTIONS / TESTS					
Test type	Test date	Witness stamp	Test type	Test date	Witness stamp
	(mm/yyyy)			(mm/yyyy)	

6.7.5.13.2 The following information shall be durably marked on a metal plate firmly secured to the MEGC:

- 1) Name of the operator
- 2) Maximum permissible load mass _____ kg
- 3) Working pressure at 15 C _____ bar gauge
- 4) maximum permissible gross mass (MPGM) _____ kg
- 5) Unloaded (tare) mass _____ kg

¹⁸ The measuring unit used shall be indicated.

CHAPTER 6.8

REQUIREMENTS FOR THE CONSTRUCTION, EQUIPMENT, TYPE APPROVAL, INSPECTIONS AND TESTS, AND MARKING OF TANK-WAGONS (EXCEPT FOR TANK-WAGONS DESIGNED TO BE OPERATED ON 1520 MM GAUGE RAILWAYS), DEMOUNTABLE TANKS AND TANK-CONTAINERS AND TANK SWAP BODIES, WITH SHELLS MADE OF METALLIC MATERIALS, AND BATTERY-WAGONS AND MULTIPLE ELEMENT GAS CONTAINERS (MEGCs)

Note 1: For portable tanks and UN multiple-element gas containers (MEGCs) see Chapter 6.7, for portable tanks with shells made of fibre-reinforced plastics (FRP) materials see chapter 6.9, for vacuum-operated waste tanks see Chapter 6.10, for tank-wagons designed to be operated on 1520 mm gauge railways see Chapter 6.20.

Note 2: In this chapter, "inspection body" means a body conforming to 1.8.6.

Note 3: For tank-containers, tank swap bodies and MEGCs operated on the 1520 mm railways see 4.3.2.1.8.

Note 4: For tank-containers manufactured in accordance with ISO 1496-3:1995 and the instructions on portable tanks T1-T23, T50, T75 see Chapter 6.7.

6.8.1 SCOPE AND GENERAL PROVISIONS

6.8.1.1 The requirements across the whole width of the page apply both to tank-wagons, to demountable tanks and battery-wagons, and to tank-containers, tank swap bodies and MEGCs.

Those contained in a single column apply only:

- to tank-wagons, demountable tanks and battery-wagons in the left hand column;
- to tank-containers, tank swap bodies and MEGCs in the right hand column

6.8.1.2 These requirements shall apply to
tank-wagons, demountable tanks ,
battery-wagons
used for the carriage of gaseous, liquid, powdery or granular substances.

tank-containers, tank swap bodies and MEGCs,

6.8.1.3 Section 6.8.2 sets out the requirements applicable to tank-wagons, to demountable tanks, tank-containers, tank swap bodies intended for the carriage of substances of all classes and battery-wagons and MEGCs for gases of Class 2. Sections 6.8.3 to 6.8.5 contain special requirements supplementing or modifying the requirements of section 6.8.2.

6.8.1.4 For provisions concerning use of these tanks, see Chapter 4.3.

6.8.1.5 Conformity assessment, type approval and inspections procedures

The following provisions describe how to apply the procedures in 1.8.7.

Note: These provisions apply, subject to the compliance of the inspection bodies with the provisions of 1.8.6.

For the purpose of section 6.8.1.5 the term "country of registration" means the following:

- the SMGS Contracting State of registration of the wagon on which the tank is mounted.
- the SMGS Contracting State where the owner's or operator's company is registered;
 - if the owner's or operator's company is not

known, the SMGS Contracting State of the competent authority that approved the inspection body which performed the initial inspection. Notwithstanding 1.6.4.57 these inspection bodies shall be a credited according to EN ISO/IEC 17020: 2012 (except clause 8.1.3) Type A.

The conformity assessment of the tank shall verify that all its components conform to the requirements of Annex 2 to SMGS, irrespective of where they have been manufactured

6.8.1.5.1 Type examination according to 1.8.7.2.1

- a) The manufacturer of the tank shall engage a single inspection body approved or recognized by the competent authority of either the country of manufacture or the first country of registration of the first tank manufactured according to that type to take responsibility for the type examination. If the country of manufacture is not an SMGS Contracting State, the manufacturer shall engage a single inspection body approved or recognized by the competent authority of the country of registration of the first tank manufactured according to that type to take responsibility for the type examination.
- b) If the type examination of the service equipment is performed separately from the tank according to 6.8.2.3.1, the manufacturer of the service equipment shall engage single inspection body approved or recognized by an SMGS Contracting State to take responsibility for the type examination.

6.8.1.5.2 Type approval certificate issue according to 1.8.7.2.2

Only the competent authority that approved or recognized the inspection body that performed the type examination shall issue the type approval certificate.

However, when an inspection body is designated by the competent authority to issue the type approval certificate the type examination shall be performed by that inspection body.

6.8.1.5.3 Supervision of manufacture according to 1.8.7.3

- a) For the supervision of manufacture, the manufacturer of the tank shall engage a single inspection body approved or recognized either by the competent authority of the country of registration or the country of manufacture. If the country of manufacture is not an SMGS Contracting State, a manufacturer shall engage a single inspection body approved or recognized by the competent authority of the country of registration.
- b) If the type examination of the service equipment is performed separately from the tank, the manufacturer of the service equipment shall engage a single inspection body approved or recognized by the competent authority of an SMGS Contracting State. The manufacturer may use an in-house inspection service according to 1.8.7.7 to perform the procedures of 1.8.7.3.

6.8.1.5.4 Initial inspection and tests according to 1.8.7.4

- a) The manufacturer of the tank shall engage a single inspection body approved or recognized by the competent authority of the country of registration or the country of manufacture to take responsibility for the initial inspection and tests. If the country of manufacture is not an RID Contracting State, a manufacturer shall engage a single inspection body approved or recognized by the competent authority of the country of registration to take responsibility for the initial inspection and tests.
- b) If the service equipment is type approved separately from the tank, the manufacturer of the service equipment shall engage the same single inspection body engaged for the purposes of 6.8.1.5.3 b) to take responsibility for the initial inspection and tests. The manufacturer may use an in-house inspection service according to 1.8.7.7 to perform the procedures of 1.8.7.4.

6.8.1.5.5 Entry into service verification according to 1.8.7.5

The competent authority of the country of first registration may require, on an occasional basis, an entry into service verification of the tank to verify conformity with the applicable requirements.¹

The competent authority of the country of first registration may require, on an occasional basis, an entry into service verification of the tank to verify conformity with the applicable requirements.

When the country of registration of a tank-wagon is changed, the competent authority of the SMGS Contracting State to which the tank-wagon is transferred may require, on an occasional basis, an entry into service verification of the tank.

When the country of registration of a tank-container is changed, the competent authority of the SMGS Contracting State to which the tank-container is transferred may require, on an occasional basis an entry into service verification.

To perform the entry into service verification, the owner or operator of the tank shall engage a single inspection body different to the inspection bodies engaged for the type examination, supervision of manufacture or initial inspection. The inspection body engaged for the entry into service verification shall be approved by the competent authority of the country of registration or, if no such inspection body exists, the inspection body shall be recognized by the competent authority of the country of registration. The entry into service verification shall consider the condition of the tank and shall ensure that the requirements of Annex 2 to SMGS are fulfilled.

6.8.1.5.6 Intermediate, periodic or exceptional inspection according to 1.8.7.6

The intermediate or periodic or exceptional inspection shall be performed:

by an inspection body approved or recognized by the competent authority of the country where the inspection takes place or by an inspection body approved or recognized by the competent authority of the country of registration.

by an inspection body approved or recognized by the competent authority of the SMGS Contracting State where the inspection takes place or by an inspection body approved or recognized by the competent authority of the country of registration.

The owner or operator of the tank, or its authorized representative, shall engage a single inspection body for each intermediate, periodic or exceptional inspection.

6.8.2 REQUIREMENTS APPLICABLE TO ALL CLASSES

6.8.2.1 Construction

Basic principles

6.8.2.1.1

Shells, their service and structural equipment shall be designed to withstand without loss of contents (other than quantities of gas escaping through any degassing vents):

static and dynamic stresses in normal conditions of carriage as defined in 6.8.2.1.2 and 6.8.2.1.13;

– prescribed minimum stresses as defined in 6.8.2.1.15.

6.8.2.1.2

Tank-wagons shall be constructed as to be capable of withstanding, under the maximum permissible load, the stresses which occur during carriage by rail¹. As regards these

tank-containers² and their fastenings shall, under the maximum permissible load be capable of absorbing the forces equal to those exerted by:

¹ This requirement is deemed to be met if the notified body according to the procedure of national or international regulations has successfully evaluated compliance with the provisions of Annex 2 to SMGS, in addition to the requirements of the regulations mentioned above, and has confirmed this compliance by a relevant certificate.

² See also 7.1.3.

stresses, reference should be made to the tests prescribed by the competent authority.

- in the direction of travel (longitudinal direction)- twice the total mass;
- horizontally at right angles to the direction of travel - the total mass; (where the direction of travel is not clearly determined- twice the total mass in each direction);
- vertically upwards- the total mass;
- vertically downwards- twice the total mass.

6.8.2.1.3 The walls of the shells shall have at least the thickness specified in
6.8.2.1.17 and 6.8.2.1.18 | 6.8.2.1.17 to 6.8.2.1.20

6.8.2.1.4 Shells shall be designed and constructed in accordance with the requirements of documents listed in 6.8.2.6 or of a technical code recognized by the competent authority, in accordance with 6.8.2.7, in which the material is chosen and the shell thickness determined taking into account maximum and minimum filling and working temperatures, but the following minimum requirements of 6.8.2.1.6 to 6.8.2.1.26 shall be met.

6.8.2.1.5 Tanks intended to contain certain dangerous substances shall be provided with additional protection. This may take the form of additional thickness of the shell (increased calculation pressure) determined in the light of the dangers inherent in the substances concerned or of a protective device (see the special provisions of 6.8.4).

6.8.2.1.6 Welds shall be skilfully made and shall afford the fullest safety. The execution and checking of welds shall comply with the requirements of 6.8.2.1.23.

6.8.2.1.7 Measures shall be taken to protect shells against the risk of deformation as a result of a negative internal pressure (vacuum).

Shells, other than shells according to 6.8.2.2.6, designed to be equipped with vacuum valves shall be able to withstand, without permanent deformation, an external pressure (excess pressure) of not less than 21 kPa (0.21 bar). Shells used for the carriage of solid substances (powdery or granular) of packing groups II or III only, which do not liquefy during carriage, may be designed for a external pressure (excess pressure) not less than 5 kPa (0.05 bar). The vacuum valves shall be set to relieve at a vacuum setting not greater than the tank's design vacuum pressure. Shells, which are not designed to be equipped with a vacuum valve shall be able to withstand an external pressure, which may build up in operation conditions, of not less than 40 kPa (0.4 bar).

Materials for shells

6.8.2.1.8 Shells shall be made of suitable metallic materials which, unless other temperature ranges are prescribed in the various classes, shall be resistant to brittle fracture and to stress corrosion cracking between -20 °C

and +50 °C.

6.8.2.1.9 The materials of shells and/or of their protective linings which are in contact with the contents shall not contain substances liable to react dangerously (the term "*Dangerous reaction*" see in 1.2.1) with the contents, to form dangerous compounds, or appreciably to weaken the material.

If contact between the substance carried and the material used for the construction of the shell entails a progressive decrease in the shell thickness, this thickness shall be increased at manufacture by an appropriate amount. This additional thickness to allow for corrosion shall not be taken into consideration in calculating the shell thickness.

6.8.2.1.10 For welded shells only materials of faultless weldability whose adequate impact strength at an ambient temperature of -20 °C can be guaranteed, particularly in the weld seams and the

zones adjacent thereto, shall be used.

If fine-grained steel is used, the guaranteed value of the yield strength R_e shall not exceed 460 N/mm² and the guaranteed value of the upper limit of tensile strength R_m shall not exceed 725 N/mm², in accordance with the specifications of the material.

6.8.2.1.11 Ratios of R_e/R_m exceeding 0.85 are not allowed for steels used in the construction of welded shells,

where:

R_e = apparent yield strength for steels having a clearly-defined yield point or guaranteed 0.2% proof strength for steels with no clearly-defined yield point (1% for austenitic steels);

R_m = tensile strength.

The values specified in the inspection certificate for the material shall be taken as a basis in determining this ratio in each case.

6.8.2.1.12 For steel, the elongation at fracture, in % shall be not less than

$$\frac{10\,000}{\text{determined tensile strength in N/mm}^2}$$

but in any case for fine-grained steels it shall be not less than 16 % and not less than 20 % for other steels.

For aluminium alloys the elongation at fracture shall be not less than 12%³

Calculation of the shell thickness

6.8.2.1.13 The pressure on which the shell thickness is based shall not be less than the calculation pressure, but the stresses referred to in 6.8.2.1.1 shall also be taken into account, and, if necessary, the following stresses

In the case of wagons in which the tank constitutes a stressed self-supporting member, the shell shall be designed to withstand the stresses thus imposed in addition to stresses from other sources.

Under each of these stresses the safety factors to be observed shall be the following:

- for metals having a clearly-defined yield point – a safety factor of 1.5 in relation to the apparent yield strength; or
- for metals with no clearly-defined yield point: a safety factor of 1.5 in relation to the guaranteed 0.2% proof strength (1% maximum elongation for austenitic steels).

6.8.2.1.14 The calculation pressure is in the second part of the tank's code (see 4.3.4.1) according to Column 12 of Table A of Chapter 3.2.

When "G" appears, the following requirements shall apply:

- a) Gravity-discharge shells intended for the carriage of substances having a vapour pressure not exceeding 110 kPa (1.1 bar) (absolute pressure) at 50 °C shall be designed for a calculation pressure of twice the static pressure of the substance to be carried but not less

³ In the case of sheet metal the axis of the tensile test-piece shall be at right angles to the direction of rolling. The permanent elongation at fracture shall be measured on test-pieces of circular cross-section in which the gauge length l is equal to five times the diameter d ($l = 5d$); if test-pieces of rectangular section are used, the gauge length shall be calculated by the formula

$$l = 5.65 \sqrt{F_0}$$

where F_0 indicates the initial cross-section area of the test-piece.

than twice the static pressure of water.

- b) Pressure-filled or pressure-discharge shells intended for the carriage of substances having a vapour pressure not exceeding 110 kPa (1.1 bar) (absolute pressure) at 50 °C shall be designed for a calculation pressure equal to 1.3 times the filling or discharge pressure

When the numerical value of the minimum calculation pressure is given (gauge pressure) the shell shall be designed for this pressure which shall not be less than 1.3 times the filling or discharge pressure. The following minimum requirements shall apply in these cases:

- a) Shells intended for the carriage of substances having a vapour pressure of more than 110 kPa (1.1 bar) at 50 °C and a boiling point of more than 35 °C shall, whatever their filling or discharge system, be designed for a calculation pressure of not less than 150 kPa (1.5 bar) gauge pressure or 1.3 times the filling or discharge pressure, whichever is the higher.
- b) Shells intended for the carriage of substances having a boiling point of not more than 35 °C shall, whatever their filling or discharge system, be designed for a calculation pressure equal to 1.3 times the filling or discharge pressure but not less than 0.4 MPa (4 bar) (gauge pressure).

At the test pressure, the stress σ at the most severely stressed point of the shell shall not exceed the material-dependent limits prescribed below. Allowance shall be made for any weakening due to the welds.

6.8.2.1.15

For all metals and alloys, the stress σ at the test pressure shall be lower than the smaller of the values given by the following formulae:

6.8.2.1.16

$$\sigma \leq 0.75 R_e \text{ or } \sigma \leq 0.5 R_m$$

where

R_e = apparent yield strength for steels having a clearly-defined yield point or guaranteed 0.2% proof strength for steels with no clearly defined yield point (1% for austenitic steels)

R_m = tensile strength.

The values of R_e and R_m to be used shall be specified minimum values according to material standards. If no material standard exists for the metal or alloy in question, the values of R_e and R_m used shall be approved by the competent authority or by a body designated by the competent authority.

When austenitic steels are used, the specified minimum values according to the material standards may be exceeded by up to 15% if these higher values are attested in the inspection certificate. The minimum values shall, however, not be exceeded when the formula given in 6.8.2.1.18 is applied.

Minimum shell thickness

6.8.2.1.17

The shell thickness shall not be less than the greater of the values determined by the following formula:

$$e = \frac{P_T D}{2[\sigma]\lambda} ;$$

$$e = \frac{P_C D}{2[\sigma]}$$

where:

e = minimum shell thickness in mm

P_T = test pressure in MPa

P_C = calculation pressure in MPa as specified in 6.8.2.1.14 or 4.3.3.1.1;

D = internal diameter of shell in mm

$[\sigma]$ – permissible stress, as defined in 6.8.2.1.16, in MPa

λ – a coefficient allowing for any weakening due to welds, and linked to the inspection

methods defined in 6.8.2.1.23.

The thickness shall in no case be less than that defined in 6.8.2.1.18

6.8.2.1.18 to 6.8.2.1.20.

6.8.2.1.18 Shells shall be not less than 6 mm thick if of mild steel⁴, or of equivalent thickness if of another metal. For powdery or granular substances, this thickness may be reduced to 5 mm for mild steel or to an equivalent thickness for other metals.

Shells shall be not less than 5 mm thick if of mild steel⁴ (in conformity with the requirements of 6.8.2.1.11 and 6.8.2.1.12) or of equivalent thickness if of another metal.

Whichever metal is used, the minimum wall thickness of the shell shall in no case be less than 4.5 mm.

Where the diameter is more than 1.80 m, this thickness shall be increased to 6 mm except in the case of tanks intended for the carriage of powdery or granular substances, if the shell is of mild steel⁴ or to an equivalent thickness if of another metal.

Whatever the metal used, the shell thickness shall in no case be less than 3 mm, or or 4.5 mm if the tank is an extra-large tank-container

Equivalent thickness" means the thickness obtained by the following formula⁵

$$e_1 = \frac{464e_0}{\sqrt[3]{(Rm_1 A_1)^2}}$$

6.8.2.1.19 (Reserved)

Where protection of the tank against damage is provided according to 6.8.2.1.20, the competent authority may allow the aforesaid minimum thicknesses to be reduced in proportion to the protection provided; however, the said thicknesses shall be not less than 3 mm in the case of mild steel⁴, or than an equivalent thickness in the case of other materials, for shells not more than 1.80 m in diameter. For shells of a diameter exceeding 1.80 m this minimum thickness shall be increased to 4 mm in the case of mild steel⁴, and to an equivalent thickness in the

⁴ For the definitions of "mild steel" and "reference steel" see 1.2.1. "Mild steel" in this case also covers a steel referred to in material standards as "mild steel", with a minimum tensile strength between 360 N/mm² and 490 N/mm² and a minimum elongation at fracture conforming to 6.8.2.1.12

⁵ This formula is derived from the general formula:

$$e_1 = e_0 \sqrt[3]{\left(\frac{Rm_0 A_0}{Rm_1 A_1}\right)^2}$$

where

*e*₁ = minimum shell thickness for the metal chosen, in mm;

*e*₀ = minimum shell thickness for mild steel, in mm, according to 6.8.2.1.18 and 6.8.2.1.19;

*Rm*₀ = 370 (tensile strength for reference steel, see definition 1.2.1, in N/mm²);

*A*₀ = 27 (elongation at fracture for reference steel, in %);

*Rm*₁ = minimum tensile strength of the metal chosen, in N/mm²; and

*A*₁ = minimum elongation at fracture of the metal chosen under tensile stress, in %.

case of other metals.

Equivalent thickness means the thickness given by the formula in 6.8.2.1.18.

The thickness of shells with protection against damage in accordance with 6.8.2.1.20 shall not be less than the values given in the table below:

	Diameter of shell	<1,80 m	>1,80 m
Minimum thickness of shells	Austenitic stainless steels	2,5 mm	3 mm
	Austenitic-ferritic stainless steels	3 mm	3,5 mm
	Other steels	3 mm	4 mm
	Aluminium alloys	4 mm	5 mm
	Pure aluminium of 99.80%	6 mm	8 mm

6.8.2.1.20 (Reserved)

The protection referred to in 6.8.2.1.19 may consist of:

- overall external structural protection as in "sandwich" construction where the sheathing is secured to the shell; or
- a structure in which the shell is supported by a complete skeleton including longitudinal and transverse structural members; or
- double-wall construction

Where the tanks are made with double walls, the space between being evacuated of air, the aggregate thickness of the outer metal wall and the shell wall shall correspond to the minimum wall thickness prescribed in 6.8.2.1.18, the thickness of the wall of the shell itself being not less than the minimum thickness prescribed in 6.8.2.1.19.

Where tanks are made with double walls with an intermediate layer of solid materials at least 50 mm thick, the outer wall shall have a thickness of not less than 0.5 mm if it is made of mild steel⁴ or at least 2 mm if it is made of a plastics material reinforced with glass fibre. Solid foam with an impact absorption capacity such as that, for example, of polyurethane foam, may be used as the intermediate layer of solid material.

6.8.2.1.21 (Reserved)

6.8.2.1.22 (Reserved)

Welding and inspection of welds

6.8.2.1.23 The inspection body performing inspections in accordance with 6.8.2.4.1 or 6.8.2.4.4 shall verify and confirm the ability of the manufacturer or the maintenance or repair shop to perform welding operations and the operation of a weld quality assurance system. Welding shall be

performed by skilled welders using a welding process whose effectiveness (including any heat treatments required) has been demonstrated by test.

Note: When 6.8.5 is applicable, the impact-strength tests carried out for the qualifications of the welding processes shall comply with the requirements of 6.8.5.3.

Non-destructive tests shall be carried out by radiography or by ultrasound⁶ and must confirm that the quality of the welding is appropriate to the stresses. The following checks shall be carried out in accordance with the value of the coefficient λ , used in determining the thickness of the shell in 6.8.2.1.17:

$\lambda = 0.8$: All weld beads shall so far as possible be inspected visually on both faces and shall be subjected to non-destructive checks. The non-destructive checks shall include all weld "Tee" junctions, all inserts used to avoid welds crossing and all welds in the knuckle area of the tank ends. The total length of welds to be examined shall not be less than: 10% of the length of all the longitudinal welds, 10% of the length of all the circumferential welds, 10% of the length of all the circumferential welds in the tank ends, and 10% of the length of all the radial welds in the tank ends.

$\lambda = 0.9$: All weld beads shall so far as possible be inspected visually on both faces and shall be subjected to non-destructive checks. The non-destructive checks shall include all connections, all inserts used to avoid welds crossing, all welds in the knuckle area of the tank ends and all welds for the assembly of large-diameter items of equipment. The total length of welds to be examined shall not be less than: 100% of the length of all the longitudinal welds, 25% of the length of all the circumferential welds, 25% of the length of all the circumferential welds in the tank ends, and 25% of the length of all the radial welds in the tank ends.

$\lambda = 1$: All weld beads throughout their length shall be subjected to non-destructive checks and shall so far as possible be inspected visually on both faces. A weld test-piece shall be taken.

The non-destructive checks of the circumferential, longitudinal and radial welds shall be carried out by radiography or by ultrasound. Other welds allowed in the appropriate design and construction standard shall be tested using alternative methods (e.g. magnetic particle testing, capillary testing or eddy-current testing) in accordance with the relevant standard(s) referenced in 6.8.2.6.2. The checks shall confirm that the quality of the welding is appropriate to the stresses.

In the cases of either $\lambda = 0.8$ or $\lambda = 0.9$, when the presence of an unacceptable defect is detected in a portion of a weld, the non-destructive checks shall be extended to a portion of equal length on both sides of the portion that contains the defect. If the non-destructive checks detect an additional defect that is unacceptable, non-destructive checks shall be extended to all remaining welds of the same type of welding process.

Where there are doubts regarding the quality of welds, including the welds made to repair any defects revealed by the non-destructive checks, additional checks of the welds may be required.

Other construction requirements.

6.8.2.1.24	The protective lining shall be so designed that its leakproofness remains intact, whatever the deformation liable to occur in normal conditions of carriage (see 6.8.2.1.2).
6.8.2.1.25	The thermal insulation shall be so designed as not to hinder access to, and/or the operation of, filling and discharge devices and safety valves.
6.8.2.1.26	If shells intended for the carriage of flammable liquids having a flash-point of not more than 60 °C are fitted with non-metallic protective linings (inner layers), the shells and the protective linings shall be so designed that no danger of ignition from electrostatic charges can occur.
6.8.2.1.27	All parts of tank-wagons intended for the All parts of a tank-container intended for the

⁶ Lap joints used for joining an end to the shell wall may be tested using alternative methods to radiography or ultrasound.

carriage of liquids having a flash-point of not more than 60 °C and for the carriage of flammable gases, or of UN No. 1361 CARBON or UN No. 1361 CARBON BLACK, Packing Group II, shall be linked to the chassis by means of electrical connection and shall be capable of being electrically earthed. Any metal contact capable of causing electrochemical corrosion shall be avoided.

carriage of liquids having a flash-point of not more than 60 °C, flammable gases, or UN No. 1361 CARBON or UN No. 1361 CARBON BLACK, packing group II, shall be capable of being electrically earthed. Any metal contact capable of causing electrochemical corrosion shall be avoided.

6.8.2.1.28 (Reserved)

6.8.2.1.29 The minimum distance between the headstock plane and the most protruding point at the shell extremity on tank-wagons shall be 300 mm. Alternatively for tank-wagons for substances other than those for which the requirements of special provision TE 25 of 6.8.4 b) apply, buffer override protection of a design approved by the competent authority shall be provided. This alternative is only applicable to tank-wagons used solely on railway infrastructure requiring a freight vehicle gauge smaller than G1⁷.

(Reserved)

6.8.2.2 *Items of equipment*

6.8.2.2.1 Suitable non-metallic materials may be used to manufacture service and structural equipment. Service equipment welded to the shell shall be welded in such a way that the shell is protected from loss of leakproofness due to accidental stresses.

This can be achieved, for example, through the following protection measures:

- Underframe connection: securing by means of a pad ensuring distribution of dynamic loads;
- Supports for upper gangway, access ladder, drainage pipes, valve control mechanisms and other load transmission brackets: securing by means of weld-on reinforcement plate;
- Appropriate dimensioning or other protective measures (e.g. designated breaking point).

The items of equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during carriage or handling. They shall exhibit a suitable degree of safety comparable to that of the shells themselves, and shall in particular:

- be compatible with the substances carried; and
- meet the requirements of 6.8.2.1.1.

Piping shall be designed, constructed and installed so as to avoid the risk of damage due to

⁷ The G1 freight wagon gauge is referenced in Document 33 A3 of the List.

thermal expansion and contraction, mechanical shock and vibration.

The leakproofness of the service equipment shall be ensured even in the event of the overturning of the tank-wagon or tank-container.

The gaskets shall be made of a material compatible with the substance carried and shall be replaced as soon as their effectiveness is impaired, for example as a result of ageing.

Gaskets ensuring the leakproofness of fittings requiring manipulation during normal use of tanks shall be so designed and arranged that manipulation of the fittings incorporating them does not damage them.

6.8.2.2.2

Each bottom-filling or bottom-discharge opening in tanks which are referred to, in Column 12 of Table A of Chapter 3.2, with a tank code including the letter "A" in its third part (see 4.3.4.1.1) shall be equipped with at least two mutually independent closures, mounted in series, comprising:

- an external stop-valve with piping made of a malleable metal material and;
- a closing device at the end of each pipe which may be a screw-threaded plug, a blank flange or an equivalent device. This closing device shall be sufficiently tight so that the substance is contained without loss. Measures shall be taken to enable the safe release of pressure in the discharge pipe before the closing device is completely removed.

Each bottom-filling or bottom-discharge opening in tanks which are referred to, in Column 12 of Table A of Chapter 3.2, with a tank code including the letter "B" in its third part (see 4.3.3.1.1 or 4.3.4.1.1) shall be equipped with at least three mutually independent closures, mounted in series, comprising

- an internal stop-valve, i.e. a stop-valve mounted inside the shell or in a welded flange or companion flange;
- an external stop-valve or an equivalent device⁸
 - one at the end of each pipe and
 - as near as possible to the shell and
- a closing device at the end of each pipe which may be a screw-threaded plug, a blank flange or an equivalent device. This closing device shall be sufficiently tight so that the substance is contained without loss. Measures shall be taken to enable the safe release of pressure in the discharge pipe before the closing device is completely removed.

However, in the case of tanks intended for the carriage of certain crystallizable or highly viscous substances and shells fitted with protective lining, the internal stop-valve may be replaced by an external stop-valve provided with additional protection.

The internal stop-valve shall be operable either from above or from below. Its setting ("Open" or "Closed") shall so far as possible in each case be capable of being verified from the ground. Internal stop-valve control devices shall be so designed as to prevent any unintended opening through impact or an inadvertent act.

The internal shut-off device shall continue to be effective in the event of damage to the external control device.

In order to avoid any loss of contents in the event of damage to the external fittings (pipes, lateral shut-off devices), the internal stop-valve and its seating shall be protected against the danger of being wrenched off by external stresses or shall be so designed as to resist them. The filling and discharge devices (including flanges or threaded plugs) and protective caps (if any) shall be capable of being secured against any unintended opening.

The position and/or direction of closure of shut-off devices shall be clearly apparent⁹.

⁸ In the case of tank-containers of less than 1m³ capacity, the external stop-valve or other equivalent device may be replaced by a blank flange.

All openings of tanks which are referred to in Column 12 of Table A of Chapter 3.2, by a tank code including letter "C" or "D" in its third part (see 4.3.3.1.1 and 4.3.4.1.1) shall be situated above the surface level of the liquid. These tanks shall have no pipes or pipe connections below the surface level of the liquid. The cleaning openings (fist-holes) are, however, permitted in the lower part of the shell for tanks referred to by a tank code including letter "C" in its third part. This opening shall be capable of being sealed by a flange so closed as to be leakproof and whose design shall be approved by the competent authority or by a body designated by the competent authority.

6.8.2.2.3

Tanks that are not hermetically closed may be fitted with vacuum valves, or with self-operating ventilation valves, to avoid an unacceptable negative internal pressure. These valves shall be set to relieve at a vacuum setting not greater than the vacuum pressure for which the tank has been designed (see 6.8.2.1.7). Hermetically closed tanks shall not be fitted with vacuum valves or with self-operating ventilation valves.

However, tanks of the tank code SGAH, S4AH or L4BH, fitted with vacuum valves which open at a negative pressure of not less than 21 kPa (0.21 bar) shall be considered as being hermetically closed. For tanks intended for the carriage of solid substances (powdery or granular) of packing group II or III only, which do not liquefy during transport, the negative pressure may be reduced to not less than 5 kPa (0.05 bar).

Vacuum valves or self-operating ventilation valves, and breather devices (see 6.8.2.2.6) used on tanks intended for the carriage of substances meeting the flash-point criteria of Class 3, shall prevent the immediate passage of flame into the shell by means of a suitable protective device, or the shell of the tank shall be explosion pressure shock resistant, which means being capable of withstanding without leakage, but allowing deformation, an explosion resulting from the passage of the flame.

Flame arresters for breather devices shall be suitable for the vapour emitted by the substances carried (maximum experimental safety gap – MESH), temperature range and application. They shall meet the requirements and tests of EN ISO 16852:2016 (*Flame arresters – Performance requirements, test methods and limits for use*) for the situations given in the Table below:

Application/Installation	Testing requirements
Direct communication with atmosphere	EN ISO 16852:2016, 7.3.2.1.
Communication to pipe work system	EN ISO 16852:2016, 7.3.3.2 (applies to valve/flame arrester combinations when tested together)
	EN ISO 16852:2016, 7.3.3.3 (applies to flame arresters tested independently of the valves)

For tanks with self-operating ventilation valves, the connection between the self-operating ventilation valve and the bottom valve shall be arranged so as to preclude the valves from opening or the contents from escaping onto the external surface of the tank in case of tank deformation.

6.8.2.2.4

The shell or each of its compartments shall be provided with an opening large enough to permit the internal inspection.

These openings shall be provided with closures designed for a test pressure of at least 0.4 MPa (4 bar). Hinged dome covers for

These openings for extra-large tank-containers intended for the carriage of substances in the liquid state which are not

⁹ Dry detachable connections are self-closing. Therefore there is no need to specify whether they are open or closed. Such closing device may be used only as a second or third closing device.

tanks with a test pressure of more than 0.6 MPa (6 bar) shall not be permitted.

divided by partitions or surge plates into sections of not more than 7 500 litres capacity shall be provided with closures designed for a test pressure of at least 0.4 MPa (4 bar).

Hinged dome covers shall not be permitted for extralarge tank-containers with a test pressure of more than 0.6 MPa (6 bar).

6.8.2.2.5 (Reserved)

6.8.2.2.6 Tanks intended for the carriage of liquids having a vapour pressure of not more than 110 kPa (1.1 bar) (absolute) at 50 °C shall have a breather device and a safety device to prevent the contents from spilling out if the tank overturns; otherwise they shall conform to 6.8.2.2.7 or 6.8.2.2.8.

6.8.2.2.7 Tanks intended for the carriage of liquids having a vapour pressure of more than 110 kPa (1.1 bar) at 50 °C and a boiling point of more than 35 °C shall have a safety valve set at not less than 150 kPa (1.5 bar) (gauge pressure) and which shall be fully open at a pressure not exceeding the test pressure. Otherwise they shall conform to 6.8.2.2.8.

6.8.2.2.8 Tanks intended for the carriage of liquids having a boiling point of not more than 35 °C shall have a safety valve set at not less than 300 kPa (3 bar) gauge pressure and which shall be fully open at a pressure not exceeding the test pressure; otherwise they shall be hermetically closed¹⁰

6.8.2.2.9 Movable parts such as covers, closures, etc., which are liable to come into frictional or percussive contact with aluminium shells intended for the carriage of flammable liquids having a flash-point of not more than 60 °C or for the carriage of flammable gases shall not be made of unprotected corrodible steel.

6.8.2.2.10 If tanks required to be hermetically closed are equipped with safety valves, these shall be preceded by a bursting disc, and the following conditions shall be observed:

Except for tanks intended for the carriage of compressed, liquefied or dissolved gases where the arrangement of the bursting disc and safety valve satisfy the requirements of 6.8.3.2.9, burst pressures of the bursting disc shall satisfy the following requirements:

- the minimum burst pressure at 20 °C, tolerances included, shall be greater than or equal to 0.8 times the test pressure
- the maximum burst pressure at 20 °C, tolerances included, shall be less than or equal to 1.1 times the test pressure, and
- the burst pressure at the maximum service temperature shall be greater than the maximum working pressure.

A pressure gauge or another suitable indicator shall be provided in the space between the bursting disc and the safety valve, to enable detection of any rupture, perforation or leakage of the disc.

6.8.2.2.11 Level-gauges shall neither be part of, nor fitted to shells, if they incorporate transparent material which can, at any time, come into direct contact with the substance carried in the shell.

6.8.2.3 *Type examination and type approval*

6.8.2.3.1 *Type examination*

The provisions in 1.8.7.2.1 shall be applied.

A manufacturer of service equipment for which a standard is listed in the table in 6.8.2.6.1 or 6.8.3.6 may request a separate type examination. This separate type examination shall be taken into account during the type examination of the tank.

¹⁰ For the definition of "hermetically closed tank" see 1.2.1.

6.8.2.3.2

Type approval

The competent authority shall issue in respect of each new type of tank-wagon, tank-container, tank swap body, battery-wagon or MEGC a certificate attesting that the type, including fastenings, which has been examined, is suitable for the purpose for which it is intended and meets the construction requirements of 6.8.2.1, the equipment requirements of 6.8.2.2 and the special conditions for the classes of substances carried.

The certificate shall show in addition to the items listed in 1.8.7.2.2.1:

- an approval number for the type which shall consist of the distinguishing sign used on vehicles in international road traffic¹¹ of the State in whose territory the approval was granted and a registration number;
- the tank code in accordance with 4.3.3.1.1 or 4.3.4.1.1;
- the alphanumeric codes of special provisions of construction (TC), equipment (TE) and type approval (TA) of 6.8.4 which are shown in column (13) of Table A of Chapter 3.2 for those substances for the carriage of which the tank has been approved;
- if required, the substances and/or group of substances for the carriage of which the tank has been approved.

These shall be shown with their chemical name or the corresponding collective entry (see 2.1.1.2), together with their classification (class, classification code and packing group).

With the exception of substances of Class 2 and those listed in 4.3.4.1.3, the listing of approved substances may be dispensed with. In such cases, groups of substances permitted on the basis of the tank code shown in the rationalised approach in 4.3.4.1.2 shall be accepted for carriage taking into account any relevant special provision.

Note: *Annex B of document No. 5B on the List describing the type as well as the list of authorized service equipment for the tank type, or equivalent documents shall be attached to or included in the certificate.*

The substances referred to in the certificate or the groups of substances approved according to the tank's hierarchy shall, in general, be compatible with the characteristics of the tank. A reservation shall be included in the certificate if it was not possible to investigate this compatibility exhaustively when the type approval was issued.

A copy of the certificate shall be attached to the tank record of each tank, battery-wagon or MEGC constructed (see 4.3.2.1.7).

When the manufacturer of service equipment had a separate type examination carried out and when the manufacturer requests it, the competent authority shall issue a certificate attesting that the type which has been examined meets the standard listed in the table in 6.8.2.6.1 or 6.8.3.6.

6.8.2.3.3

If the tanks, battery-wagons or MEGCs are manufactured in series without modification this approval shall be valid for the tanks, battery-wagons or MEGCs manufactured in series or according to the prototype.

A type approval may however serve for the approval of tanks with limited variations of the design that either reduce the loads and stresses on the tanks (e.g. reduced pressure, reduced mass, reduced volume) or increase the safety of the structure (e.g. increased shell thickness, more surge-plates, decreased diameter of openings). The limited variations shall be clearly described in the type approval certificate

6.8.2.3.4

In accordance with 1.8.7.2.2.3, the competent authority shall issue a supplementary approval certificate for the modification in the case of a modification of a tank, battery-wagon or MEGC with a valid, expired or withdrawn type approval.

6.8.2.4

Inspections and tests

6.8.2.4.1

Shells and their equipment shall either together or separately undergo an initial inspection before being put into service. This inspection shall include:

- a check of conformity to the approved type;

- a check of the design characteristics¹¹,
- an examination of the internal and external conditions;
- a hydraulic pressure test¹² at the test pressure indicated on the plate prescribed in 6.8.2.5.1; and
- a leakproofness test and a check of satisfactory operation of the equipment.

Except in the case of Class 2, the test pressure for the hydraulic pressure test depends on the calculation pressure and shall be at least equal to the pressure indicated below:

Calculation pressure (bar)	Test pressure (bar)
G ¹³	G ¹³
1.5	1.5
2.65	2.65
4	4
10	4
15	4
21	10 (4 ¹⁴)

The minimum test pressures for Class 2 are given in the table of gases and gas mixtures in 4.3.3.2.5.

The hydraulic pressure test shall be carried out on the shell as a whole and separately on each compartment of compartmented shells.

The hydraulic pressure test shall be carried out before the installation of a thermal insulation as may be necessary.

If the shells and their equipment are tested separately, they shall be jointly subjected to a leakproofness test after assembly in accordance with 6.8.2.4.3.

The leakproofness test shall be carried out separately on each compartment of compartmented shells.

6.8.2.4.2 Shells and their equipment shall undergo periodic inspections no later than every
8 years | 5 years.

These periodic inspections shall include:

- an external and internal examination;
- a leakproofness test in accordance with 6.8.2.4.3 of the shell with its equipment and check of the satisfactory operation of all the equipment
- as a general rule, a hydraulic pressure test¹³ (for the test pressure for the shells and compartments if applicable, see 6.8.2.4.1).

Sheathing for thermal or other insulation shall be removed only to the extent required for reliable appraisal of the characteristics of the shell.

In the case of tanks intended for the carriage of powdery or granular substances, and with the agreement of the inspection body, the periodic hydraulic pressure tests may be omitted and replaced by leakproofness tests in accordance with 6.8.2.4.3, at an effective internal pressure at least equal to the maximum working pressure.

¹¹ The check of the design characteristics shall also include, for shells requiring a test pressure of 1 MPa (10 bar) or higher, the taking of weld test-pieces (work samples) in accordance with 6.8.2.1.23 and the tests prescribed in 6.8.5.

¹² In special cases and with the agreement of the competent authority, the hydraulic pressure test may be replaced by a pressure test using another liquid or gas, where such an operation does not present any danger.

¹³ G = minimum calculation pressure according to the general requirements of 6.8.2.1.14 (see 4.3.4.1).

¹⁴ Minimum test pressure for UN No. 1744 bromine or UN No. 1744 bromine solution

Protective linings shall be visually examined for defects. In case defects appear the condition of the lining shall be evaluated by appropriate test(s).

- 6.8.2.4.3** Shells and their equipment shall undergo intermediate inspections at least every
4 years | 2,5 years
after the initial inspection and each periodic inspection.

However, the intermediate inspection may be performed at any time before the specified date.

If an intermediate inspection is performed more than three months before the due date, another intermediate inspection shall be performed at the latest after this date
4 years | 2,5 years

after this earlier date or alternatively a periodic inspection may be performed in accordance with 6.8.2.4.2.

These intermediate inspections shall include a leakproofness test of the shell with its equipment and check of the satisfactory operation of all the equipment. For this purpose the tank shall be subjected to an effective internal pressure at least equal to the maximum working pressure. For tanks intended for the carriage of liquids or solids in the granular or powdery state, when a gas is used for the leakproofness test it shall be carried out at a pressure at least equal to 25% of the maximum working pressure. In all cases, it shall not be less than 20 kPa (0.2 bar) (gauge pressure).

For tanks equipped with breather devices and a safety device to prevent the contents spilling out if the tank overturns, the leakproofness test shall be carried out at a pressure at least equal to the static pressure of the densest substance to be carried, the static pressure of water or 20 kPa (0.2 bar), whichever is the highest.

The leakproofness test shall be carried out separately on each compartment of compartmented shells.

Protective linings shall be visually examined for defects. In case defects appear the condition of the lining shall be evaluated by appropriate test(s).

- 6.8.2.4.4** When the safety of the tank or of its equipment may have been impaired as a result of repairs, alterations or accident, an exceptional check shall be carried out. If an exceptional check fulfilling the requirements of 6.8.2.4.2 has been performed, then the exceptional check may be considered to be a periodic inspection. If an exceptional check fulfilling the requirements of 6.8.2.4.3 has been performed then the exceptional check may be considered to be an intermediate inspection.

- 6.8.2.4.5** Certificates shall be issued by the inspection body referred to in 6.8.1.5.4 or 6.8.1.5.6 and shall show the results of the inspections in accordance with 6.8.2.4.1 to 6.8.2.4.4, even in the case of negative results. These certificates shall refer to the list of the substances permitted for carriage in this tank or to the tank code and the alphanumeric codes of special provisions in accordance with 6.8.2.3.2.

A copy of these certificates shall be attached to the tank record of each tank, battery-wagon or MEGC tested (see 4.3.2.1.7).

- 6.8.2.4.6** (reserved)

6.8.2.5 Marking

- 6.8.2.5.1** Every tank shall be fitted with a corrosion-resistant metal plate permanently attached to the tank in a place readily accessible for inspection. The following particulars at least shall be marked on the plate by stamping or by any other similar method. These particulars may be engraved directly on the walls of the shell itself, if the walls are so reinforced that the strength of the shell is not impaired:

– approval number;

- manufacturer's name or mark;
- manufacturer's serial number;
- year of manufacture;
- test pressure (gauge pressure)¹⁵;
- external design pressure (see 6.8.2.1.7)¹⁶;
- capacity of the shell¹⁶; – in the case of multiple-compartment shells, the capacity of each compartment¹⁶

Followed by the symbol "S" when the shells or the compartments of more than 7500 litres are divided by surge plates into sections of not more than 7500 litres capacity.

- design temperature (only if above +50 °C or below –20 °C)¹⁶;
- date and type of the most recent inspection: "month, year" followed by a "P" when the inspection is the initial inspection or a periodic inspection in accordance with 6.8.2.4.1 and 6.8.2.4.2, or "month, year" followed by an "L" when the inspection is an intermediate inspection in accordance with 6.8.2.4.3;
- stamp of the inspection body that carried out the inspection;
- material of the shell and reference to materials standards, if available and, where appropriate, the protective lining.

In addition, the maximum working pressure¹⁶ allowed shall be inscribed on pressure-filled or pressure-discharge tanks (for Class 2, see 6.8.3.5).

6.8.2.5.2

The following particulars shall be inscribed on both sides of the tank-wagon (on the tank itself or on plates):

- vehicle keeper marking¹⁶ or name of operator;
- capacity of the tank¹⁶;
- unladen mass of tank-wagon¹⁶
- load limits according to the characteristics of the wagon and the nature of the lines used;
- for the substances according to 4.3.4.1.3, the proper shipping name of the substance(s) accepted for carriage
- tank code according to 4.3.4.1.1;
- for substances other than those according to 4.3.4.1.3, the alphanumeric codes of all special provisions TC and TE which are

The following particulars shall be inscribed on both sides of the tank-wagon (on the tank itself or on plates):

- name of owner and of operator;
- capacity of the shell¹⁶;
- unladen mass of tank-wagon¹⁶;
- maximum permissible gross mass¹⁶;
- for the substances according to 4.3.4.1.3, the proper shipping name of the substance(s) accepted for carriage
- tank code according to 4.3.4.1.1;
- for substances other than those according to 4.3.4.1.3, the alphanumeric codes of all special provisions TC and TE which are shown in column (13) of Table A of Chapter 3.2 for the substances to be carried in the

¹⁵ Add the units of measurement after the numerical values.

¹⁶ Vehicle keeper marking in accordance with the national legislation

shown in column (13) of Table A of Chapter 3.2 for the substances to be carried in the tank;

- date (month, year) of the next inspection in accordance with 6.8.2.4.2 and 6.8.2.4.3 or with the TT special provisions of 6.8.4 for the sub-stance(s) accepted for carriage. If the next inspection is an inspection in accordance with 6.8.2.4.3, the date shall be followed by the letter "L".

tank;

6.8.2.6 Requirements for tanks which are designed, constructed, inspected and tested according to referenced documents

Note: Requirements for persons or bodies identified in Annex 2 to SMGS as having responsibilities have priority over such requirements enshrined in documents.

6.8.2.6.1 Design and construction

Since 1 January 2009 the use of the referenced documents has been mandatory. Exceptions are dealt with in 6.8.2.7 and 6.8.3.7.

Type approval certificates shall be issued in accordance with 1.8.7 and 6.8.2.3. For the issuance of a type approval certificate, one standard applicable according to the indication in column 4 shall be chosen from the table below. If more than one standard may be applied, only one of them shall be chosen.

Column 3 shows the paragraphs of Chapter 6.8 to which the standard conforms.

Column 5 gives the latest date when existing type approvals shall be withdrawn according to 1.8.7.2.2.2; if no date is shown the type approval remains valid until it expires.

Standards shall be applied in accordance with 1.1.5. They shall be applied in full, unless otherwise specified in the table below.

The scope of application of each document is defined in the scope clause of the document unless otherwise specified in the Table below.

Technical Regulatory Document Reference Number	Title of document	Require- ments the standard complies with	Applicable to new type approvals or to renewals	Latest date for with- drawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
For design and construction of tanks				
List, Document 34		6.8.2.1	Between 1 January 2005 and 30 June 2009	
List, Document 35		6.8.2.1, 6.8.3.1	Between 1 July 2009 and 31 December 2016	

<i>List,</i> Document 36		6.8.2.1, 6.8.3.1	Between 1 January 2015 and 31 December 2018	
<i>List,</i> Document 37		6.8.2.1, 6.8.3.1	Between 1 January 2017 and 31 December 2021	
<i>List,</i> Document 37A		6.8.2.1 and 6.8.3.1	Between 1 January 1 2021 and 31 December 2026	
<i>List,</i> Document 37B		6.8.2.1 and 6.8.3.1	Until further notice	
<i>List,</i> Document 38		6.8.2.1	Between 1 January 2005 and 31 December 2009	
<i>List,</i> Document 39 Annex A		6.8.2.1	Between 1 January 2010 and 31 December 2018	
<i>List,</i> Document 40		6.8.2.1	Between 1 January 2017 and 31 December 2024	
<i>List,</i> Document 40		6.8.2.1	Until further notice	
<i>For equipment</i>				
<i>List,</i> Document 4		6.8.2.2.1	Between 1 January 2009 and 31 December 2018	
<i>List,</i> Document 41		6.8.2.2.1 6.8.2.2.2 6.8.2.3.1	Between 1 January 2019 and 31 December 2026	
<i>List,</i> Document 41A		6.8.2.2.1 6.8.2.2.2 and 6.8.2.3.1	Until further notice	

List, Document 5		6.8.2.2.1	Between 1 January 2009 and 31 December 2018	
List, Document 42		6.8.2.2.1 6.8.2.2.2 6.8.2.3.1	Between 1 January 2019 and 31 December 2026	
List, Document 42/0A		6.8.2.2.1 6.8.2.2.2 and 6.8.2.3.1	Until further notice	
EN ISO 23826:2021	<i>Gas cylinders – Ball valves – Specification and testing</i>	6.8.2.1.1 and 6.8.2.2.1	Mandatorily from 1 January 2025	
List, Document 29B		6.8.2.1.1 and 6.8.2.2.11	Until further notice	

6.8.2.6.2 Type examination, inspection and test

The use of a referenced standard is mandatory.

One standard applicable according to the indication in column 4 shall be chosen from the table below for the type examination and the inspection and test of tanks.

Column 3 shows the paragraphs of Chapter 6.8 to which the standard conforms.

The standards shall be applied in accordance with 1.1.5.

The scope of application of each standard is defined in the scope clause of the standard unless otherwise indicated in the table below.

Technical Regulatory Document Reference Number	Title of document	Require- ments the standard complies with	Applicable to new type ap- provals or to renewals
(1)	(2)	(3)	(4)
List, Document 5A		6.8.2.1.23, 6.8.2.3, 6.8.2.4 and 6.8.3.4	Until 31 December 2026
List, Document 5B		6.8.2.1.23, 6.8.2.3, 6.8.2.4 and 6.8.3.4	Until further notice

6.8.2.7 Requirements for tanks which are not designed, constructed, inspected and tested according to referenced documents

To reflect scientific and technical progress or where no document is referenced in 6.8.2.6 or to

deal with specific aspects not addressed in a document referenced in 6.8.2.6, the competent authority may recognize the use of a technical code providing the same level of safety. Tanks shall, however, comply with the minimum requirements of 6.8.2.

As soon as a document newly referenced in 6.8.2.6 can be applied, the competent authority shall withdraw its recognition of the relevant technical code. A transitional period ending no later than the date of entry into force of the next edition of Annex 2 to SMGS may be applied.

The competent authority shall transmit to the OSJD Committee a list of the technical codes that it recognises and shall update the list if it changes. The list should include the following details: name and date of the code, purpose of the code and details of where it may be obtained. The OSJD Committee shall make this information publicly available on its website.

A document, which has been adopted for reference in a future edition of Annex 2 to SMGS, may be approved by the competent authority for use without notifying the OSJD Committee.

For testing, inspection and marking, the applicable document as referenced in 6.8.2.6 may also be used

6.8.3 Special requirements applicable to Class 2

6.8.3.1 Construction of shells

6.8.3.1.1 Shells intended for the carriage of compressed or liquefied gases or dissolved gases shall be made of steel.

In the case of weldless shells, by derogation from 6.8.2.1.12 a minimum elongation at fracture of 14% and also a stress σ lower than or equal to limits hereafter given according to the material may be accepted:

(a) When the ratio R_e/R_m (of the minimum guaranteed characteristics after heat treatment) is higher than 0.66 without exceeding 0.85: $\sigma \leq 0.75 R_e$.

(b) When the ratio R_e/R_m (of the minimum guaranteed characteristics after heat treatment) is higher than 0.85: $\sigma \leq 0.5 R_m$.

6.8.3.1.2 The requirements of 6.8.5 apply to the materials and construction of welded shells

6.8.3.1.3

For tanks intended for the carriage of refrigerated liquefied gases with double-walled shells, the wall thickness of the inner receptacle may, notwithstanding the requirements of 6.8.2.1.18, be 3 mm if a metal is used which has good low-temperature performance corresponding to a minimum tensile strength $R_m = 490 \text{ N/mm}^2$ and a minimum coefficient of elongation $A = 30\%$.

If other metals are used, an equivalent minimum wall thickness shall be maintained; this thickness is to be calculated according to the formula in footnote 5 to 6.8.2.1.18, where $R_{m0} = 490 \text{ N/mm}^2$ and $A_0 = 30\%$.

The outer shell shall in this case have a minimum wall thickness of 6 mm where mild steel is concerned. If other materials are used, an equivalent minimum wall thickness shall be maintained, which shall be calculated according to the formula given in 6.8.2.1.18.

(Reserved)

Construction of battery-wagons and MEGCs

6.8.3.1.4 Cylinders, tubes, pressure drums and bundles of cylinders, as elements of a battery-wagon or MEGC, shall be constructed in accordance with Chapter 6.2.

Note 1: Bundles of cylinders which are not elements of a battery-wagon or of a MEGC shall be subject to the requirements of Chapter 6.2.

Note 2: Tanks as elements of battery-wagons and MEGCs shall be constructed in accordance with 6.8.2.1 and 6.8.3.1.

Note 3: Demountable tanks¹⁷ are not to be considered elements of battery-wagons or MEGCs.

6.8.3.1.5 Elements and their fastenings

of battery-wagons

MEGCs and their fastenings as well as the frame of MEGCs

shall be capable of absorbing under the maximum permissible load the forces defined in 6.8.2.1.2. Under each force the stress at the most severely stressed point of the element and its fastenings shall not exceed the value defined in 6.2.5.3 for cylinders, tubes, pressure drums and bundles of cylinders and for tanks the value of defined in 6.8.2.1.16

Other provisions for the construction of tank-wagons and battery-wagons

- 6.8.3.1.6** Tank-wagons and battery-wagons shall be fitted with buffers with a minimum energy absorption capacity of 70 kJ. This provision does not apply to tank-wagons and battery-wagons fitted with energy absorption elements in accordance with the definition in 6.8.4, special provision TE 22 (Reserved)

6.8.3.2 Items of equipment

- 6.8.3.2.1** The discharge pipes of tanks shall be capable of being closed by blank flanges or some other equally reliable device. For tanks intended for the carriage of refrigerated liquefied gases, these blank flanges or other equally reliable devices may be fitted with pressure-release openings of a maximum diameter of 1.5 mm.

- 6.8.3.2.2** Shells intended for the carriage of liquefied gases may be provided with, in addition to the openings prescribed in 6.8.2.2.2 and 6.8.2.2.4, openings for the fitting of gauges, thermometers, manometers and with bleed holes, as required for their operation and safety.

- 6.8.3.2.3** The internal stop-valve of all filling and all discharge openings of tanks, with a capacity greater than 1 m³,

intended for the carriage of liquefied flammable and/or toxic gases shall be instant-closing and shall close automatically in the event of an unintended movement of the tank or in the event of fire. It shall also be possible to operate the internal stop-valve by remote control.

The device which keeps the internal closure open, e.g. a rail hook, is not a component of the wagon.

- 6.8.3.2.4** All openings, other than those accommodating safety valves and closed bleed holes, of tanks intended for the carriage of liquefied flammable and/or toxic gases, if their nominal diameter is more than 1.5 mm, shall be equipped with an internal shut-off device.

- 6.8.3.2.5** Notwithstanding the requirements of 6.8.2.2.2, 6.8.3.2.3 and 6.8.3.2.4, tanks intended for the carriage of refrigerated liquefied gases may be equipped with external devices in place of

¹⁷ For the definition of "demountable tank" see 1.2.1.

internal devices, if the external devices afford protection against external damage at least equivalent to that afforded by the wall of the shell.

6.8.3.2.6 If there are thermometers, they shall not project directly into the gas or liquid through the shell.

6.8.3.2.7 Filling and discharge openings situated in the upper part of tanks shall be equipped with, in addition to what is prescribed in 6.8.3.2.3, a second, external, closing device. This device shall be capable of being closed by a blank flange or some other equally reliable device.

6.8.3.2.8 Safety valves shall meet the requirements of 6.8.3.2.9 to 6.8.3.2.12 below:

6.8.3.2.9	Tanks intended for the carriage of compressed or liquefied gases or dissolved gases, may be fitted with spring-loaded safety valves.	Tanks intended for the carriage of flammable liquefied gases shall be fitted with safety valves. Tanks intended for the carriage of compressed gases, nonflammable liquefied gases or dissolved gases may be fitted with safety valves.

Safety valves, where fitted, shall meet the requirements of 6.8.3.2.9.1 to 6.8.3.2.9.5.

6.8.3.2.9.1 Safety valves shall be capable of opening automatically under a pressure between 0.9 and 1.0 times the test pressure of the tank to which they are fitted. They shall be of such a type as to resist dynamic stresses, including liquid surge. The use of dead weight or counterweight valves is prohibited. The required capacity of the safety valves shall be calculated in accordance with the formula contained in 6.7.3.8.1.1 and the safety valve shall conform at least to the requirements of 6.7.3.9.

Safety valves shall be designed to prevent or be protected from the entry of water or other foreign matter which may impair their correct functioning. Any protection shall not impair their performance.

6.8.3.2.9.2 If tanks required to be hermetically closed are equipped with safety valves, these shall be preceded by a bursting disc and the following conditions shall be met:

- a) The minimum burst pressure at 20 °C, tolerances included, shall be greater than or equal to 1.0 times the test pressure;
- b) The maximum burst pressure at 20 °C, tolerances included, shall be equal to 1.1 times the test pressure; and
- c) The bursting disc shall not reduce the required discharge capacity or correct operation of the safety valve.

A pressure gauge or another suitable indicator shall be provided in the space between the bursting disc and the safety valve, to enable detection of any rupture, perforation or leakage of the disc.

6.8.3.2.9.3 Safety valves shall be directly connected to the shell or directly connected to the outlet of the bursting disc.

6.8.3.2.9.4 Each safety valve inlet shall be situated on top of the shell as close as practicable to the top generating line. All safety valve inlets shall, under maximum filling conditions, be situated in the vapour space of the shell and the devices shall be so arranged as to ensure that the escaping vapour is discharged unrestrictedly. For flammable liquefied gases, the escaping vapour shall be directed away from the shell in such a manner that it cannot impinge upon the shell. Protective devices which deflect the flow of vapour are permissible provided the required safety valve capacity is not reduced.

6.8.3.2.9.5 Arrangements shall be made to protect the safety valves from damage caused by the tank overturning or striking overhead obstacles. Where possible, safety valves shall not project outside of the profile of the shell.

6.8.3.2.9.6 **Safety valve mark**

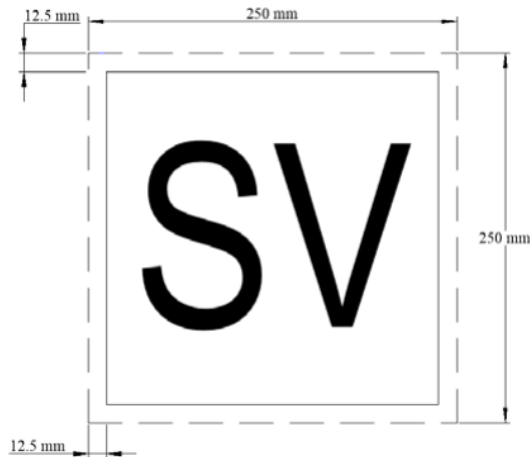
6.8.3.2.9.6.1 Tanks fitted with safety valves in accordance with 6.8.3.2.9.1 to 6.8.3.2.9.5 shall display the

mark as set out in 6.8.3.2.9.6.3 to 6.8.3.2.9.6.6.

- 6.8.3.2.9.6.2** Tanks not fitted with safety valves in accordance with 6.8.3.2.9.1 to 6.8.3.2.9.5 shall not display the mark

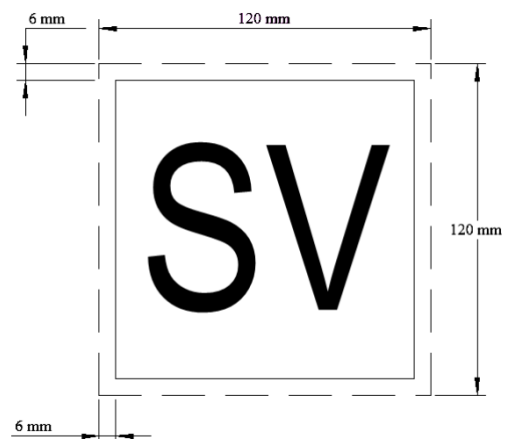
as set out in 6.8.3.2.9.6.3 to 6.8.3.2.9.6.6.

- 6.8.3.2.9.6.3** The mark shall consist of a white square with minimum dimensions of 250 mm × 250 mm. The line inside the edge shall be black, parallel and approximately 12.5 mm from the outside of that line to the outside edge of the mark. The letters "SV" shall be black, a minimum of 120 mm high and have a minimum stroke thickness of 12 mm.



- 6.8.3.2.9.6.4** (reserved)

For tank-containers with a capacity of not more than 3 000 litres the mark may be reduced in size to not less than 120 mm × 120 mm. The line inside the edge shall be black, parallel and approximately 6 mm from the outside of that line to the outside edge of the mark. The letters "SV" shall be black, a minimum of 60 mm high and have a minimum stroke thickness of 6 mm.



- 6.8.3.2.9.6.5** The material used shall be weather-resistant and it shall be ensured that the mark is durable. The mark shall not become detached from its mount in the event of 15 minutes' engulfment in fire. It shall remain affixed irrespective of the orientation of the tank.
- 6.8.3.2.9.6.6** The letters "SV" shall be indelible and shall remain legible after 15 minutes' engulfment in fire.
- 6.8.3.2.9.6.7** The marks shall be displayed on both sides of tank-wagons. The marks shall be displayed on both sides and both ends of tank-containers. For tank-containers with a capacity of not more

than 3 000 litres the marks may be displayed either on both sides or on both ends.

6.8.3.2.10 Where tanks are intended for carriage by sea, the requirements of 6.8.3.2.9 shall not prohibit the fitting of safety valves conforming to the IMDG Code.

6.8.3.2.11 Tanks intended for the carriage of refrigerated liquefied gases shall be equipped with two or more independent safety valves capable of opening at the maximum working pressure indicated on the tank. Two of these safety valves shall be sized (working individually independently of each other) to allow the gases formed by evaporation during normal operation to escape from the tank in such a way that the pressure does not at any time exceed by more than 10% the working pressure indicated on the tank.

One of the safety valves may be replaced by a bursting disc which shall be such as to burst at the test pressure.

In the event of loss of the vacuum in a double-walled tank, or of destruction of 20% of the insulation of a single-walled tank, the combination of the safety valve and bursting shall permit an outflow such that the pressure in the shell cannot exceed the test pressure. The provisions of 6.8.2.1.7 shall not apply to vacuum-insulated tanks.

6.8.3.2.12 These pressure relief devices of tanks intended for the carriage of refrigerated liquefied gases shall be so designed as to function faultlessly even at their lowest working temperature. The reliability of their operation at that temperature shall be established and checked either by testing each device or by testing a specimen device of each design-type.

6.8.3.2.13	For demountable tanks ¹⁸ the following requirements shall apply:	(Reserved)
	(a) if they can be rolled, the valves shall be provided with protective caps	
	(b) they shall be so fixed on the underframe of the wagon that they cannot move.	

Thermal insulation

6.8.3.2.14 If tanks intended for the carriage of liquefied gases are equipped with thermal insulation, such insulation shall consist of either:

– a sun shield covering not less than the upper third but not more than the upper half of the tank surface and separated from the shell by an air space at least 4 cm across; or

– a complete cladding, of adequate thickness, of insulating materials.

6.8.3.2.15 Tanks intended for the carriage of refrigerated liquefied gases shall be thermally insulated. Thermal insulation shall be ensured by means of a continuous sheathing. If the space between the shell and the sheathing is under vacuum (vacuum insulation), the protective sheathing shall be so designed as to withstand without deformation an external pressure of at least 100 kPa (1 bar) (gauge pressure). By derogation from the definition of "calculation pressure" in 1.2.1, external and internal reinforcing devices may be taken into account in the calculations. If the sheathing is so closed as to be gas-tight, a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of in-adequate gas-tightness of the shell or of its items of equipment. The device shall prevent the infiltration of moisture into the heat-insulating sheath. For type testing of the effectiveness of the insulation system, see 6.8.3.4.11.

6.8.3.2.16 Tanks intended for the carriage of liquefied gases having a boiling point below –182 °C at atmospheric pressure shall not include any combustible material either in the thermal insulation or in the means of attachment.

The means of attachment for vacuum insulated tanks may, with the approval of the

competent authority, contain plastics substances between the shell and the sheathing

- 6.8.3.2.17** By derogation from the requirements of 6.8.2.2.4 shells intended for the carriage of refrigerated liquefied gases need not have an inspection openings.

Items of equipment for battery-wagons and MEGCs

- 6.8.3.2.18** Service and structural equipment shall be configured and designed to prevent damage that could result in the release of the pressure receptacle contents during normal conditions of handling and carriage. When the connection between the frame of the battery-wagon or MEGC and the elements allows relative movement between the sub-assemblies, the equipment shall be so fastened as to permit such movement without damage to working parts. Manifold piping leading to shut-off valves shall be sufficiently flexible to protect the valves and the piping from shearing, or releasing the pressure receptacle contents. The filling and discharge devices (including flanges or threaded plugs) and any protective caps shall be capable of being secured against unintended opening.
- 6.8.3.2.19** In order to avoid any loss of content in the event of damage, the manifolds, the discharge fittings (pipe sockets, shut-off devices), and the stop-valves shall be protected or arranged from being wrenched off by external forces or designed to withstand them.
- 6.8.3.2.20** The manifold shall be designed for service in a temperature range of $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$.
- The manifold shall be designed, constructed and installed so as to avoid the risk of damage due to thermal expansion and contraction, mechanical shock and vibration. All piping shall be of suitable metallic material. Welded pipe joints shall be used wherever possible.
- Joints in copper tubing shall be brazed or have an equally strong metal union. The melting point of brazing materials shall be no lower than $525\text{ }^{\circ}\text{C}$. The joints shall not decrease the strength of tubing as may happen when cutting threads.
- 6.8.3.2.21** Except for UN No. 1001 acetylene, dissolved, the permissible maximum stress σ of the manifolding arrangement at the test pressure of the receptacles shall not exceed 75% of the guaranteed yield strength of the material.
- The necessary wall thickness of the manifolding arrangement for the carriage of UN No. 1001 acetylene, dissolved shall be calculated according to an approved code of practice.
- Note:** For the yield strength, see 6.8.2.1.11.
- 6.8.3.2.22** By derogation from the requirements of 6.8.3.2.3, 6.8.3.2.4 and 6.8.3.2.7, for cylinders, tubes, pressure drums and bundles of cylinders (frames) forming a battery-wagon or MEGC, the required closing devices may be provided for within the manifolding arrangement.
- 6.8.3.2.23** If one of the elements is equipped with a safety valve and shut-off devices are provided between the elements, every element shall be so equipped
- 6.8.3.2.24** The filling and discharge devices may be affixed to a manifold.
- 6.8.3.2.25** Each element, including each individual cylinder of a bundle, intended for the carriage of toxic gases, shall be capable of being isolated by a shut-off valve.
- 6.8.3.2.26** Battery-wagons or MEGCs intended for the carriage of toxic gases shall not have safety valves, unless the safety valves are preceded by a bursting disc. In the latter case, the arrangement of the bursting disc and safety valve shall be satisfactory to requirements of the competent authority.
- 6.8.3.2.27** When battery-wagons or MEGCs are intended for carriage by sea, the requirements of 6.8.3.2.26 shall not prohibit the fitting of safety valves conforming to the IMDG Code.
- 6.8.3.2.28** Receptacles which are elements of a battery-wagon or MEGC intended for the carriage of flammable gases shall be combined in groups of not more than 5 000 litres which are capable of being isolated by a shut-off valve.

Each element of a battery-wagon or MEGC intended for the carriage of flammable gases, when consisting of tanks conforming to this Chapter, shall be capable of being isolated by a shut-off valve.

6.8.3.3 Type examination and type approval

No special requirements..

6.8.3.4 Inspections and tests

- 6.8.3.4.1** The materials of every welded shell with the exception of cylinders, tubes, pressure drums and cylinders as part of bundles of cylinders which are elements of a battery-wagon or of a MEGC shall be tested according to the method described in 6.8.5.
- 6.8.3.4.2** The basic requirements for the test pressure are given in 4.3.3.2.1 to 4.3.3.2.4 and the minimum test pressures are given in the table of gases and gas mixtures in 4.3.3.2.5.
- 6.8.3.4.3** The first hydraulic pressure test shall be carried out before thermal insulation is placed in position. When the shell, its fittings, piping and items of equipment have been tested separately, the tank shall be subjected to a leakproofness test after assembly.
- 6.8.3.4.4** The capacity of each shell intended for the carriage of compressed gases filled by mass, liquefied gases or dissolved gases shall be determined, under the supervision of the inspection body, by weighing or volumetric measurement of the quantity of water which fills the shell. The measurement of shell capacity shall be accurate to within 1%. Determination by a calculation based on the dimensions of the shell is not permitted. The maximum filling masses (kg/l) allowed in accordance with packing instruction P 200 or P 203 in 4.1.4.1 as well as 4.3.3.2.2 and 4.3.3.2.3 shall be prescribed by the inspection body.
- 6.8.3.4.5** Checking of the welds shall be carried out in accordance with the $\lambda = 1$ requirements of 6.8.2.1.23.
- 6.8.3.4.6** In the case of tanks intended for the carriage of refrigerated liquefied gases
- a) By derogation from the requirements of 6.8.2.4.2 the periodic inspections shall take place at least after eight years of service after an initial inspection and thereafter at least every 12 year,
 - b) By derogation from the requirements of 6.8.2.4.3 the intermediate inspections shall take place at least six years after each periodic inspection.
- 6.8.3.4.7** In the case of vacuum-insulated tanks, the hydraulic-pressure test and the check of the internal condition may, with the consent of the inspection body, be replaced by a leakproofness test and measurement of the vacuum.
- 6.8.3.4.8** If, at the time of periodic inspections, openings have been made in shells intended for the carriage of refrigerated liquefied gases, the method by which they are hermetically closed before the shells are returned to service shall be approved by the inspection body and shall ensure the integrity of the shell.
- 6.8.3.4.9** Leakproofness tests of tanks intended for the carriage of gases shall be performed at a pressure of not less than:

- For compressed gases, liquefied gases and dissolved gases: 20% of the test pressure;
- For refrigerated liquefied gases: 90% of the maximum working pressure.

Holding times for tanks carrying refrigerated liquefied gases

6.8.3.4.10

The reference holding time for tanks carrying refrigerated liquefied gases shall be determined on the basis of the following:

- (a) The effectiveness of the insulation system, determined in accordance with 6.8.3.4.11;
- (b) The lowest set pressure of the pressure limiting device(s);
- (c) The initial filling conditions;
- (d) An assumed ambient temperature of 30 °C;

(e) The physical properties of the individual refrigerated liquefied gas intended to be carried.

6.8.3.4.11

The effectiveness of the insulation system (heat influx in Watts) shall be determined by type testing the tanks. This test shall consist of either:

(a) A constant pressure test (for example at atmospheric pressure) during which the loss of refrigerated liquefied gas is measured over a period of time; or

(b) A closed system test during which the rise in pressure in the shell is measured over a period of time.

When performing the constant pressure test, variations in atmospheric pressure shall be taken into account. When performing either test corrections shall be made for any variation of the ambient temperature from the assumed ambient temperature reference value of 30 °C.

Note: ISO 21014:2006 "Cryogenic vessels – Cryogenic insulation performance" details methods of determining the insulation performance of cryogenic vessels and provides a method of calculating the holding time.

Inspections and tests for battery-wagons and MEGCs

6.8.3.4.12

The elements and items of equipment of each battery-wagon or MEGC shall be inspected and tested either together or separately before being put into service for the first time (initial inspection and test). Thereafter battery-wagons or MEGCs cylinders, tubes, pressure drums and cylinders as part of bundles of cylinders shall be inspected at not more than five-year intervals. Battery-wagons and MEGCs the elements of which are tanks shall be inspected according to 6.8.3.4.2 and 6.8.3.4.3. An exceptional inspection and test shall be performed regardless of the last periodic inspection and test when necessary according to 6.8.3.4.16.

6.8.3.4.13

The initial inspection shall include:

- a check of conformity to the approved type;
- a check of the design characteristics;
- an examination of the internal and external conditions;
- a hydraulic pressure test¹⁸ at the test pressure indicated on the plate prescribed in 6.8.3.5.10;
- a leakproofness test at the maximum working pressure; and
- a check of satisfactory operation of the equipment.

When the elements and their fittings have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test

6.8.3.4.14

Cylinders, tubes and pressure drums and cylinders as part of bundles of cylinders shall be tested according to packing instruction P 200 or P 203 in 4.1.4.1.

The test pressure of the manifold of the battery-wagon or MEGC shall be the same as that of the elements of the battery-wagon or MEGC. The pressure test of the manifold may be performed as a hydraulic test or by using another liquid or gas with the agreement of the competent authority or its competent authority. By derogation from this requirement, the test pressure for the manifold of battery-wagon or MEGC shall not be less than 300 bar for UN No. 1001 acetylene, dissolved.

6.8.3.4.15

The periodic inspection shall include a leakproofness test at the maximum working pressure and an external examination of the structure, the elements and the service equipment without disassembling. The elements and the piping shall be tested at the periodicity defined

¹⁸ In special cases, if agreed by the competent authority, the hydraulic pressure test may be replaced by a pressure test using gas, or if agreed by the inspection body, by using another liquid, where such an operation does not present any danger.

in packing instruction P 200 of 4.1.4.1 and in accordance with the requirements of 6.2.1.6 and 6.2.3.5 respectively. When the elements and equipment have been pressure-tested separately, they shall be subjected together after assembly to a leakproofness test.

6.8.3.4.16 An exceptional inspection and test is necessary when the battery-wagon or MEGC shows evidence of damaged or corroded areas, or leakage, or any other conditions, that indicate a deficiency that could affect the integrity of the battery-wagon or MEGC. The extent of the exceptional inspection and test and, if deemed necessary, the disassembling of elements shall depend on the amount of damage or deterioration of the battery-wagon or MEGC. It shall include at least the examinations required under 6.8.3.4.17.

6.8.3.4.17 The examinations shall ensure that:

- (a) the elements are inspected externally for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the battery-wagons or MEGCs unsafe for transport;
- (b) the piping, valves, and gaskets are inspected for corroded areas, defects, and other conditions, including leakage, that might render battery-wagons or MEGCs unsafe for filling, discharge or transport;
- (c) missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;
- (d) all emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves shall be operated to demonstrate proper operation;
- (e) required markings on the battery-wagons or MEGCs are legible and in accordance with the applicable requirements; and
- (f) any framework, supports and arrangements for lifting the battery-wagons or MEGCs are in satisfactory condition.

6.8.3.4.18 The tests, inspections and checks in accordance with 6.8.3.4.12 to 6.8.3.4.17 shall be carried out by the inspection body. Certificates shall be issued showing the results of these operations, even in the case of negative results. These certificates shall refer to the list of the substances permitted for carriage in this battery-wagon or MEGC in accordance with 6.8.2.3.2.

A copy of these certificates shall be attached to the tank record of each tank, battery-wagon or MEGC tested (see 4.3.2.1.7).

6.8.3.5 Marking

6.8.3.5.1 The following additional particulars shall be marked by stamping or by any other similar method on the plate prescribed in 6.8.2.5.1, or directly on the walls of the shell itself if the walls are so reinforced that the strength of the tank is not impaired.

6.8.3.5.2 On tanks intended for the carriage of only one substance:
– the proper shipping name of the gas and, in addition for gases classified under an n.o.s. entry, the technical name¹⁹

¹⁹ *Instead of the proper shipping name or, if applicable, of the proper shipping name of the n.o.s. entry followed by the technical name, the use of the following names is permitted:*

– for UN No. 1078 refrigerant gas, n.o.s: mixture F1, mixture F2, mixture F3;
– for UN No. 1060 methylacetylene and propadiene mixtures, stabilized: mixture P1, mixture P2;
– for UN No. 1965 hydrocarbon gas mixture, liquefied, n.o.s: mixture A, mixture A01, mixture A02, mixture A0, mixture A1, mixture B1, mixture B2, mixture B, mixture C. The names customary in the trade and mentioned in 2.2.2.3, Classification code 2F, UN No. 1965, Note 1 may be used only as a complement;
– for UN No. 1010 Butadienes, stabilized: 1,2-Butadiene, stabilized, 1,3-Butadiene, stabilized;
– for UN No. 1012 Butylene: 1-butylene, cis-2-butylene, trans-2-butylene, butylenes mixture.

This indication shall be supplemented:

- in the case of tanks intended for the carriage of compressed gases filled by volume (pressure), by an indication of the maximum filling pressure at 15 °C permitted for the tank; and
- in the case of tanks intended for the carriage of compressed gases filled by mass, and of liquefied gases, refrigerated liquefied gases or dissolved gases by an indication of the maximum permissible load mass in kg and of the filling temperature if below –20 °C.

6.8.3.5.3 On tanks intended for the carriage of many substances:

- the proper shipping names of the gases and, in addition for gases classified under an n.o.s. entry, the technical name of the gases²⁰ for whose carriage the tank is approved.

These particulars shall be supplemented by an indication of the maximum permissible load mass in kg for each gas.

6.8.3.5.4 On tanks intended for the carriage of refrigerated liquefied gases:

- the maximum working pressure²⁰.
- reference holding time (in days or hours) for each gas²¹;
- the associated initial pressures (in bar gauge or kPa gauge) ²¹.

6.8.3.5.5 On tanks equipped with thermal insulation:

- the inscription "thermally insulated" or "thermally insulated by vacuum".

6.8.3.5.6 In addition to the particulars prescribed in 6.8.2.5.2, the following shall be inscribed:
on both sides of the tank-wagon (on the tank | on the tank-container (on the tank itself or on plates):
itself or on plates):

- a) – the tank code according to the certificate (see 6.8.2.3.2) with the actual test pressure of the tank;
- the inscription: "minimum filling temperature allowed :...";
- b) where the tank is intended for the carriage of one substance only:
 - the proper shipping name of the gas and, in addition for gases classified under an n.o.s. entry, the technical name²⁰;

– for compressed gases which are filled by mass, and for liquefied gases, refrigerated liquefied gases or dissolved gases, the maximum permissible load mass in kg;

- c) where the tank is intended for the carriage of many substances:

- the proper shipping name of the gas and, for gases classified under an n.o.s. entry, the technical name²⁰ of all gases to whose carriage the tank is assigned

with an indication of the maximum permissible load mass in kg for each of them;

- d) where the shell is equipped with thermal insulation:

- the inscription "thermally insulated" (or "thermally insulated by vacuum"), in an official language of the country of registration and also, if that language is not Russian, - in Russian unless any agreements concluded between the countries concerned in the transport operation provide otherwise.

6.8.3.5.7 The load limits in accordance with 6.8.2.5.2 | (reserved)

²⁰ Add the units of measurements after the numerical values.

- for compressed gases filled by mass,
- for liquefied or refrigerated, liquefied gases and
- for dissolved gases,

shall be determined in the light of the maximum permissible load mass of the shell, depending on the substance carried; in the case of multi-purpose tanks and if folding panels are used, the name in full of the particular gas being carried shall be stated together with the load limit on the same

folding panel. If such panels are used they shall be designed and be capable of being secured so that they cannot unfold or become loose from the frame during carriage (especially as a result of impacts or unintentional actions).

6.8.3.5.8 The panels on wagons carrying demountable tanks as referred to in 6.8.3.2.13 need not bear the particulars prescribed in 6.8.2.5.2 and 6.8.3.5.6. (reserved)

6.8.3.5.9 (reserved)

Marking of battery-wagons and MEGCs

6.8.3.5.10 Every battery-wagon and every MEGC shall be fitted with a corrosion-resistant metal plate permanently attached in a place readily accessible for inspection. The following particulars at least shall be marked on the plate by stamping or by any other similar method:

- approval number;
- manufacturer's name or mark;
- manufacturer's serial number;
- year of manufacture;
- test pressure (gauge pressure)²¹;
- design temperature (only if above +50 °C or below –20 °C)²¹;
- date (month and year) of initial inspection and most recent periodic inspection in accordance with 6.8.3.4.12 to 6.8.3.4.15;
- stamp of the inspection body who carried out the inspection.

6.8.3.5.11	The following particulars shall be inscribed on both sides of the battery-wagon or on plates:	The following particulars shall be inscribed on MEGC or on plates:
	– vehicle keeper marking or name of operator²¹; – number of elements;	– vehicle keeper marking or name of operator; – number of elements; – total capacity of the elements²¹;

²¹ Vehicle keeper marking in accordance with national legislation.

- total capacity of the elements²¹;
 - load limits according to the characteristics of the wagon and the nature of the lines used;
 - tank code according to the certificate (see 6.8.2.3.2) with the relevant test pressure for the battery-wagon;
 - proper shipping name and, in addition, for gases covered by an n.o.s. entry, the technical name²⁰ of the gas the transport of which the battery-wagon is used;
 - the date (month, year) of the next test in accordance with 6.8.2.4.3 and 6.8.3.4.15.
- maximum permissible laden mass²¹
 - tank code according to the certificate (see 6.8.2.3.2) with the relevant test pressure for MEGC
 - proper shipping name and, in addition, for gases covered by an n.o.s. entry, the technical name²⁰ of the gas the transport of which the MEGC is used; and of the MEGC filled by mass
 - tare²¹

6.8.3.5.12 The frame of a battery-wagon or MEGC shall bear near the filling point a plate specifying:

- the maximum filling pressure²¹ at 15 °C allowed for elements intended for compressed gases;
- the proper shipping name of the gas in accordance with Chapter 3.2 and, in addition for gases classified under an n.o.s. entry, the technical name²⁰; and, in addition, in the case of liquefied gases:
- the permissible maximum load per element²¹.

6.8.3.5.13 Cylinders, tubes and pressure drums, and cylinders as part of bundles of cylinders, shall be marked according to 6.2.2.7. These receptacles need not be labelled individually with the danger labels as required in Chapter 5.2.

Battery-wagons and MEGCs shall be placarded and marked according to Chapter 5.3.

6.8.3.6 Requirements for battery-wagons and MEGCs which are designed, constructed, inspected and tested according to referenced documents

Note: *Persons or bodies identified in documents as having responsibilities in accordance therewith shall primarily meet the requirements of Annex 2 to SMGS*

Since 1 January 2009 the use of the referenced standards has been mandatory. Exceptions are dealt with in 6.8.3.7.

Type approval certificates shall be issued in accordance with 1.8.7 and 6.8.2.3. For the issuance of a type approval certificate, one standard applicable according to the indication in column (4) shall be chosen from the table below. If more than one standard may be applied, only one of them shall be chosen.

Column (3) shows the paragraphs of Chapter 6.8 to which the standard conforms.

Column (5) gives the latest date when existing type approvals shall be withdrawn according to 1.8.7.2.2.2; if no date is shown the type approval remains valid until it expires.

Standards shall be applied in accordance with 1.1.5. They shall be applied in full unless otherwise specified in the table below..

The scope of application of each document is defined in the scope clause of this document unless otherwise specified in the Table below.

Technical Regulatory Document Reference Number	Title of document	Requirements the standard complies with	Applicable to new type approvals or to renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)

List Document 43		6.8.3.1.4, 6.8.3.1.5, 6.8.3.2.18 - 6.8.3.2.26, 6.8.3.4.12 - 6.8.3.4.14 6.8.3.5.10 - 6.8.3.5.13	Between 1 January 2005 and 31 December 2020	
List Document 44		6.8.3.1.4, 6.8.3.1.5, 6.8.3.2.18 - 6.8.3.2.28, 6.8.3.4.12- 6.8.3.4.14 6.8.3.5.10 - 6.8.3.5.13	Until further notice	
EN ISO 23826:2021	Gas cylinders – Ball valves – Specification and testing	6.8.2.1.1 AND 6.8.2.2.1	Mandatorily from 1 January 2025	

6.8.3.7 Requirements for battery-wagons and MEGCs which are not designed, constructed, inspected and tested not according to referenced documents

To reflect scientific and technical progress or where no document is referenced in 6.8.3.6 or to deal with specific aspects not addressed in a document referenced in 6.8.3.6, the competent authority may recognize the use of a technical code providing the same level of safety. Battery-wagons and MEGCs shall, however, comply with the minimum requirements of 6.8.3.

As soon as a document newly referenced in 6.8.3.6 can be applied, the competent authority shall withdraw its recognition of the relevant technical code. A transitional period ending no later than the date of entry into force of the next edition of Annex 2 to SMGS may be applied.

The procedure for periodic inspections shall be specified in the type approval if the standards referenced in 6.2.2, 6.2.4 or 6.8.2.6 are not applicable or shall not be applied.

The competent authority shall transmit to the OSJD Committee a list of the technical codes that it recognizes and shall update the list if it changes. The list should include the following details: name and date of the code, purpose of the code and details of where it may be obtained. The OSJD Committee shall make this information publicly available on its website.

A document which has been adopted for reference in a future edition of Annex 2 to SMGS may be approved by the competent authority for use without notifying the OSJD Committee.

6.8.4 Special provisions

Note 1: For liquids having a flash-point of not more than 60 °C and for flammable gases, see also 6.8.2.1.26, 6.8.2.1.27 and 6.8.2.2.9.

Note 2: For requirements for tanks subjected to a pressure test of not less than 1 MPa (10 bar) or for tanks intended for the carriage of refrigerated liquefied gases,

When they are shown under an entry in Column (13) of Table A of Chapter 3.2, the following special provisions apply:

(a) Construction (TC)

TC 1 The requirements of 6.8.5 are applicable to the materials and construction of these shells.

TC 2 Shells, and their items of equipment, shall be made of aluminium not less than 99.5% pure or of suitable steel not liable to cause hydrogen peroxide to decompose. Where shells are made of aluminium not less than 99.5% pure, the wall thickness need not exceed 15 mm, even where calculation in accordance with 6.8.2.1.17 gives a higher value. In any case, the wall thickness less than 15 mm may be allowed only in the case, when this lower value of the wall

thickness has been calculated in accordance with 6.8.2.1.17.

- TC 3** The shells shall be made of austenitic steel.
- TC 4** Shells shall be provided with an enamel or equivalent protective lining if the material of the shell is attacked by UN No. 3250 chloroacetic acid.
- TC 5** Shells shall be provided with a lead lining not less than 5 mm thick or an equivalent lining.
- TC 6** Where the use of aluminium is necessary for tanks, such tanks shall be made of aluminium not less than 99.5% pure; the wall thickness need not exceed 15 mm even where calculation in accordance with 6.8.2.1.17 gives a higher value. In any case, the wall thickness less than 15 mm may be allowed only in the case, when this lower value of the wall thickness has been calculated in accordance with 6.8.2.1.17.
- TC 7** (Reserved)

(b) Items of equipment (TE)

- TE 1** (Deleted)
- TE 2** (Deleted)
- TE 3** Tanks shall in addition meet the following requirements:
- the heating device shall not penetrate into, but shall be exterior to the shell. However, a pipe used for extracting the phosphorus may be equipped with a heating jacket. The device heating the jacket shall be so regulated as to prevent the temperature of the phosphorus from exceeding the filling temperature of the shell. Other piping shall enter the shell in its upper part; openings shall be situated above the highest permissible level of the phosphorus and be capable of being completely enclosed under lockable caps.
- The tank shall be equipped with a gauging system for verifying the level of the phosphorus and, if water is used as a protective agent, with a fixed gauge mark showing the highest permissible level of the water.
- TE 4** Shells shall be equipped with thermal insulation made of materials which are not readily flammable.
- TE 5** If shells are equipped with thermal insulation, such insulation shall be made of materials which are not readily flammable.
- TE 6** Tanks may be equipped with a device of a design which precludes its obstruction by the substance carried and which prevents leakage and the build-up of excess overpressure or underpressure inside the shell
- TE 7** The shell-discharge system shall be equipped with two mutually independent shut-off devices mounted in series, the first taking the form of a quick-closing internal stop-valve of an approved type and the second that of an external stop-valve, one at each end of the discharge pipe. A blank flange, or another device providing the same measure of security, shall also be fitted at the outlet of each external stop-valve. The internal stop-valve shall be such that if the pipe is wrenched off the stop-valve will remain integral with the shell and in the closed position.
- TE 8** The connections to the external pipe-sockets of tanks shall be made of materials not liable to cause decomposition of hydrogen peroxide.
- TE 9** Tanks shall be fitted in their upper part with a shut-off device preventing any build-up of excess pressure inside the shell due to the decomposition of the substances carried, any leakage of liquid, and any entry of foreign matter into the shell.
- TE 10** The shut-off devices of tanks shall be so designed as to preclude obstruction of the devices by solidified substance during carriage.
- Where tanks are sheathed in thermally-insulating material, the material shall be of an inorganic nature and entirely free from combustible matter.
- TE 11** Shells and their service equipment shall be so designed as to prevent the entry of foreign matter, leakage of liquid or any building up of dangerous excess pressure inside the shell due to the decomposition of the substances carried. A safety valve preventing the entry of foreign

matter also fulfils this provision.

TE 12

Tanks shall be equipped with thermal insulation complying with the requirements of 6.8.3.2.14. The sun shield and any part of the tank not covered by it, or the outer sheathing of a complete lagging, shall be painted white or finished in bright metal. The paint shall be cleaned before each transport journey and renewed in case of yellowing or deterioration. The thermal insulation shall be free from combustible matter.

Tanks shall be fitted with temperature sensing devices.

Tanks shall be fitted with safety valves and emergency pressure-relief devices. Vacuum-relief devices may also be used. Emergency pressure-relief devices shall operate at pressures determined according to both the properties of the organic peroxide and the construction characteristics of the tank. Fusible elements shall not be permitted in the body of the shell.

Tanks shall be fitted with spring-loaded safety valves to prevent significant pressure build-up within the shell of the decomposition products and vapours released at a temperature of 50 °C. The capacity and start-to-discharge pressure of the safety-valve(s) shall be based on the results of the tests specified in special provision TA2. The start-to-discharge pressure shall however in no case be such that liquid could escape from the valve(s) if the tank were overturned.

The emergency-relief devices may be of the spring-loaded or frangible types designed to vent all the decomposition products and vapours evolved during a period of not less than one hour of complete fire engulfment as calculated by the following formula:

$$q = 70961 \times F \times A^{0.82};$$

where:

q = heat absorption [W]

A = wetted area [m²]

F = insulation factor [-]

F = 1 for non-insulated tanks, or

$$F = \frac{U(923 - T_{PO})}{47032} \quad \text{for insulated tanks}$$

where:

U = K/L = heat transfer coefficient of the insulation [W·m⁻²·K⁻¹]

K = heat conductivity of insulation layer [W·m⁻¹·K⁻¹]

L = thickness of insulation layer [m]

T_{PO} = temperature of peroxide at relieving conditions [K].

The start-to-discharge pressure of the emergency-relief device(s) shall be higher than that above specified and based on the results of the tests referred to in special provision TA 2. The emergency-relief devices shall be dimensioned in such a way that the maximum pressure in the tank never exceeds the test pressure of the tank.

Note: An example of a method to determine the size of emergency-relief devices is given in Appendix 5 of the Manual of Tests and Criteria.

For tanks equipped with thermal insulation consisting of a complete cladding, the capacity and setting of the emergency-relief device(s) shall be determined assuming a loss of insulation from 1% of the surface area.

Vacuum-relief devices and spring-loaded safety valves of tanks shall be provided with flame arresters unless the substances to be carried and their decomposition products are

non-combustible. Due attention shall be paid to the reduction of the relief capacity caused by the flame arrester

TE 13	Tanks shall be thermally insulated and fitted with a heating device on the outside.	
TE 14	Tanks shall be equipped with thermal insulation. The thermal insulation directly in contact with the shell shall have an ignition temperature at least 50 °C higher than the maximum temperature for which the tank was designed.	
TE 15	(Reserved)	
TE 16	(Reserved)	
TE 17	For demountable tanks ²² , the following requirements apply: (a) they shall be so fixed on the underframe of the wagon that they cannot move; (b) they shall not be interconnected by a manifold; (c) if they can be rolled, the valves shall be provided with protective caps.	(Reserved)
TE 18	(Reserved)	
TE 19	(Reserved)	
TE 20	Notwithstanding the other tank-codes which are permitted in the hierarchy of tanks of the rationalized approach in 4.3.4.1.2, tanks shall be equipped with a safety valve.	
TE 21	The closures shall be protected with lockable caps.	
TE 22	In order to reduce the extent of damage in the event of a collision shock or accident, each end of tank-wagons for substances carried in the liquid state and gases or battery-wagons shall be capable of absorbing at least 800 kJ of energy by means of elastic or plastic deformation of defined components of the subframe or by means of a similar procedure (e.g. crash elements). The energy absorption shall be determined in relation to a collision on a straight track. Energy absorption by means of plastic deformation shall only occur in conditions other than those encountered during normal conditions of rail transport (impact speed higher than 12 km/h or individual buffer force greater than 1500 kN). Energy absorption of not more than 800 kJ at each end of the wagon shall not lead to transfer of energy to the shell which could cause visible, permanent deformation of the shell. The requirements of this special provision are deemed to be met if crashworthy buffers that conform to the document No 45 and No 46 of <i>the List</i> are used.	(Reserved)

²² For the definition of "demountable tank", see 1.2.1.

The requirements of this special provision are deemed to be met by tank-wagons with an automatic coupling device equipped with energy absorption elements capable of absorbing at least 140 kJ at each end of the wagon.

TE 23

Tanks shall be equipped with a device of a design which precludes its obstruction by the substance carried and which prevents leakage and the build-up of excess overpressure or underpressure inside the shell.

TE 24

(Reserved)

TE 25

Shells of tank-wagons shall also be protected against the overriding of buffers and derailment or, failing that, to limit damage when buffers override by at least one of the following measures.

(Reserved)

Measures to avoid overriding

a) Device to protect against the overriding of buffers

The device to protect against the overriding of buffers shall ensure that the sub-frames of the wagons remain on the same horizontal level. The following requirements shall be fulfilled

- The device to protect against the overriding of buffers shall not interfere with the normal operation of the wagons (for example negotiating curves, Berne rectangle, shunter's handle). The device to protect against the overriding of buffers shall permit the free taking of curves by another wagon fitted with a device to protect against the overriding of buffers in a curve of 75 m radius).

- The device to protect against the overriding of buffers shall not interfere with the normal functioning of the buffers (elastic or plastic deformation) (see also special provision TE22 in 6.8.4 (b)).

- The device to protect against the overriding of buffers shall function independently of the condition of the load and the wear and tear of the wagons concerned.

- The device to protect against the overriding of buffers shall withstand a vertical force (upwards or downwards) of 150 kN

- The device to protect against the overriding of buffers shall be effective irrespective of whether the other wagon concerned is fitted with a device to protect against the overriding of buffers. It shall not be possible for devices to protect against the overriding of buffers to obstruct each other.

- The increase in the overhang for fixing the

device to protect against the overriding of buffers shall be less than 20 mm.

- The width of the device to protect against the overriding of buffers shall be at least as big as the width of the buffer head (with the exception of the device to protect against the overriding of buffers located above the left-hand footboard, which shall be tangent to the free space for the shunter, although the maximum width of the buffer must be covered).

- A device to protect against the overriding of buffers shall be located above every buffer.

- The device to protect against the overriding of buffers shall permit the attachment of buffers prescribed in documents No 47 and 48 of *the List* and other documents, and shall not present an obstacle to maintenance work.

- The device to protect against the overriding of buffers shall be built in such a way that the risk of penetration of the tank end is not increased in the event of a shock.

Measures to limit damage when buffers override

(b) Increasing the wall thickness of the tank ends or using other materials with a greater energy absorption capacity

The wall thickness of the tank ends shall be at least 12 mm.

However, the wall thickness of the ends of tanks for the carriage of gases UN 1017 chlorine, UN 1749 chlorine trifluoride, UN 2189 di-chlorosilane, UN 2901 bromine chloride and UN 3057 trifluoroacetyl chloride shall in this case be at least 18 mm.

(c) Sandwich cover for tank ends

If protection is provided by a sandwich cover, it shall cover the entire area of the tank ends and shall have a specific energy absorption capacity of at least 22 kJ (corresponding to a wall thickness of 6 mm), which shall be measured in accordance with the method described in Annex B to document Nos 38, 39 and 40 of *the List* "Tanks for the transport of dangerous goods – Metallic tanks with a working

pressure not exceeding 0.5 bar – Design and construction". If the risk of corrosion cannot be eliminated by structural measures, it shall be made possible to undertake an inspection of the external wall of the tank end, e.g. by providing a removable cover.

(d) Protective shield at each end of the wagon

If a protective shield is used at each end of the wagon, the following requirements shall apply:

- the protective shield shall cover the width of the tank in each case, up to the respective height. In addition, the width of the protective shield shall, over the entire height of the shield, be at least as wide as the distance defined by the outside edge of the buffer heads;

- the height of the protective shield, measured from the top edge of the headstock, shall cover

- either two thirds of the tank diameter
- or at least 900 mm and shall in addition be equipped at the top edge with an arresting device for climbing buffers;

- the protective shield shall have a minimum wall thickness of 6 mm;

- the protective shield and its attachment points shall be such that the possibility of the tank ends being penetrated by the protective shield itself is minimized.

(e) Protective shield at each end of wagons fitted with automatic couplers.

If a protective shield is used at each end of the wagon, the following requirements shall apply:

- the protective shield shall cover the tank end to a height of at least 1100 mm, measured from the top edge of the headstock, the couplers shall be fitted with anticreep devices to prevent unintentional uncoupling and the protective shield shall, over the entire height of the shield, be at least 1200 mm wide;

- the protective shield shall have a minimum wall thickness of 12 mm;

- the protective shield and its attachment points shall be such that the possibility of the tank ends being penetrated by the protective shield itself is minimized.

The wall thicknesses specified in b), c) and d) above relate to reference steel. If other materials are used, except if mild steel is used, the equivalent thickness shall be calculated in accordance with the formula in 6.8.2.1.18. The values of R_m and A to be used shall be specified minimum values according to material standards.

the carriage of flammable refrigerated liquefied gases shall be equipped with an instant closing automatic stop-valve (see 6.8.3.2.3) as close as possible to the tank.

(c) Type approval (TA)

- TA 1** Tanks shall not be approved for the carriage of organic substances.
- TA 2** This substance may be carried in tank-wagons or tank-containers under the conditions laid down by the competent authority of the country of origin, if, on the basis of the tests mentioned below, the competent authority is satisfied that such a transport operation can be carried out safely.
- If the country of origin is not an SMGS Contracting State, these conditions shall be recognized by the competent authority of the first SMGS Contracting State reached by the consignment.
- For the type approval tests shall be undertaken:
- to prove the compatibility of all materials normally in contact with the substance during carriage;
 - to provide data to facilitate the design of the emergency pressure-relief devices and safety valves taking into account the design characteristics of the tank; and
 - to establish any special requirements necessary for the safe carriage of the substance.
- The test results shall be included in the report for the type approval.
- TA 3** This substance may be carried only in tanks with the tank code LGAV or SGAV; the hierarchy in 4.3.4.1.2 is not applicable.
- TA 4** The conformity assessment procedures of section 1.8.7 shall be applied by the competent authority or inspection body, its delegate or inspection body conforming to 1.8.6.2, 1.8.6.4, 1.8.6.3 and accredited to EN ISO/IEC 17020:2012 (except clause 8.1.3) type A.
- TA 5** This substance may only be carried in tanks with tank code S2.65AN(+); the hierarchy in 4.3.4.1.2 is not applicable.

(d) Inspections and tests (TT)

- TT 1** Tanks of pure aluminium need to be subjected to the initial and periodic hydraulic pressure tests at a pressure of only 250 kPa (2.5 bar) (gauge pressure).
- TT 2** The condition of the lining of shells shall be inspected every year by an inspection body by the competent authority, who shall inspect the inside of the shell.(see the paragraph 4.3.5 of the special provision TU43)
- TT 3** (Reserved) | By derogation from the requirements of 6.8.2.4.2, periodic inspections shall take place at least every eight years and shall include a thickness check using suitable instruments. For such tanks, the leakproofness test and check for which provision is made in 6.8.2.4.3 shall be carried out at least every four years.
- TT 4** (reserved)
- TT 5** The hydraulic pressure tests shall take place at least every
4 years | 2½ years.
- TT 6** The periodic inspection shall be carried out at least every 4 years. | (Reserved)
- TT 7** Notwithstanding the requirements of 6.8.2.4.2, the periodic internal inspection may be replaced by a programme approved by the competent authority.

- TT 8** Tanks on which the proper shipping name required for the entry UN 1005 AMMONIA, ANHYDROUS is marked in accordance with 6.8.3.5.1 to 6.8.3.5.3 and constructed of fine-grained steel with a yield strength of more than 400 H/mm² in accordance with the material standard, shall be subjected at each periodic inspection according to 6.8.2.4.2, to magnetic particle inspections to detect surface cracking.
- For the lower part of each shell at least 20% of the length of each circumferential and longitudinal weld shall, together with all nozzle welds and any repair or ground areas, be inspected.
- If the marking of the substance on the tank or tank plate is removed, a magnetic particle inspection shall be carried out and these actions recorded in the inspection certificate attached to the tank record.
- Such magnetic particle inspections shall be performed in accordance with Document 5C of the *List*.
- TT 9** For inspections and tests (including supervision of the manufacture) the procedures of section 1.8.7 shall be applied by the competent authority or inspection body, its delegate or inspection body conforming to 1.8.6.3 and accredited according to EN ISO/IEC 17020:2012 (except clause 8.1.3) type A.
- TT10** The periodic inspections according to 6.8.2.4.2 shall take place:
- | | | |
|------------------------|--|---------------------------|
| at least every 4 years | | at least every 2,5 years. |
|------------------------|--|---------------------------|

(e) Marking (TM)

Note: *These particulars shall be in an official language of the country of approval, and also, if that language is not Russian, in Russian, unless any agreements concluded between the countries concerned in the transport operation provide otherwise. This inscription is allowed in English, German or French language if the carriage is preceded by the carriage which is not ruled by Annex 2 to SMGS.*

- TM 1** Tanks shall bear in addition to the particulars prescribed in 6.8.2.5.2, the words: "DO NOT OPEN DURING CARRIAGE. LIABLE TO SPONTANEOUS COMBUSTION." (see also the Note above).
- TM 2** Tanks shall bear in addition to the particulars prescribed in 6.8.2.5.2, the words: "DO NOT OPEN DURING CARRIAGE. GIVES OFF FLAMMABLE GASES ON CONTACT WITH WATER." (see also the Note above).
- TM 3** Tanks shall also bear, on the plate prescribed in 6.8.2.5.1, the proper shipping name and the maximum permissible load mass in kg for this substance
- | | | |
|--|--|--|
| The load limits in accordance with 6.8.2.5.2 shall be determined in the light of the maximum permissible load mass of the shell, depending on the substance carried. | | |
|--|--|--|
- TM 4** For tanks the following additional particulars shall be marked by stamping or by any other similar method on the plate prescribed in 6.8.2.5.2 or directly on the shell itself, if the walls are so reinforced that the strength of the tank is not impaired:
- the chemical name with the approved concentration of the substance concerned.
- TM 5** Tanks shall bear, in addition to the particulars referred to in 6.8.2.5.1 the date (month, year) of the most recent inspection of the internal condition of the shell.
- TM 6** Tank-wagons shall bear an orange band in | (Reserved)

accordance with 5.3.5.

TM 7 The trefoil symbol, as described in 5.2.1.7.6, shall be marked by stamping or any other equivalent method on the plate described in 6.8.2.5.1. This trefoil may be engraved directly on the walls of the shell itself, if the walls are so reinforced that the strength of the shell is not impaired.

6.8.5 REQUIREMENTS CONCERNING THE MATERIALS AND CONSTRUCTION OF SHELLS OF TANK-WAGONS AND TANK-CONTAINERS FOR WHICH A TEST PRESSURE NOT LESS THAN 1 MPa (10 bar) IS REQUIRED, AND OF SHELLS OF TANK-WAGONS AND TANK-CONTAINERS INTENDED FOR THE CARRIAGE OF REFRIGERATED LIQUEFIED GASES OF CLASS 2

6.8.5.1 Materials and shells

6.8.5.1.1

a) Shells intended for the carriage of:

- compressed, liquefied gases or dissolved gases of Class 2;
 - UN Nos. 1380, 2845, 2870, 3194 and 3391 to 3394 of Class 4.2; and
 - UN No. 1052 hydrogen fluoride, anhydrous and UN No.1790 hydrofluoric acid with more than 85% hydrogen fluoride of Class 8
- shall be made of steel.

b) Shells constructed of fine-grained steels for the carriage of:

- corrosive gases of Class 2 and UN No. 2073 ammonia solution; and
- UN No. 1052 hydrogen fluoride, anhydrous and UN No.1790 hydrofluoric acid with more than 85% hydrogen fluoride of Class 8

shall be heat-treated for thermal stress relief.

Thermal stress relief shall not be required if:

- 1) there is no risk of corrosion due to stress cracking; and
 - 2) the mean notch bar impact value in the welding metal, the transition area and the base material, determined in each case by means of three samples, is an average of 45 J. ISO-V shall be used as a sample. For the base material, the sample shall be tested "crosswise". For the welding metal and the transition area, notch position S in the middle of the welding metal or the middle of the transitional area shall be selected. Testing shall be carried out at the lowest operating temperature.
- c) Shells intended for the carriage of refrigerated liquefied gases of Class 2, shall be made of steel, aluminium, aluminium alloy, copper or copper alloy (e.g. brass). However, shells made of copper or copper alloy shall be allowed only for gases containing no acetylene; ethylene, however, may contain not more than 0.005% acetylene.
- d) Only materials appropriate to the lowest and highest working temperatures of the shells and of their fittings and accessories may be used.

6.8.5.1.2 The following materials shall be allowed for the manufacture of shells:

a) steels not subject to brittle fracture at the lowest working temperature (see 6.8.5.2.1):

- mild steels (except for refrigerated liquefied gases of Class 2);
- fine-grained steels, down to a temperature of –60 °C;
- nickel steels (with a nickel content of 0.5 to 9%), down to a temperature of –196 °C, depending on the nickel content;
- austenitic chrome-nickel steels, down to a temperature of –270 °C;
- austenitic-ferritic stainless steels, down to a temperature of –60 °C;

b) aluminium not less than 99.5% pure or aluminium alloys (see 6.8.5.2.2);

c) deoxidized copper not less than 99.9% pure, or copper alloys having a copper content of over 56% (see 6.8.5.2.3).

- 6.8.5.1.3** a) shells made of steel, aluminium or aluminium alloys shall be either seamless or welded.
b) shells made of austenitic steel, copper or copper alloy may be hard-soldered.
- 6.8.5.1.4** The fittings and accessories may either be screwed to the shells or be secured thereto as follows:
a) shells made of steel, aluminium or aluminium alloy: by welding;
b) shells made of austenitic steel, of copper or of copper alloy: by welding or hard-soldering.
- 6.8.5.1.5** The construction of shells and their attachment to the underframe of the wagon or in the container frame shall be such as to preclude with certainty any such reduction in the temperature of the load-bearing components as would be likely to render them brittle. The means of attachment of shells shall themselves be so designed that even when the shell is at its lowest working temperature they still possess the necessary mechanical properties.

6.8.5.2 Test requirements

6.8.5.2.1 Steel shells

The materials used for the manufacture of shells and the weld beads shall, at their lowest working temperature, but at least at $-20\text{ }^{\circ}\text{C}$, meet at least the following requirements as to impact strength:

- The tests shall be carried out with test-pieces having a V-shaped notch;
- The minimum impact strength (see 6.8.5.3.1 to 6.8.5.3.3) for test-pieces with the longitudinal axis at right angles to the direction of rolling and a V-shaped notch (conforming to ISO R 148) perpendicular to the plate surface, shall be 34 J/cm^2 for mild steel (which, because of existing ISO standards, may be tested with test-pieces having the longitudinal axis in the direction of rolling); fine-grained steel; ferritic alloy steel $\text{Ni} < 5\%$, ferritic alloy steel $5\% \leq \text{Ni} \leq 9\%$; or austenitic Cr-Ni steel; or austenitic-ferritic stainless steel;
- In the case of austenitic steels, only the weld bead need be subjected to an impact-strength test;
- For working temperatures below $-196\text{ }^{\circ}\text{C}$ the impact-strength test is not performed at the lowest working temperature, but at $-196\text{ }^{\circ}\text{C}$.

6.8.5.2.2 Shells made of aluminium or aluminium alloy

The seams of shells shall meet the requirements laid down by the competent authority.

6.8.5.2.3 Shells made of copper or copper alloy

It is not necessary to carry out tests to determine whether the impact strength is adequate.

6.8.5.3 Impact-strength tests

- 6.8.5.3.1** For sheets less than 10 mm but not less than 5 mm thick, test-pieces having a cross-section of $10\text{ mm} \times e\text{ mm}$, where "e" represents the thickness of the sheet, shall be used. Machining to 7.5 mm or 5 mm is permitted if it is necessary. The minimum value of 34 J/cm^2 shall be required in every case.

Note: *No impact-strength test shall be carried out on sheets less than 5 mm thick, or on their weld seams.*

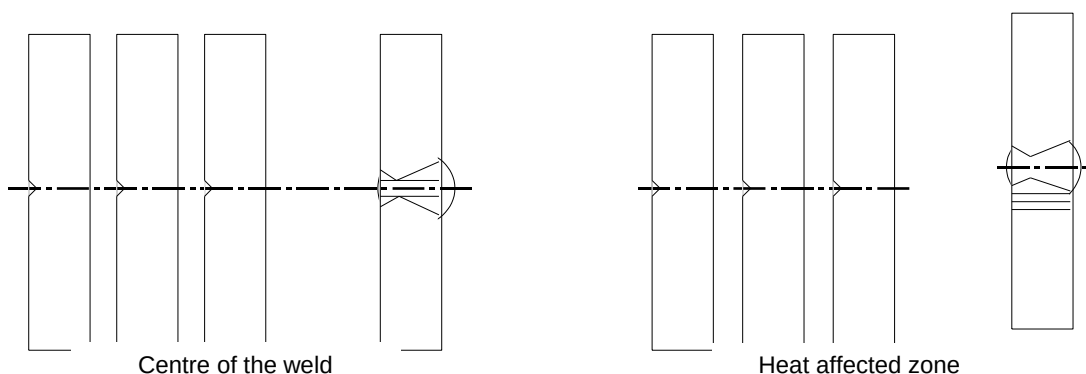
- 6.8.5.3.2** a) For the purpose of testing sheets, the impact strength shall be determined on three test-pieces. Test-pieces shall be taken at right angles to the direction of rolling; however, for mild steel they may be taken in the direction of rolling.

b) For testing weld seams the test-pieces shall be taken as follows:

when $\leq 10\text{ mm}$:

3 test-pieces with the notch at the centre of the weld

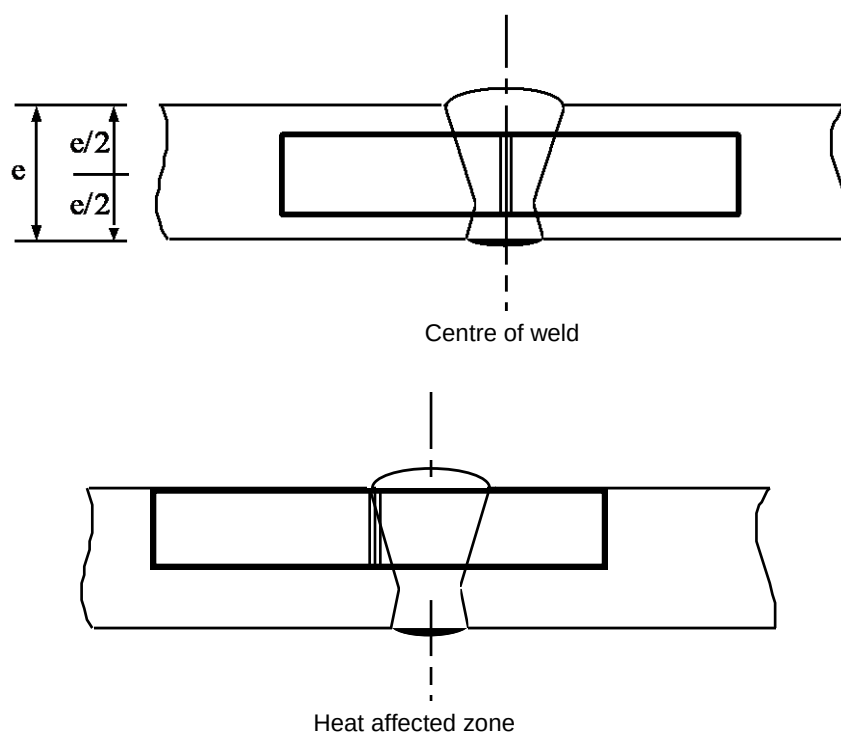
3 test-pieces with the notch in the centre of the heat affected zone (the V-notch to cross the fusion boundary at the centre of the specimen);



when $10 \text{ mm} < e \leq 20 \text{ mm}$:

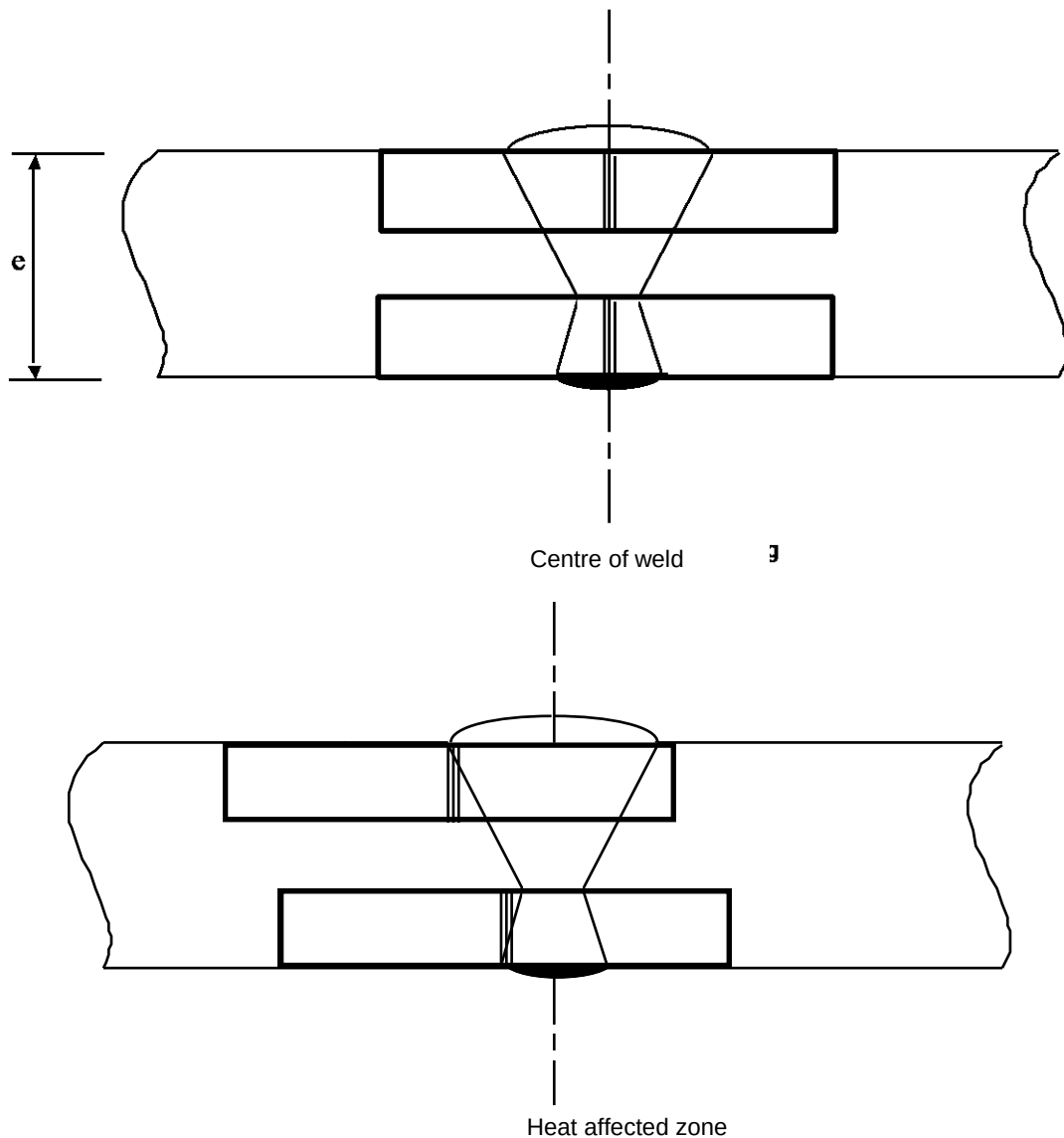
3 test-pieces from the centre of the weld;

3 test-pieces from the heat affected zone (the V-notch to cross the fusion boundary at the center of the specimen).



when $e > 20 \text{ mm}$:

2 sets of three test-pieces (one set on the upper face, one set on the lower face) at each of the points indicated below (the V-notch to cross the fusion boundary at the centre of the specimen for those taken from the heat affected zone)



6.8.5.3.3

- For sheets, the average of the three tests shall meet the minimum value of 34 J/cm² indicated in 6.8.5.2.1; not more than one of the individual values may be below the minimum value and then not below 24 J/cm².
- For welds, the average value obtained from the three test-pieces taken at the centre of the weld shall not be below the minimum value of 34 J/cm²; not more than one of the individual values may be below the minimum value and then not below 24 J/cm².
- For the heat affected zone (the V-notch to cross the fusion boundary at the centre of the specimen) the value obtained from not more than one of the three test-pieces may be below the minimum value of 34 J/cm², though not below 24 J/cm².

6.8.5.3.4

If the requirements prescribed in 6.8.5.3.3 are not met, one retest only may be done if:

- the average value of the first three tests is below the minimum value of 34 J/cm²
- or more than one of the individual values is less than the minimum value of 34 J/cm² but not below 24 J/cm².

- 6.8.5.3.5.** In a repeated impact test on sheets or welds, none of the individual values may be below 34 J/cm². The average value of all the results of the original test and of the retest should be equal to or more than the minimum of 34 J/cm².

On a repeated impact strength test on the heat-affected zone, none of the individual values may be below 34 J/cm²

6.8.5.4 Reference to standards

The requirements of 6.8.5.2 and 6.8.5.3 shall be deemed to have been complied with if the following relevant standards have been applied:

EN ISO 21028-1:2016 Cryogenic vessels – Toughness requirements for materials at cryogenic temperature – Part 1: Temperatures below -80 °C

EN ISO 21028-2:2018 Cryogenic vessels – Toughness requirements for materials at cryogenic temperature– Part 2: Temperatures between -80 °C and -20 °C

CHAPTER 6.9
REQUIREMENTS FOR THE DESIGN, CONSTRUCTION,
INSPECTION AND TESTING
OF PORTABLE TANKS WITH SHELLS
MADE OF FIBRE-REINFORCED PLASTICS (FRP) MATERIALS

6.9.1 Application and general requirements

6.9.1.1 The requirements of section 6.9.2 apply to portable tanks with an FRP shell intended for the carriage of dangerous goods of Classes 1, 3, 5.1, 6.1, 6.2, 8 and 9 by all modes of transport. In addition to the requirements of this Chapter, unless otherwise specified, the applicable requirements of the International Convention for Safe Containers (CSC) 1972, as amended, shall be fulfilled by any multimodal portable tank with FRP shell which meets the definition of a "container" within the terms of that Convention.

6.9.1.2 The requirements of this Chapter do not apply to offshore portable tanks.

6.9.1.3 The requirements of Chapter 4.2 and section 6.7.2 apply to FRP portable tank shells except for those concerning the use of metal materials for the construction of a portable tank shell and additional requirements stated in this Chapter.

6.9.1.4 In recognition of scientific and technological advances, the technical requirements of this Chapter may be varied by alternative arrangements. These alternative arrangements shall offer a level of safety not less than that given by the requirements of this Chapter with respect to compatibility with substances carried and the ability of the FRP portable tank to withstand impact, loading and fire conditions. For international carriage, alternative arrangement FRP portable tanks shall be approved by the applicable competent authorities.

6.9.2 Requirements for the design, construction, inspection and testing of FRP portable tanks

6.9.2.1 Definitions

For the purposes of this section, the definitions of 6.7.2.1 apply except for definitions related to metal materials ("Fine grain steel", "Mild steel" and "Reference steel") for the construction of the shell of a portable tank.

Additionally, the following definitions apply to portable tanks with an FRP shell:

External layer means the part of the shell which is directly exposed to the atmosphere;

Fibre-reinforced plastics (FRP), see 1.2.1;

Filament winding means a process for constructing FRP structures in which continuous reinforcements (filament, tape, or other), either previously impregnated with a matrix material or impregnated during winding, are placed over a rotating mandrel. Generally, the shape is a surface of revolution and may include ends (heads);

FRP shell means a closed part of cylindrical shape with an interior volume intended for carriage of chemical substances;

FRP tank means a portable tank constructed with an FRP shell and ends (heads), service equipment, safety relief devices and other installed equipment;

Glass transition temperature (T_g) means a characteristic value of the temperature range over which the glass transition takes place;

Hand layup means a process for moulding reinforced plastics in which reinforcement and resin are placed on a mould;

Liner means a layer on the inner surface of an FRP shell preventing contact with the dangerous goods being carried;

Mat means a fibre reinforcement made of random, chopped or twisted fibres bonded together as sheets of various length and thickness;

Parallel shell-sample means an FRP specimen, which must be representative of the shell, constructed in parallel to the shell construction if it is not possible to use cut-outs from the shell itself. The parallel shell-sample may be flat or curved;

Representative sample means a sample cut out from the shell;

Resin infusion means an FRP construction method by which dry reinforcement is placed into a matched mould, single sided mould with vacuum bag, or otherwise, and liquid resin is supplied to the part through the use of external applied pressure at the inlet and/or application of full or partial vacuum pressure at the vent;

Structural layer means FRP layers of a shell required to sustain the design loads;

Veil means a thin mat with high absorbency used in FRP product plies where polymeric matrix surplus fraction content is required (surface evenness, chemical resistance, leakage-proof, etc.).

6.9.2.2 General design and construction requirements

6.9.2.2.1 The requirements of 6.7.1 and 6.7.2.2 apply to FRP portable tanks. For areas of the shell that are made from FRP, the following requirements of Chapter 6.7 are exempt: 6.7.2.2.1, 6.7.2.2.9.1, 6.7.2.2.13 and 6.7.2.2.14. Shells shall be designed and constructed in accordance with the requirements of a pressure vessel code, applicable to FRP materials, recognized by the competent authority.

In addition, the following requirements apply.

6.9.2.2.2 Manufacturer's quality system

6.9.2.2.2.1 The quality system shall contain all the elements, requirements, and provisions adopted by the manufacturer. It shall be documented in a systematic and orderly manner in the form of written policies, procedures, and instructions.

6.9.2.2.2.2 The contents shall in particular include adequate descriptions of:

- a) The organizational structure and responsibilities of personnel with regard to design and product quality;
- b) The design control and design verification techniques, processes, and procedures that will be used when designing the portable tanks;
- c) The relevant manufacturing, quality control, quality assurance and process operation instructions that will be used;
- d) Quality records, such as inspection reports, test data and calibration data;
- e) Management reviews to ensure the effective operation of the quality system arising from the audits in accordance with 6.9.2.2.2.4;
- f) The process describing how customer requirements are met;
- g) The process for control of documents and their revision;
- h) The means for control of non-conforming portable tanks, purchased components, in-process and final materials; and
- i) Training programmes and qualification procedures for relevant personnel.

6.9.2.2.2.3 Under the quality system, the following minimum requirements shall be met for each FRP portable tank manufactured:

- a) Use of an inspection and test plan (ITP);
- b) Visual inspections;
- c) Verification of fibre orientation and mass fraction by means of documented control process;
- d) Verification of fibre and resin quality and characteristics by means of certificates or other documentation;
- e) Verification of liner quality and characteristics by means of certificates or other documentation;
- f) Verification of whichever is applicable of formed thermoplastic resin characteristic or degree of cure of thermoset resin, by direct or indirect means (e.g. Barcol test or differential scanning calorimetry) to be determined in accordance with 6.9.2.7.1.2 h), or by creep testing of a representative sample or parallel shell-sample in accordance with 6.9.2.7.1.2 e) for a period of 100 hours;
- g) Documentation of whichever is applicable of thermoplastic resin forming processes or thermoset resin cure and post-cure processes; and
- h) Retention and archiving of shell samples for future inspection and shell verification (e.g. from manhole cut out) for a period of 5 years.

6.9.2.2.2.4 Audit of the quality system

The quality system shall be initially assessed to determine whether it meets the requirements in 6.9.2.2.2.1 to 6.9.2.2.2.3 to the satisfaction of the competent authority.

The manufacturer shall be notified of the results of the audit. The notification shall contain the conclusions of the audit and any corrective actions required.

Periodic audits shall be carried out, to the satisfaction of the competent authority, to ensure that the manufacturer maintains and applies the quality system. Reports of the periodic audits shall be provided to the manufacturer.

6.9.2.2.2.5 Maintenance of the quality system

The manufacturer shall maintain the quality system as approved in order that it remains adequate and efficient.

The manufacturer shall notify the competent authority that approved the quality system of any intended changes. The proposed changes shall be evaluated to determine whether the amended quality system will still satisfy the requirements in 6.9.2.2.2.1 to 6.9.2.2.2.3.

6.9.2.2.3 *FRP Shells*

6.9.2.2.3.1 FRP shells shall have a secure connection with structural elements of the portable tank frame. FRP shell supports and attachments to the frame shall cause no local stress concentrations exceeding the design allowables of the shell structure in accordance with the provisions stated in this Chapter for all operating and test conditions.

6.9.2.2.3.2 Shells shall be made of suitable materials, capable of operating within a minimum design temperature range of -40 °C to +50 °C, unless temperature ranges are specified for specific more severe climatic or operating conditions (e.g. heating elements), by the competent authority of the country where the transport operation is being performed.

6.9.2.2.3.3 If a heating system is installed, it shall comply with 6.7.2.5.12 to 6.7.2.5.15 and with the following requirements:

- a) The maximum operating temperature of the heating elements integrated or connected to the shell shall not exceed the maximum design temperature of the tank;
- b) The heating elements shall be designed, controlled and utilized so that the temperature of the carried substance cannot exceed the maximum design temperature of the tank or a value at which the internal pressure exceeds MAWP; and
- c) Structures of the tank and its heating elements shall allow examination of the shell with respect to possible effects of overheating.

6.9.2.2.3.4 Shells shall consist of the following elements:

- Liner;
- Structural layer;
- External layer.

Note: *The elements may be combined if all applicable functional criteria are met.*

6.9.2.2.3.5 The liner is the inner element of the shell designed as the primary barrier to provide for the long-term chemical resistance in relation to the substances to be carried, to prevent any dangerous reaction with the contents or the formation of dangerous compounds and any substantial weakening of the structural layer owing to the diffusion of products through the liner. Chemical compatibility shall be verified in accordance with 6.9.2.7.1.3.

The liner may be an FRP liner or a thermoplastic liner.

6.9.2.2.3.6 FRP liners shall consist of the following two components:

- a) Surface layer ("gel-coat"): adequate resin rich surface layer, reinforced with a veil, compatible with the resin and contents. This layer shall have a maximum fibre mass content of 30% and have a minimum thickness of 0.25 mm and a maximum thickness of 0.60 mm;
- b) Strengthening layer(s): layer or several layers with a minimum thickness of 2 mm, containing a minimum of 900 g/m² of glass mat or chopped fibres with a mass content in glass of not less than 30% unless equivalent safety is demonstrated for a lower glass content.

6.9.2.2.3.7 If the liner consists of thermoplastic sheets, they shall be welded together in the required shape, using a qualified welding procedure and personnel. Welded liners shall have a layer of electrically conductive media placed against the non-liquid contact surface of the welds to facilitate spark testing. Durable bonding between liners and the structural layer shall be achieved by the use of an appropriate method.

6.9.2.2.3.8 The structural layer shall be designed to withstand the design loads according to 6.7.2.2.12, 6.9.2.2.3.1, 6.9.2.3.2, 6.9.2.3.4 and 6.9.2.3.6.

6.9.2.2.3.9 The external layer of resin or paint shall provide adequate protection of the structural layers of the tank from environmental and service exposure, including to UV radiation and salt fog, and occasional splash exposure to cargoes.

6.9.2.2.3.10 Resins

The processing of the resin mixture shall be carried out in compliance with the recommendations of the supplier. These resins can be:

- Unsaturated polyester resins;
- Vinyl ester resins;
- Epoxy resins;

- Phenolic resins;
- Thermoplastic resins.

The resin heat distortion temperature (HDT), determined in accordance with 6.9.2.7.1.1 shall be at least 20 °C higher than the maximum design temperature of the shell as defined in 6.9.2.2.3.2, but shall in any case not be lower than 70 °C.

6.9.2.2.3.11 Reinforcement material

The reinforcement material of the structural layers shall be selected such that they meet the requirements of the structural layer.

For the liner glass fibres of at a minimum type C or ECR according to ISO 2078:1993 + Amd 1:2015 shall be used. Thermoplastic veils may only be used for the liner when their compatibility with the intended contents has been demonstrated.

6.9.2.2.3.12 Additives

Additives necessary for the treatment of the resin, such as catalysts, accelerators, hardeners and thixotropic substances as well as materials used to improve the tank, such as fillers, colours, pigments etc. shall not cause weakening of the material, taking into account lifetime and temperature expectancy of the design.

6.9.2.2.3.13 FRP shells, their attachments and their service and structural equipment shall be designed to withstand the loads mentioned in 6.7.2.2.12, 6.9.2.2.3, 6.9.2.3.2, 6.9.2.3.4 and 6.9.2.3.6 without loss of contents (other than quantities of gas escaping through any degassing vents) during the design lifetime.

6.9.2.2.3.14 Special requirements for the carriage of substances with a flash-point of not more than 60 °C

6.9.2.2.3.14.1 FRP tanks used for the carriage of flammable liquids with a flash-point of not more than 60 °C shall be constructed to ensure the elimination of static electricity from the various component parts to avoid the accumulation of dangerous charges.

6.9.2.2.3.14.2 The electrical surface resistance of the inside and outside of the shell as established by measurements shall not be higher than 109 Ω. This may be achieved by the use of additives in the resin or interlaminar conducting sheets, such as metal or carbon network.

6.9.2.2.3.14.3 The discharge resistance to earth as established by measurements shall not be higher than 107 Ω.

6.9.2.2.3.14.4 All components of the shell shall be electrically connected to each other and to the metal parts of the service and structural equipment of the tank. The electrical resistance between components and equipment in contact with each other shall not exceed 10 Ω.

6.9.2.2.3.14.5 The electrical surface-resistance and discharge resistance shall be measured initially on each manufactured tank or a specimen of the shell in accordance with the procedure recognized by the competent authority. In the event of damage to the shell, requiring repair, the electrical resistance shall be re-measured.

6.9.2.2.3.15 The tank shall be designed to withstand, without significant leakage, the effects of a full engulfment in fire for 30 minutes as specified by the test requirements in 6.9.2.7.1.5. Testing may be waived with the agreement of the competent authority, where sufficient proof can be provided by tests with comparable tank designs.

6.9.2.2.3.16 Construction process for FRP shells

6.9.2.2.3.16.1 Filament winding, hand layup, resin infusion or other appropriate composite production processes shall be used for construction of FRP shells.

6.9.2.2.3.16.2 The weight of the fibre reinforcement shall conform to that set forth in the procedure specification with a tolerance of +10 % and –0 %. One or more of the fibre types specified in 6.9.2.2.3.11 and in the procedure specification shall be used for reinforcement of shells.

6.9.2.2.3.16.3 The resin system shall be one of the resin systems specified in 6.9.2.2.3.10. No filler, pigment or dye additions shall be used which will interfere with the natural colour of the resin except as permitted by the procedure specification.

6.9.2.3 *Design criteria*

6.9.2.3.1 FRP shells shall be of a design capable of being stress-analysed mathematically or experimentally by resistance strain gauges or by other methods approved by the competent authority.

6.9.2.3.2 FRP shells shall be designed and constructed to withstand the test pressure. Specific provisions are laid down for certain substances in the applicable portable tank instruction indicated in column (10) of Table A of Chapter 3.2 and described in 4.2.5, or by a portable tank special provision indicated in column (11) of Table A of Chapter 3.2 and described in 4.2.5.3. The minimum wall thickness of the FRP shell shall not be less than that specified in 6.9.2.4.

6.9.2.3.3 At the specified test pressure the maximum tensile relative deformation measured in mm/mm in the shell shall not result in the formation of microcracks, and therefore not be greater than the first measured point of elongation based fracture or damage of the resin, measured during tensile tests prescribed under 6.9.2.7.1.2 c).

6.9.2.3.4 For internal test pressure, external design pressure specified in 6.7.2.2.10, static loads specified in 6.7.2.2.12 and static gravity loads caused by the contents with the maximum density specified for the design and at maximum filling degree, failure criteria (FC) in the longitudinal direction, circumferential direction, and any other in-plane direction of the composite layup shall not exceed the following value:

$$FC \leq \frac{1}{K}$$

where:

$$K = K_0 \times K_1 \times K_2 \times K_3 \times K_4 \times K_5$$

where:

K shall have a minimum value of 4;

K₀ is a strength factor. For the general design the value for K₀ shall be equal to or more than 1.5. The value of K₀ shall be multiplied by a factor of two, unless the shell is provided with protection against damage consisting of a complete metal skeleton including longitudinal and transverse structural members;

K₁ is a factor related to the deterioration in the material properties due to creep and ageing. It shall be determined by the formula:

$$K_1 = \frac{1}{\alpha\beta}$$

where:

α is the creep factor;

β is the ageing factor determined in accordance with 6.9.2.7.1.2 e) and f), respectively. When used in calculation, factors α and β shall be between 0 and 1.

Alternatively, a conservative value of $K_1 = 2$ may be applied for the purpose of undertaking the numerical validation exercise in 6.9.2.3.4 (this does not remove the need to perform testing to determine α and β);

K_2 is a factor related to the service temperature and the thermal properties of the resin, determined by the following equation, with a minimum value of 1: $K_2 = 1,25 - 0,0125(\text{HDT} - 70)$, where HDT is the heat distortion temperature of the resin, in °C;

K_3 is a factor related to the fatigue of the material; the value of $K_3 = 1.75$ shall be used unless otherwise agreed with the competent authority. For the dynamic design as outlined in 6.7.2.2.12 the value of $K_3 = 1.1$ shall be used;

K_4 is a factor related to resin curing and has the following values:

- 1.0 where curing is carried out in accordance with an approved and documented process, and the quality system described under 6.9.2.2.2 includes verification of degree of cure for each FRP portable tank using a direct measurement approach, such as differential scanning calorimetry (DSC) determined via ISO 11357-2:2016, as per 6.9.2.7.1.2 h);
- 1.1 where thermoplastic resin forming or thermoset resin curing is carried out in accordance with an approved and documented process, and the quality system described under 6.9.2.2.2 includes verification of whichever is applicable formed thermoplastic resin characteristics or degree of cure of thermoset resin, for each FRP portable tank using an indirect measurement approach as per 6.9.2.7.1.2 h), such as Barcol testing via documents Nos. 50A or 50B of the *List*, HDT via ISO 75-1:2013, thermo-mechanical analysis (TMA) via ISO 11359-1:2014 or dynamic thermo-mechanical analysis (DMA) via ISO 6721-11:2019;
- 1.5 in other cases.

K_5 is a factor related to the portable tank instruction in 4.2.5.2.6:

- 1.0 for T 1 to T 19;
- 1.33 for T 20;
- 1.67 for T 21 to T 22.

A design validation exercise using numerical analysis and a suitable composite failure criterion is to be undertaken to verify that the stresses in the plies in the shell are below the allowables. Suitable composite failure criteria include, but are not limited to, Tsai-Wu, Tsai-Hill, Hashin, Yamada-Sun, Strain Invariant Failure Theory, Maximum Strain, or Maximum Stress. Other relations for the strength criteria are allowed upon agreement with the competent authority. The method and results of this design validation exercise are to be submitted to the competent authority.

The allowables are to be determined using experiments to derive parameters required by the chosen failure criteria combined with factor of safety K , the strength values measured as per 6.9.2.7.1.2 c), and the maximum elongation strain criteria prescribed in 6.9.2.3.5. The analysis of joints is to be undertaken in accordance with the allowables determined in 6.9.2.3.7 and the strength values measured as per 6.9.2.7.1.2 g). Buckling is to be considered in accordance with 6.9.2.3.6. Design of openings and metallic inclusions is to be considered in accordance with 6.9.2.3.8.

- 6.9.2.3.5** At any of the stresses as defined in 6.7.2.2.12 and 6.9.2.3.4, the resulting elongation in any direction shall not exceed the value indicated in the following table or one tenth of the elongation at fracture of the resin determined by ISO 527-2:2012, whichever is lower.

Examples of known limits are presented in the table below.

Type of resin	Maximum strain in tension (%)
Unsaturated polyester or phenolic	0.2
Vinylester	0.25
Epoxy	0.3
Thermoplastic	See 6.9.2.3.3

6.9.2.3.6 For the external design pressure the minimum safety factor for linear buckling analysis of the shell shall be as defined in the applicable pressure vessel code but not less than three.

6.9.2.3.7 The adhesive bondlines and/or overlay laminates used in the joints, including the end joints, connection between the equipment and shell, the joints of the surge plates and the partitions with the shell shall be capable of withstanding the loads of 6.7.2.2.12, 6.9.2.2.3.1, 6.9.2.3.2, 6.9.2.3.4 and 6.9.2.3.6. In order to avoid concentrations of stresses in the overlay lamination, the applied taper shall not be steeper than 1:6. The shear strength between the overlay laminate and the tank components to which it is bonded shall not be less than:

$$\tau = \gamma \frac{Q}{l} \leq \frac{\tau_R}{K}$$

where:

τ_R is the interlaminar shear strength according to ISO 14130:1997 and Cor 1:2003;

Q is the load per unit width of the interconnection;

K is the safety factor determined as per 6.9.2.3.4;

l is the length of the overlay laminate;

γ is the notch factor relating average joint stress to peak joint stress at failure initiation location.

Other calculation methods for the joints are allowed following approval with the competent authority.

6.9.2.3.8 Metallic flanges and their closures are permitted to be used in FRP shells, under design requirements of 6.7.2. Openings in the FRP shell shall be reinforced to provide at least the same safety factors against the static and dynamic stresses as specified in 6.7.2.2.12, 6.9.2.3.2, 6.9.2.3.4 and 6.9.2.3.6 as that for the shell itself. The number of openings shall be minimized. The axis ratio of oval-shaped openings shall be not more than 2.

If metallic flanges or componentry are integrated into the FRP shell using bonding, then the characterisation method stated in 6.9.2.3.7 shall apply to the joint between the metal and FRP. If the metallic flanges or componentry are fixed in an alternative fashion, e.g. threaded fastener connections, then the appropriate provisions of the relevant pressure vessel standard shall apply.

6.9.2.3.9 Check calculations of the strength of the shell shall be performed by finite element method simulating the shell layups, joints within FRP shell, joints between the FRP shell and the container frame, and openings.

Treatment of singularities shall be undertaken using an appropriate method according to the applicable pressure vessel code.

6.9.2.4 Minimum wall thickness of the shell

6.9.2.4.1 Minimum thickness of the FRP shell shall be confirmed by check calculations of the strength of the shell considering strength requirements given in 6.9.2.3.4.

6.9.2.4.2 Minimum thickness of the FRP shell structural layers shall be determined in accordance with 6.9.2.3.4, however, in any case the minimum thickness of the structural layers shall be at least 3 mm.

6.9.2.5 Equipment components for portable tanks with FRP shell Service equipment, bottom openings, pressure relief devices, gauging devices, supports, frameworks, lifting and tie-down attachments of portable tanks shall meet the requirements of 6.7.2.5 to 6.7.2.17. If any other metallic features are required to be integrated into the FRP shell, then the provisions of 6.9.2.3.8 shall apply.

6.9.2.6 *Design approval*

6.9.2.6.1 Design approval of FRP portable tanks shall be as per 6.7.2.18 requirements. The following additional requirements apply to FRP portable tanks.

6.9.2.6.2 The prototype test report for the purpose of the design approval shall additionally include the following:

a) Results of the material tests used for FRP shell fabrication in accordance with 6.9.2.7.1 requirements;

b) Results of the ball drop test in accordance with the requirements of 6.9.2.7.1.4.

c) Results the fire resistance test in accordance with provisions of 6.9.2.7.1.5.

6.9.2.6.3 A service life inspection programme shall be established, which shall be a part of the operation manual, to monitor the condition of the tank at periodic inspections. The inspection programme shall focus on the critical stress locations identified in the design analysis performed under 6.9.2.3.4. The inspection method shall take into account the potential damage mode at the critical stress location (e.g. tensile stress or interlaminar stress). The inspection shall be a combination of visual and non-destructive testing (e.g. acoustic emissions, ultrasonic evaluation, thermographic). For heating elements, the service life inspection programme shall allow an examination of the shell or its representative locations to take into account the effects of overheating.

6.9.2.6.4 A representative prototype tank shall be subjected to tests as specified below. For this purpose, service equipment may be replaced by other items if necessary.

6.9.2.6.4.1 The prototype shall be inspected for compliance with the design type specification. This shall include an internal and external inspection and measurement of the main dimensions.

6.9.2.6.4.2 The prototype, equipped with strain gauges at all locations of high strain, as identified by the design validation exercise in accordance with 6.9.2.3.4, shall be subjected to the following loads and the strain shall be recorded:

a) Filled with water to the maximum filling degree. The measuring results shall be used to calibrate the design calculations according to 6.9.2.3.4;

b) Filled with water to the maximum filling degree and subjected to static loads in all three directions mounted by the base corner castings without additional mass applied external to the shell. For comparison with the design calculation according to 6.9.2.3.4 the strains recorded shall be extrapolated in relation to the quotient of the accelerations required in 6.7.2.2.12 and measured;

c) Filled with water and subjected to the specified test pressure. Under this load, the shell shall exhibit no visual damage or leakage.

The stress corresponding to the measured strain level shall not exceed the minimum factor of safety calculated in 6.9.2.3.4 under any of these loading conditions.

6.9.2.7 *Additional provisions applicable to FRP portable tanks*

6.9.2.7.1 *Material testing*

6.9.2.7.1.1 Resins

Resin tensile elongation shall be determined in accordance with ISO 527-2:2012. The heat distortion temperature (HDT) of the resin shall be determined in accordance with ISO 75-1:2013.

6.9.2.7.1.2 Shell-samples

Prior to testing, all coatings shall be removed from the samples. If shell samples are not possible then parallel shell-samples may be used. The tests shall cover:

- a) The thickness of the laminates of the central shell wall and the ends;
- b) The mass content and composition of composite reinforcement by ISO 1172:1996 or ISO 14127:2008, as well as orientation and arrangement of reinforcement layers;
- c) The tensile strength, elongation at fracture and modulus of elasticity according to ISO 527-4:1997 or ISO 527-5:2009 for the circumferential and longitudinal directions of the shell. For areas of the FRP shell, tests shall be performed on representative laminates in accordance with ISO 527-4:1997 or ISO 527-5:2009, to permit evaluation of the suitability of safety factor (K). A minimum of six specimens per measure of tensile strength shall be used, and the tensile strength shall be taken as the average minus two standard deviations;
- d) The bending deflection and strength established by the three-point or four-point bending test according to ISO 14125:1998 + Amd 1:2011 using a sample with a minimum width of 50 mm and a support distance of at least 20 times the wall thickness. A minimum of five specimens shall be used.
- e) The creep factor α determined by taking the average result of at least two specimens with the configuration described in (d), subject to creep in three-point or four-point bending, at the maximum design temperature nominated under 6.9.2.2.3.2, for a period of 1 000 hours. The following test is to be undertaken for each specimen:
 - 1) Place specimen into bending apparatus, unloaded, in oven set to maximum design temperature and allow to acclimatise for a period of not less than 60 minutes;
 - 2) Load specimen bending in accordance with ISO 14125:1998 + Amd 1:2011 at flexural stress equal to the strength determined in (d) divided by four. Maintain mechanical load at maximum design temperature without interruption for not less than 1 000 hours;
 - 3) Measure the initial deflection six minutes after full load application in (e) (ii). Specimen shall remain loaded in test rig;
 - 4) Measure the final deflection 1 000 hours after full load application in (e) (ii); and
 - 5) Calculate the creep factor α by dividing the initial deflection from (e) (iii) by the final deflection from e) (iv);
- f) The ageing factor β determined by taking the average result of at least two specimens with the configuration described in (d), subject to loading in static three-point or four-point bending, in conjunction with immersion in water at the maximum design temperature nominated under 6.9.2.2.3.2 for a period of 1 000 hours. The following test is to be undertaken for each specimen:
 - 1) Prior to testing or conditioning, specimens shall be dried in an oven at 80 °C for a period of 24 hours;

- 2) The specimen shall be loaded in three-point or four-point bending at ambient temperature, in accordance with ISO 14125:1998 + Amd 1:2011, at the flexural stress level equal to the strength determined in (d) divided by four. Measure the initial deflection six minutes after full load application. Remove specimen from test rig;
- 3) Immerse unloaded specimen in water at the maximum design temperature for a period of not less than 1 000 hours without interruption to the water conditioning period. When conditioning period has lapsed, remove specimens, keep damp at ambient temperature, and complete f) 4) within three days;
- 4) The specimen shall be subject to second round of static loading, in a manner identical to f) 2). Measure the final deflection six minutes after full load application. Remove specimen from test rig; and
- 5) Calculate the ageing factor β by dividing the initial deflection from (f) (ii) by the final deflection from f) 4);
- g) The interlaminar shear strength of the joints measured by testing representative samples in accordance with ISO 14130:1997;
- h) The efficiency of whichever is applicable of thermoplastic resin forming characteristics or thermoset resin cure and post-cure processes for laminates determined using one or more of the following methods:
 - 1) Direct measurement of formed thermoplastic resin characteristics or thermoset resin degree of cure: glass transition temperature (T_g) or melting temperature (T_m) determined using differential scanning calorimetry (DSC) via ISO 11357-2:2016; or
 - 2) Indirect measurement of formed thermoplastic resin characteristics or thermoset resin degree of cure:
 - HDT via ISO 75-1:2013;
 - T_g or T_m using thermo-mechanical analysis (TMA) via ISO 11359-1:2014;
 - Dynamic thermo-mechanical analysis (DMA) via ISO 6721-11:2019;
 - Barcol testing via documents Nos. 50A or 50B of the *List*.

6.9.2.7.1.3 The chemical compatibility of the liner and chemical contact surfaces of service equipment with the substances to be carried shall be demonstrated by one of the following methods. This demonstration shall account for all aspects of the compatibility of the materials of the shell and its equipment with the substances to be carried, including chemical deterioration of the shell, initiation of critical reactions of the contents and dangerous reactions between both.

- a) In order to establish any deterioration of the shell, representative samples taken from the shell, including any liners with welds, shall be subjected to the chemical compatibility test according to document No. 51 of the *List* for a period of 1 000 hours at 50 °C or the maximum temperature at which a particular substance is approved for carriage. Compared with a virgin sample, the loss of strength and elasticity modulus measured by the bending test according to document No. 50 of the *List* shall not exceed 25 %. Cracks, bubbles, pitting effects as well as separation of layers and liners and roughness shall not be acceptable;
- b) Certified and documented data of positive experiences on the compatibility of filling substances in question with the materials of the shell with which they come into contact at given temperatures, times and other relevant service conditions;

- c) Technical data published in relevant literature, standards or other sources, acceptable to the competent authority;
- d) Upon agreement with the competent authority other methods of chemical compatibility verification may be used.

6.9.2.7.1.4 Ball drop test as per document No. 52 of the *List*

The prototype shall be subjected to the ball drop test according to document No. 52 of the *List*, No. 6.6. No visible damage inside or outside the tank shall occur.

6.9.2.7.1.5 Fire resistance test

6.9.2.7.1.5.1 A representative prototype tank with its service and structural equipment in place and filled to 80 % of its maximum capacity with water, shall be exposed to a full engulfment in fire for 30 minutes, caused by an open heating oil pool fire or any other type of fire with the same effect. The fire shall be equivalent to a theoretical fire with a flame temperature of 800 °C, emissivity of 0.9 and to the tank a heat transfer coefficient of 10 W/(m²K) and surface absorptivity of 0.8. A minimum net heat flux of 75 kW/m² shall be calibrated according to ISO 21843:2018. The dimensions of the pool shall exceed those of the tank by at least 50 cm to each side and the distance between fuel level and tank shall be between 50 cm and 80 cm. The rest of the tank below liquid level, including openings and closures, shall remain leakproof except for drips.

6.9.2.8 Inspection and testing

6.9.2.8.1 Inspection and testing of portable FRP tanks shall be carried out as per provisions of 6.7.2.19. In addition, welded thermoplastic liners shall be spark tested under a suitable standard, after pressure tests performed in accordance with the periodic inspections specified in 6.7.2.19.4.

6.9.2.8.2 In addition, the initial and periodic inspections shall follow the service life inspection programme and any associated inspection methods per 6.9.2.6.3.

6.9.2.8.3 The initial inspection and test shall verify that construction of the tank is made in accordance with the quality system required by 6.9.2.2.2.

6.9.2.8.4 Additionally, during inspection of the shell the position of the areas heated by heating elements shall be indicated or marked, be available on design drawings or shall be made visible by a suitable technique (e.g. infrared). Examination of the shell shall take into account the effects of overheating, corrosion, erosion, overpressure and mechanical overloading.

6.9.2.9 Retention of samples

Shell samples (e.g. from manhole cut out) for each tank manufactured shall be maintained for future inspection and shell verification for a period of five years from the date of the initial inspection and test and until successful completion of the required five-year periodic inspection.

6.9.2.10 Marking

6.9.2.10.1 The requirements of 6.7.2.20.1 apply to portable tanks with an FRP shell except those of 6.7.2.20.1 f) 2).

6.9.2.10.2 The information required in 6.7.2.20.1 (f) (i) shall be: "Shell structural material: Fibre-reinforced plastic", the reinforcement fibre e.g. "Reinforcement: E-glass" and resin e.g. "Resin: Vinyl Ester".

6.9.2.10.3 Requirements of provision 6.7.2.20.2 apply to portable tank with an FRP shell.

CHAPTER 6.10

REQUIREMENTS FOR THE CONSTRUCTION, EQUIPMENT, TYPE APPROVAL, INSPECTION AND MARKING OF VACUUM-OPERATED WASTE TANKS

Note 1: For portable tanks and UN multiple element gas containers (MEGCs), see Chapter 6.7; for tank-wagons, demountable tanks, tank-containers and tank swap bodies, with shells made of metallic materials, and battery-wagons and multiple element gas containers (MEGCs) other than UN MEGCs see Chapter 6.8; for portable tanks with shells made of fibre-reinforced plastics (FRP) materials, see Chapter 6.9; for tank-wagons designed to be operated on 1520 mm gauge railways, see Chapter 6.20.

Note 2: This Chapter applies to tank-containers and tank swap bodies.

6.10.1 GENERAL

6.10.1.1 Definitions

Note: A tank which fully complies with the requirements of Chapter 6.8 is not considered to be a "vacuum-operated waste tank".

6.10.1.1.1. The term "protected area" means the areas located as follows:

- a) The lower part of the tank in a zone which extends over a 60 ° angle on either side of the lower generating line;
- b) The top part of a tank in a zone which extends over a 30 ° angle on either side of the top generating line.

6.10.1.1 Scope

6.10.1.1.1 The special requirements of 6.10.2 to 6.10.4 complete or modify Chapter 6.8 and are applied to vacuum-operated waste tanks.

Vacuum-operated waste tanks may be equipped with openable ends, if the requirements of Chapter 4.3 allow bottom discharge of the substances to be carried (indicated by the letters "A" or "B" in the tank code given in Column (12) of Table A of Chapter 3.2, in accordance with 4.3.4.1.1).

Vacuum-operated waste tanks shall comply with all the requirements of Chapter 6.8, except where overtaken by special requirements in this Chapter. However, the requirements of 6.8.2.1.19 and 6.8.2.1.20 shall not apply.

6.10.2 CONSTRUCTION

6.10.2.1 Tanks shall be designed for a calculation pressure equal to 1.3 times the filling or discharge pressure but not less than 400 kPa (4 bar) (gauge pressure). For the carriage of substances for which a higher calculation pressure of the tank is specified in Chapter 6.8, this higher pressure shall apply.

6.10.2.2 Tanks shall be designed to withstand a negative internal pressure of 100 kPa (1 bar).

6.10.3 ITEMS OF EQUIPMENT

6.10.3.1 The items of equipment shall be so arranged as to be protected against the risk of

being wrenched off or damaged during carriage or handling. This requirement can be fulfilled by placing items of equipment in a so-called "protected area" (see 6.10.1.1.1).

- 6.10.3.2** The bottom discharge of shells may be constituted by external piping with a stop-valve fitted as close to the shell as practicable and a second closure which may be a blank flange or other equivalent device.
- 6.10.3.3** The position and closing direction of the stop-valve(s) connected to the shell, or to any compartment in the case of compartmented shells, shall be unambiguous, and be able to be checked from the ground.
- 6.10.3.4** In order to avoid any loss of contents in the event of damage to the external filling and discharge fittings (pipes, lateral shut-off devices), the internal stop-valve, or the first external stop-valve (where applicable), and its seatings shall be protected against the danger of being wrenched off by external stresses or shall be so designed as to withstand them. The filling and discharge devices (including flanges or threaded plugs) and protective caps (if any) shall be capable of being secured against any unintended opening.
- 6.10.3.5** The tanks may be equipped with openable ends. Openable ends shall comply with the following conditions:
- a) The ends shall be designed to be secured leaktight when closed;
 - b) Unintentional opening shall not be possible;
 - c) Where the opening mechanism is power operated the end shall remain securely closed in the event of a power failure;
 - d) A safety or breakseal device shall be incorporated to ensure that the openable end cannot be opened when there is still a residual over pressure in the tank. This requirement does not apply to openable ends which are power-operated, where the movement is positively controlled. In this case the controls shall be of the dead-man type and be so positioned that the operator can observe the movement of the openable end at all times and is not endangered during opening and closing of the openable end; and
 - e) Provisions shall be made to protect the openable end and prevent it from being forced open during a roll-over of the tank-container or tank swap body.
- 6.10.3.6** Vacuum-operated waste tanks which are fitted with an internal piston to assist in the cleaning of the tank or discharging shall be provided with stop-devices to prevent the piston in every operational position being ejected from the tank when a force equivalent to the maximum working pressure of the tank is applied to the piston. The maximum working pressure for tanks or compartments with pneumatic operated piston shall not exceed 100 kPa (1.0 bar). The internal piston shall be constructed in a manner and of materials which will not cause an ignition source when the piston is moved. The internal piston may be used as a compartment provided it is secured in position. Where any of the means by which the internal piston is secured is external to the tank, it shall be placed in a position not liable to accidental damage.
- 6.10.3.7** The tanks may be equipped with suction booms if:
- a) the boom is fitted with an internal or external stop-valve fixed directly to the shell, or directly to a bend that is welded to the shell; a rotation crown wheel can be fitted between the shell or the bend and the external stop valve, if this rotation crown wheel is located in the protected area and the stop-valve control device is protected with a housing or cover against the danger of being wrenched off by external loads;

- b) the stop-valve mentioned in (a) is so arranged that carriage with the valve in an open position is prevented; and
- c) the boom is constructed in such a way that the tank will not leak as a result of accidental impact on the boom.

6.10.3.8

The tanks shall be fitted with the following additional service equipment:

- a) The outlet of a pump/exhauster unit shall be so arranged as to ensure that any flammable or toxic vapours are diverted to a place where they will not cause a danger;

Note: *This requirement may, for example, be complied with by the use of a vertical pipe discharging at the top, or a low-level outlet with a connection which allows attachment of a hose.*

- b) A device to prevent immediate passage of flame shall be fitted to all openings of a vacuum pump/exhauster unit which may provide a source of ignition and which is fitted on a tank used for the carriage of flammable wastes, or the tank shall be explosion pressure shock resistant, which means being capable of withstanding without leakage, but allowing deformation, an explosion resulting from the passage of the flame;
- c) Pumps which can deliver a positive pressure shall have a safety device fitted in the pipework which can be pressurised. The safety device shall be set to discharge at a pressure not exceeding the maximum working pressure of the tank;
- d) A stop-valve shall be fitted between the shell, or the outlet of the overfill prevention device fitted to the shell, and the pipework connecting the shell to the pump/exhauster unit;
- e) The tank shall be fitted with a suitable pressure/vacuum manometer which shall be mounted in a position where it can be easily read by the person operating the pump/exhauster unit. A distinguishing line shall be marked on the scale to indicate the maximum working pressure of the tank;
- f) The tank, or in case of compartmented tanks, every compartment, shall be equipped with a level indicating device. Glass level-gauges and level-gauges of other suitable transparent material may be used as level indicating devices, provided:
 - they form a part of the tank wall and have a resistance to pressure comparable to that of the tank; or they must be fitted external to the tank;
 - the top and bottom connections to the tank are equipped with shut-off valves fixed directly to the shell and so arranged that carriage with the valves in an open position is prevented;
 - they are suitable for operation at the maximum working pressure of the tank; and
 - are placed in a position where they will not be liable to accidental damage.

6.10.3.9

The shells of vacuum-operated waste tanks shall be fitted with a safety valve preceded by a bursting disc. The valve shall be capable of opening automatically at a pressure between 0.9 and 1.0 times the test pressure of the tank to which it is fitted. The use of dead weight or counterweight valves is prohibited.

The bursting disc shall burst at the earliest when the initial opening pressure of the valve is reached and at the latest when this pressure reaches the test pressure of the tank to which it is fitted.

Safety devices shall be of such a type as to resist dynamic stresses, including liquid surge.

The space between the bursting disc and the safety valve shall be provided with a pressure gauge or suitable tell-tale indicator for the detection of disc rupture, pinholing or leakage which could cause a malfunction of the safety valve.

6.10.4 INSPECTION

Vacuum-operated waste tanks shall be subject no later than at least every two and a half years to an examination of the internal condition, in addition to the tests according to 6.8.2.4.3.

CHAPTER 6.11

REQUIREMENTS FOR THE DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF BULK CONTAINERS

6.11.1 (Reserved)

6.11.2 APPLICATION AND GENERAL REQUIREMENTS

6.11.2.1 Bulk containers and their service and structural equipment shall be designed and constructed to withstand, without loss of contents, the internal pressure of the contents and the stresses of normal filling / discharging and carriage.

6.11.2.2 Where a discharge valve is fitted, it shall be capable of being made secure in the closed position and the whole discharge system shall be suitably protected from damage. Valves having lever closures shall be able to be secured against unintended opening and the open or closed position shall be readily apparent.

6.11.2.3 Code for designating types of bulk container

The following table indicates the codes to be used for designating types of bulk containers:

Types of bulk containers	Code
Sheeted bulk container	BK1
Closed bulk container	BK2
Flexible bulk container	BK 3

6.11.2.4 In order to take account of progress in science and technology, the use of alternative arrangements which offer at least equivalent safety as provided by the requirements of this chapter may be considered by the competent authority.

6.11.3 REQUIREMENTS FOR THE DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF CONTAINERS CONFORMING TO THE CSC USED AS BK1 OR BK2 BULK CONTAINERS

6.11.3.1 Design and construction requirements

6.11.3.1.1 The general design and construction requirements of this sub-section are deemed to be met if the bulk container complies with the requirements of ISO 1496-4:1991 "Series 1 Freight containers – Specification and testing – Part 4: Non pressurized containers for dry bulk" and the container is siftproof.

6.11.3.1.2 Containers designed and tested in accordance with ISO 1496-1:1990 "Series 1 Freight containers – Specification and testing – Part 1: General cargo containers for general purposes" shall be equipped with operational equipment which, including its connection to the container, is designed to strengthen the end walls and to improve the longitudinal restraint as necessary to comply with the test requirements of ISO 1496- 4:1991 as relevant.

6.11.3.1.3 Bulk containers shall be sift-proof. Where a liner is used to make the container sift-proof it shall be made of a suitable material. The strength of material used for, and the construction of, the liner shall be appropriate to the capacity of the container and its intended use. Joins and closures of the liner shall withstand pressures and impacts liable to occur under normal conditions of handling and carriage. For ventilated bulk containers any liner shall not impair the operation of ventilating devices.

6.11.3.1.4 The operational equipment of bulk containers designed to be emptied by tilting shall be capable of withstanding the total filling mass in the tilted orientation.

6.11.3.1.5 Any movable roof (roof section) or side or end wall shall be fitted with locking devices with

securing devices designed to show the locked state to an observer at ground level.

6.11.3.2 Service equipment

6.11.3.2.1 Filling and discharge devices shall be so constructed and arranged as to be protected against the risk of being wrenched off or damaged during carriage and filling/discharging. The filling and discharge devices shall be capable of being secured against unintended opening. The "open" and "closed" position and direction of closure shall be clearly indicated.

6.11.3.2.2 Seals of openings shall be so arranged as to avoid any damage by the operation, filling and emptying of the bulk container.

6.11.3.2.3 Where ventilation is required bulk containers shall be equipped with means of air exchange, either by natural convection, e.g. by openings, or active elements, e.g. fans. The ventilation shall be designed to prevent negative pressures in the container at all times. Ventilating elements of bulk containers for the carriage of flammable substances or substances emitting flammable gases or vapours shall be designed so as not to be a source of ignition.

6.11.3.3 Inspection and testing

6.11.3.3.1 Containers used, maintained and qualified as bulk containers in accordance with the requirements of this section shall be tested and approved in accordance with the CSC.

6.11.3.3.2 Containers used and qualified as bulk containers shall be inspected periodically according to the CSC.

6.11.3.4 Marking

6.11.3.4.1 Containers used as bulk containers shall be marked with a Safety Approval Plate in accordance with the CSC.

6.11.4 REQUIREMENTS FOR THE DESIGN, CONSTRUCTION AND APPROVAL OF BK1 AND BK2 BULK CONTAINERS OTHER THAN CONTAINERS CONFORMING TO THE CSC

***Note:** When containers conforming to the provisions of this section are used for the carriage of solids in bulk, the following statement shall be shown on the transport document:
"Bulk container BK(X)¹ approved by the competent authority of ..." (see 5.4.1.1.17).*

6.11.4.1 Bulk containers covered in this section include skips, offshore bulk containers, bulk bins, swap bodies, trough shaped containers, roller containers, and load compartments of wagons.

6.11.4.2 These bulk containers shall be designed and constructed so as to be strong enough to withstand the shocks and loadings normally encountered during carriage including, as applicable, transshipment between modes of transport

6.11.4.3 (Reserved)

6.11.4.4 These bulk containers shall be approved by the competent authority and the approval shall include the code for designating types of bulk containers in accordance with 6.11.2.3 and the requirements for inspection and testing as appropriate.

6.11.4.5 Where it is necessary to use a liner in order to retain the dangerous goods, it shall meet the provisions of 6.11.3.1.3.

¹ (x) shall be replaced with "1" or "2" as appropriate

6.11.5 Requirements for the design, construction, inspection and testing of BK 3 flexible bulk containers

6.11.5.1 *Design and construction requirements*

- 6.11.5.1.1** Flexible bulk containers shall be sift-proof.
- 6.11.5.1.2** Flexible bulk containers shall be completely closed to prevent the release of contents.
- 6.11.5.1.3** Flexible bulk containers shall be waterproof.
- 6.11.5.1.4** Parts of the flexible bulk container which are in direct contact with dangerous goods:
 - (a) shall not be affected or significantly weakened by those dangerous goods;
 - (b) shall not cause a dangerous effect, e.g. catalysing a reaction or reacting with the dangerous goods; and
 - (c) shall not allow permeation of the dangerous goods that could constitute a danger under normal conditions of carriage.

6.11.5.2 *Service equipment and handling devices*

- 6.11.5.2.1** Filling and discharge devices shall be so constructed as to be protected against damage during carriage and handling. The filling and discharge devices shall be secured against unintended opening.
- 6.11.5.2.2** Slings of the flexible bulk container, if fitted, shall withstand pressure and dynamic forces, which can appear in normal conditions of handling and carriage.
- 6.11.5.2.3** The handling devices shall be strong enough to withstand repeated use.

6.11.5.3 *Inspection and testing*

- 6.11.5.3.1** The design type of each flexible bulk container shall be tested as provided for in 6.11.5 in accordance with procedures established by the competent authority allowing the allocation of the mark and shall be approved by this competent authority.
- 6.11.5.3.2** Tests shall also be repeated after each modification of the design type, which alters the design, material or manner of construction of a flexible bulk container.
- 6.11.5.3.3** Tests shall be carried out on flexible bulk containers prepared as for carriage. Flexible bulk containers shall be filled to the maximum mass at which they may be used and the contents shall be evenly distributed. The substances to be carried in the flexible bulk container may be replaced by other substances, except where this would invalidate the results of the test. When another substance is used it shall have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total mass of the flexible bulk container, so long as they are placed so that the test results are not affected.
- 6.11.5.3.4** Flexible bulk containers shall be manufactured and tested under a quality assurance programme which satisfies the competent authority, in order to ensure that each manufactured flexible bulk container meets the requirements of this Chapter.
- 6.11.5.3.5 *Drop test***
 - 6.11.5.3.5.1 *Applicability***

For all types of flexible bulk containers, as a design type test.
 - 6.11.5.3.5.2 *Preparation for testing***

The flexible bulk container shall be filled to its maximum permissible gross mass.
 - 6.11.5.3.5.3 *Method of testing***

The flexible bulk container shall be dropped onto a target surface that is non-resilient and horizontal. The target surface shall be:

- (a) Integral and massive enough to be immovable;
- (b) Flat with a surface kept free from local defects capable of influencing the test results;
- (c) Rigid enough to be non-deformable under test conditions and not liable to become damaged by the tests; and
- (d) Sufficiently large to ensure that the test flexible bulk container falls entirely upon the surface.

Following the drop, the flexible bulk container shall be restored to the upright position for observation.

6.11.5.3.5.4 Drop height shall be:

Packing group III: 0.8 m.

6.11.5.3.5.5 *Criteria for passing the test*

- (a) There shall be no loss of contents. A slight discharge, e.g. from closures or stitch holes, upon impact shall not be considered to be a failure of the flexible bulk container provided that no further leakage occurs after the container has been restored to the upright position;
- (b) There shall be no damage, which renders the flexible bulk container unsafe to be carried for salvage or for disposal.

6.11.5.3.6 ***Top lift test***

6.11.5.3.6.1 *Applicability*

For all types of flexible bulk containers as a design type test.

6.11.5.3.6.2 *Preparation for testing*

Flexible bulk containers shall be filled to six times the maximum net mass, the load being evenly distributed.

6.11.5.3.6.3 *Method of testing*

A flexible bulk container shall be lifted in the manner for which it is designed until clear of the floor and maintained in that position for a period of five minutes.

6.11.5.3.6.4 *Criteria for passing the test*

There shall be no damage to the flexible bulk container or its lifting devices which renders the flexible bulk container unsafe for carriage or handling, and no loss of contents.

6.11.5.3.7 ***Topple test***

6.11.5.3.7.1 *Applicability*

For all types of flexible bulk containers as a design type test.

6.11.5.3.7.2 *Preparation for testing*

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.11.5.3.7.3 *Method of testing*

A flexible bulk container shall be toppled onto any part of its top by lifting the side furthest from the drop edge upon a target surface that is non-resilient and horizontal. The target

surface shall be:

- (a) Integral and massive enough to be immovable;
- (b) Flat with a surface kept free from local defects capable of influencing the test results;
- (c) Rigid enough to be non-deformable under test conditions and not liable to become damaged by the tests; and
- (d) Sufficiently large to ensure that the tested flexible bulk container falls entirely upon the surface.

6.11.5.3.7.4 For all flexible bulk containers, the topple height is specified as follows:

Packing group III: 0.8 m.

6.11.5.3.7.5 *Criterion for passing the test*

There shall be no loss of contents. A slight discharge, e.g. from closures or stitch holes, upon impact shall not be considered to be a failure of the flexible bulk container provided that no further leakage occurs.

6.11.5.3.8 ***Righting test***

6.11.5.3.8.1 *Applicability*

For all types of flexible bulk containers designed to be lifted by the top or side part, as a design type test.

6.11.5.3.8.2 *Preparation for testing*

The flexible bulk container shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass.

6.11.5.3.8.3 *Method of testing*

The flexible bulk container, lying on its side, shall be lifted at a speed of at least 0.1 m/s to an upright position, clear of the floor, by no more than half of the lifting devices.

6.11.5.3.8.4 *Criterion for passing the test*

There shall be no damage to the flexible bulk container or its lifting devices which renders the flexible bulk container unsafe for carriage or handling.

6.11.5.3.9 ***Tear test***

6.11.5.3.9.1 *Applicability*

For all types of flexible bulk containers as a design type test.

6.11.5.3.9.2 *Preparation for testing*

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.11.5.3.9.3 *Method of testing*

With the flexible bulk container placed on the ground, a 300 mm cut shall be made, completely penetrating all layers of the flexible bulk container on a wall of a wide face. The cut shall be made at a 45° angle to the principal axis of the flexible bulk container, halfway between the bottom surface and the top level of the contents. The flexible bulk container shall then be subjected to a uniformly distributed superimposed load equivalent to twice the maximum gross mass. The load must be applied for at least fifteen minutes. A flexible bulk container which is designed to be lifted from the top or the side shall, after removal of the superimposed load, be

lifted clear of the floor and maintained in that position for a period of fifteen minutes.

- 6.11.5.3.9.4** Criterion for passing the test
The cut shall not propagate more than 25% of its original length.

6.11.5.3.10 Stacking test

- 6.11.5.3.10.1** Applicability
For all types of flexible bulk containers as a design type test.

- 6.11.5.3.10.2** Preparation for testing
The flexible bulk container shall be filled to its maximum permissible gross mass.

- 6.11.5.3.10.3** Method of testing
The flexible bulk container shall be subjected to a force applied to its top surface that is four times the design load-carrying capacity for 24 hours.

- 6.11.5.3.10.4** Criterion for passing the test

There shall be no loss of contents during the test or after removal of the load.

6.11.5.4 Test report

- 6.11.5.4.1** A test report containing at least the following particulars shall be drawn up and shall be available to the users of the flexible bulk container:

1. Name and address of the test facility;
2. Name and address of applicant (where appropriate);
3. Unique test report identification;
4. Date of the test report;
5. Manufacturer of the flexible bulk container;
6. Description of the flexible bulk container design type (e.g. dimensions, materials, closures, thickness, etc) and/or photograph(s);
7. Maximum capacity/maximum permissible gross mass;
8. Characteristics of test contents, e.g. particle size for solids;
9. Test descriptions and results;
10. The test report shall be signed with the name and status of the signatory.

- 6.11.5.4.2** The test report shall contain statements that the flexible bulk container prepared as for carriage was tested in accordance with the appropriate provisions of this Chapter and that the use of other containment methods or components may render it invalid. A copy of the test report shall be available to the competent authority.

6.11.5.5 Marking

- 6.11.5.5.1** Each flexible bulk container manufactured and intended for use according to the provisions of shall bear marks that are durable, legible and placed in a location so as to be readily visible. Letters, numerals and symbols shall be at least 24 mm high and shall show:



- (a) The United Nations packaging symbol . This symbol shall not be used for any purpose other than certifying that a packaging, a flexible bulk container, a portable tank or an MEGC complies with the relevant requirements in Chapters 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.11;

- (b) The code BK 3;

(c) A capital letter designating the packing group(s) for which the design type has been approved:

Z for packing group III only;

(d) The month and year (last two digits) of manufacture;

(e) The character(s) identifying the country authorizing the allocation of the mark, indicated by the distinguishing sign used on vehicles in international road traffic²;

(f) The name or symbol of the manufacturer and other identification of the flexible bulk container as specified by the competent authority;

(g) The stacking test load in kg;

(h) The maximum permissible gross mass in kg.

The marks shall be applied in the sequence shown in (a) to (h); each mark, required in these subparagraphs, shall be clearly separated, e.g. by a slash or space and presented in a way that ensures that all of the parts of the mark are easily identified.

6.11.5.5.2

Example of marking



BK3/Z/11 09

RUS/NTT/MK-14-10
56000/14000.

² Distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

CHAPTER 6.20

REQUIREMENTS FOR THE CONSTRUCTION, EQUIPMENT, COMPLIANCE VERIFICATION (TYPE APPROVAL), INSPECTIONS AND TESTS, AND MARKING OF TANK-WAGONS WITH SHELLS MADE OF METALLIC MATERIALS DESIGNED TO BE OPERATED ON 1520 MM GAUGE RAILWAYS

6.20.1 SCOPE

6.20.1.1 (Reserved)

6.20.1.2 This Chapter sets out the requirements applicable to tank-wagons with shells made of metals and intended to be operated on 1520-mm gauge railways.

6.20.1.3 Section 6.20.2 sets out the requirements applicable to tank-wagons intended for the carriage of substances of all classes. Sections 6.20.3 - 6.20.5 contain special requirements supplementing or modifying the requirements of section 6.20.2.

6.20.1.4 For provisions concerning use of these tanks, see Chapter 4.3.

6.20.1.5 (reserved)

6.20.1.6 Definitions

For the purposes of this section:

Fine-grained steel means steel which has a ferritic grain size of 6 or finer when determined in accordance with ISO 643:2012.

Malleable metal means a metal which is capable of plastic deformation in a certain range of temperatures.

Operating manual means a document containing information about the design, principle of operation, characteristics (features) of a product along with instructions needed for correct and safe operation of the product (use for intended purpose, periodic and routine maintenance, requirements to a tank-wagon's' inspections, storage and carriage), and evaluation of its technical condition in order to determine whether it needs to be sent for repair, as well as information on the proper disposal of the product.

Technical specifications means a standardization document that sets out requirements to the quality and safety of a specific product or a specific product category which requirements are necessary and sufficient for their identification, quality control, and safety during their manufacturing, transport, storage, and use.

Remanufacturing of a wagon means repair performed to restore a wagon to its full or nearly full service life; involves the replacement or restoration of any parts of the wagon, including its basic parts.

Reconditioning of a wagon means repair performed to restore the proper technical condition and partially restore its service life; involves replacement or restoration of a limited range of parts, and verifying the technical condition of all parts.

Effective design pressure¹ means the sum of the vapour pressure of liquid or gas at the highest working temperature and the hydraulic shock pressure at an impact interaction of the tank-wagon with the adjoining wagons.

Effective test pressure² means pressure determined based on the effective design pressure.

6.20.2 REQUIREMENTS APPLICABLE TO ALL CLASSES

6.20.2.1 Construction

Basic principles

6.20.2.1.1 Shells, their service and structural equipment shall be designed to withstand without loss of contents (other than quantities of gas escaping through any degassing vents):

- Static and dynamic stresses in normal conditions of carriage as defined in 6.20.2.1.2 and 6.20.2.1.13.

In addition, the minimum thickness of the wall of the shell shall be ensured to meet the requirements of 6.20.2.1.15, 6.20.2.1.16, and 6.20.2.1.17.

6.20.2.1.2 Tank-wagons shall be designed to withstand stresses that may occur in the course of their operation and are identified in applicable national and/or international standards.³

6.20.2.1.3 The thickness of the shell walls shall at least meet the values set out in 6.20.2.1.17 and 6.20.2.1.18.

6.20.2.1.4 Shells shall be designed and constructed to meet the requirements of documents listed in 6.20.2.6 or of a technical code recognized by the competent authority, in accordance with 6.20.2.7, in which the material is chosen and the shell thickness determined taking into account maximum and minimum filling and working temperatures, but the following minimum requirements of 6.20.2.6 to 6.20.2.1.28 shall be met.

6.20.2.1.5 Tanks intended to contain certain dangerous substances shall be provided with additional protection. This may take the form of additional thickness of the shell (increased design pressure) determined in the light of the dangers inherent in the substances concerned or of a protective device (see the special provisions of 6.20.4).

6.20.2.1.6 Welds shall be skilfully made and shall afford the fullest reliability and safety. The execution and checking of welds shall comply with the requirements of 6.20.2.1.23.

6.20.2.1.7 Measures shall be taken to protect shells against the risk of deformation as a result of a negative internal pressure (vacuum).

Shells, other than shells according to 6.20.2.2.6, designed to be equipped with vacuum valves shall be able to withstand an external pressure of not less than 21 kPa (0.21 bar) above the internal pressure. Shells used for the carriage of solid substances (powdery or granular) of packing groups II or III only, which do not liquefy during carriage, shall be designed for an external pressure of not less than 5 kPa (0.05 bar). The vacuum valves shall be set to relieve at a vacuum setting not greater than the tank's design vacuum pressure. Shells which are not designed to be equipped with a vacuum valve shall be able to withstand an external pressure that may occur during the operation of the shell but not less than 40 kPa (0.4 bar) above the internal pressure.

Materials for shells

¹ This term corresponds to the term "design pressure" specified in the document No. 42A0 of the List.

² This term corresponds to the term "test pressure" specified in the document No. 42A0 of the List.

³ These requirements are deemed to be met if the competent authority, under the procedures and technical code prescribed by the national or international regulations, has conducted an analysis of conformance and evidenced its decision with an appropriate certificate of conformance (declaration or certificate of compliance).

6.20.2.1.8 Shells shall be made of suitable metallic materials which, unless other temperature ranges are prescribed in the various classes, shall be resistant to brittle fracture and to stress corrosion cracking between –60 °C and +50 °C. Other temperature ranges may be adopted if approved by the competent authority.

6.20.2.1.9 The materials of shells and/or of their protective linings which are in contact with the contents shall not contain substances liable to react dangerously (see "Dangerous reaction" in 1.2.1) with the contents, to form dangerous compounds, or appreciably to weaken the material.

If contact between the substance carried and the material used for the construction of the shell entails a progressive decrease in the shell thickness, this thickness shall be increased at manufacture by an appropriate amount. This additional thickness to allow for corrosion shall not be taken into consideration in calculating the shell thickness.

6.20.2.1.10 For welded shells only materials of faultless weldability whose adequate impact strength at an ambient temperature of minus 60 °C can be guaranteed, particularly in the weld seams and the welding heat-affected zone, shall be used.

Other temperature ranges may be adopted if approved by the competent authority.

If fine-grained steel is used, the guaranteed value of the yield strength R_e shall not exceed 460 MPa and the guaranteed value of the upper limit of tensile strength R_m shall not exceed 725 MPa, in accordance with the specifications of the material.

6.20.2.1.11 Ratios of R_e/R_m exceeding 0.85 are not allowed for steels used in the construction of welded shells,

where:

R_e = apparent yield strength for steels having a clearly-defined yield point or guaranteed 0.2% proof strength for steels with no clearly-defined yield point, or 1% for austenitic steels;

R_m – tensile strength.

The values specified in the inspection certificate for the material shall be taken as a basis in determining this ratio in each case.

6.20.2.1.12 For steel, the elongation at fracture, in % shall be not less than

$$\frac{10000}{\text{determined tensile strength in MPa}} \%$$

but in any case for fine-grained steels it shall be not less than 16 % and not less than 20 % for other steels.

For aluminium alloys the elongation at fracture shall be not less than 12% ⁴.

Calculation of the shell thickness

6.20.2.1.13 The pressure on which the shell thickness is based shall be determined as prescribed in 6.20.2.1.14, 6.20.2.1.15.1, 6.20.2.4.1, and 6.20.3.4.2.

In the case of wagons in which the tank constitutes a stressed self-supporting member, the shell shall be designed to withstand the stresses thus imposed in addition to stresses from other sources.

6.20.2.1.14 The design pressure is in the second part of the shell code (see 4.3.4.1) according to Column 12 of Table A of Chapter 3.2.

When the letter "G" appears, the following requirements shall apply:

⁴ In the case of sheet-metal the axis of the tensile test-piece shall be at right angles to the direction of rolling. The permanent elongation at fracture, shall be measured on a test-piece of circular cross-section in which the gauge length "l" is equal to five times the diameter "d" ($l = 5d$); if test pieces of rectangular cross-section are used, the gauge length "l" shall be calculated by the formula: $l = 5.65 \sqrt{F_0}$ where F_0 indicates the initial cross-sectional area of the test-piece.

- a) Gravity-discharge shells intended for the carriage of substances having a vapour pressure not exceeding 110 kPa (1.1 bar) (absolute pressure) at 50 °C shall be designed for a design pressure of twice the static pressure of the substance to be carried but not less than twice the static pressure of water.
- b) Pressure-filled or pressure-discharge shells intended for the carriage of substances having a vapour pressure not exceeding 110 kPa (1.1 bar) (absolute pressure) at 50 °C shall be designed for a design pressure equal to 1.3 times the maximum filling or discharge pressure.

When the numerical value of the minimum design pressure is given (gauge pressure), the shell shall be designed for this pressure which shall not be less than 1.3 times the filling or discharge pressure. The following minimum requirements shall apply in these cases:

- c) Shells intended for the carriage of substances having a vapour pressure of more than 110 kPa (1.1 bar) at 50 °C and a boiling point of more than 35 °C shall, whatever their filling or discharge system, be designed for a design pressure of not less than 150 kPa (1.5 bar) gauge pressure or 1.3 times the filling or discharge pressure, whichever is the higher.
- d) Shells intended for the carriage of substances having a boiling point of not more than 35 °C shall, whatever their filling or discharge system, be designed for a design pressure equal to 1.3 times the filling or discharge pressure but not less than 0.4 MPa (4 bar) (gauge pressure).

6.20.2.1.15 For the purposes of calculating the minimal material-dependent wall thickness, the stress σ in the shell shall not exceed the limits set out in 6.20.2.1.16. Allowance shall be made for any weakening due to the welds.

6.20.2.1.15.1 The pressure of a hydraulic shock is calculated by the formula:

$$P_h = N \cdot \frac{m_s}{m_{gr}} \cdot \frac{1}{F}; [\text{MPa}]$$

where:

N = the force of impact on the automatic coupling as defined in national and/or international standards and regulations but not less than 2.5 MN;

m_s = the mass of the substance in a shell based on the full load capacity of the tank-wagon, [kg];

m_{gr} = the gross mass of the tank-wagon, [kg];

F = the area of the shell's internal cross-section, [m²].

6.20.2.1.16 At the design pressure determined under 6.20.2.1.14 and at the test pressure determined under 6.20.2.4.1, the stress σ in the shell shall, for all metals and alloys, be lower than the smaller of the values given by the following formulae:

$$\sigma \leq 0,75 \cdot R_e \text{ or } \sigma \leq 0,5 \cdot R_m$$

where:

R_e = minimal guaranteed tensile yield strength or conventional yield limit at residual elongation of 0.2%. For austenitic steels, R_e is assumed to be 1%.

R_m = tensile strength.

At the effective design pressure determined under 6.20.2.1.15.1, and effective test pressure determined under 6.20.2.4.1, permissible values of stress shall be determined as described in document No. 42A0 of the *List*⁵.

When austenitic steels are used, the specified minimum values according to the material standards may be exceeded by up to 15% if these higher values are attested in the inspection certificate. The minimum values shall, however, not be exceeded when the formula given in 6.20.2.1.18 is applied.

For tanks intended to be operated at temperatures of 50 °C or greater, the stress limits shall be reduced as directed by the competent authorities.

Minimum design shell thickness

6.20.2.1.17 The minimum shell wall thickness at the design pressure determined under 6.20.2.1.14 and test pressure under 6.20.2.4.1 shall not be less than the greater of the values determined by the following formulae:

$$e = \frac{P_c D}{2[\sigma]\lambda}; e = \frac{P_t D}{2[\sigma]},$$

where:

e = minimum shell thickness in mm;

P_t = test pressure in MPa as specified in 6.20.2.4.1;

P_c = design pressure in MPa as specified in 6.20.2.1.14 or in the table of 4.3.3.1.1;

D = internal diameter of shell in mm;

$[\sigma]$ = permissible stress, as defined in 6.20.2.1.16 for both the design and test stress, in MPa;

λ = a coefficient not exceeding 1, allowing for any weakening due to welds, and linked to the inspection methods defined in 6.20.2.1.23.

The minimum shell wall thickness at the effective design pressure determined under 6.20.2.1.15.1 and effective test pressure determined under 6.20.2.4.1 shall be determined as specified in document No. 42A0 of the *List*⁵.

The minimum shell wall thickness shall not be less than the greatest of the values determined as required by this section.

6.20.2.1.18 In addition to the requirements specified in 6.20.2.1.17, the shell wall shall not be less than 6 mm thick if of mild steel⁵ or of equivalent thickness if of another metal. If the shell is intended for the carriage of powdery or granular substances, this thickness may be reduced to 5 mm for mild steel or to an equivalent thickness for other metals. Whichever metal is used, the minimum wall thickness of the shell shall in no case be less than 4.5 mm.

"Equivalent thickness" means the thickness obtained by the following formula⁶: $e_1 = \frac{464e_0}{\sqrt[3]{(R_{m1}A_1)^2}}$

⁵ For the purposes of calculation under document No. 42A0 of the *List*, the terms "effective design pressure" and "effective test pressure" used in chapter 6.20 and defined in paragraph 6.20.1.5, shall be synonymous to the terms "design pressure" and "test pressure", respectively, as used in document No. 42A0 of the *List*.

⁶ This formula is derived from the general formula:

$$e_1 = e_0 \sqrt[3]{\left(\frac{R_{m0}A_0}{R_{m1}A_1}\right)^2},$$

where

e_1 = minimum shell thickness for the metal chosen, in mm;

e_0 = minimum shell thickness for mild steel, in mm, according to 6.20.2.1.18;

R_{m0} = 370 MPa (tensile strength limit for reference steel in MPa; (see 1.2.1);

A_0 = 27 elongation at fracture for reference steel, in %;

R_{m1} = minimum tensile strength of the metal chosen, in N/mm²; and

A_1 = minimum elongation at fracture of the metal chosen under tensile stress, in %.

- 6.20.2.1.19 (Reserved)
- 6.20.2.1.20 (Reserved)
- 6.20.2.1.21 (Reserved)
- 6.20.2.1.22 (Reserved)

Welding and inspection of welds

- 6.20.2.1.23 The ability of the manufacturer to perform welding operations shall be recognized by the competent authority. Welding shall be performed by qualified welders using a qualified welding process whose effectiveness (including any heat treatments required) has been demonstrated by tests. Tests shall be carried out by radiography, ultrasound or other non-destructive test methods and shall confirm the required quality of the welds.

Note: When 6.20.5 is applied, tests for impact strength performed to attest the welding techniques shall meet the requirements of 6.20.5.3.

The coefficients λ used in determining the thickness of the shell in 6.20.2.1.17, shall, depending on the scope of the non-destructive testing and the type of the weld, be set in accordance with the table

Type of weld and method of welding	Value of the weld strength coefficients	
	Length of welds to be examined is 100% of the total length*	Length of welds to be examined is 10 to 50% of the total length *
Both-faces continuous butt or "Tee" weld made with automatic or semi-automatic equipment	1,0	0,9**
Butt weld with a root pass or both-faces continuous "Tee" weld made with manual equipment	1,0	0,9**
Butt weld accessible on one side only and having in the process of welding a metal filler backing on the root side abutting the primary metal along the entire length of the weld	0,9	0,8
"Tee" weld with a structural gap between the welded parts	0,8	0,65
Butt weld made with automatic or semi-automatic equipment on one side with a flux or ceramic filler	0,9	0,8
Butt weld made manually on one side	0,9	0,65

* – The scope of testing is determined by the manufacturing requirement specification;

** – 50% of the total length of all longitudinal welds shall be examined

Irrespective of the value of the λ coefficient, all welds along their entire accessible length shall be inspected on both sides both visually and with measuring instruments.

If in the process of a non-destructive check with the scope from 10 to 50% an unacceptable defect is detected, the non-destructive checks shall be extended to the rest of the welds made by the same welder (operator) using the same process (technology) and weld type along the entire length of the junction.

Where the competent authority has doubts regarding the quality of welds, including the welds made to repair any defects revealed by the non-destructive checks, the competent authority may require additional checks to be performed.

Where austenitic steel or two-layer steel with the corrosion-resistant layer of austenitic steel is

used in welded shells, welds shall be tested for resistance to intercrystalline corrosion. The metal in the weld and heat-affected zone shall be resistant to intercrystalline corrosion. The technical conditions for tanks intended for the carriage of refrigerated liquefied gases shall be supplemented by rules specifying that these tanks shall be subjected to intercrystalline corrosion test.

Other construction requirements

- 6.20.2.1.24** The protective lining shall be so designed that its leakproofness remains intact, whatever the deformation liable to occur in normal conditions of carriage (see 6.20.2.1.2).
- 6.20.2.1.25** The thermal insulation of the shell shall be so designed as not to hinder access to, and/or the normal operation of, main equipment or devices.
- 6.20.2.1.26** If shells intended for the carriage of flammable liquids having a flash-point of not more than 60 °C are fitted with non-metallic protective linings (inner layers), the shells and the protective linings shall be so designed that no danger of ignition from electrostatic charges can occur.
- 6.20.2.1.27** The electrical resistance between any components of a shell (from the upper gangway to the rails) shall not exceed 0.15 ohms. All tank wagons should avoid any metal-to-metal contact that may cause electrochemical corrosion.
- 6.20.2.1.28** Tank-wagons shall be fitted with impact energy-absorbing devices with a nominal capacity of not less than 100 kJ unless otherwise required by 6.20.3.1.6 or special clause TE22 of 6.20.4.
- 6.20.2.1.29** (Reserved)

6.20.2.2 Items of equipment

- 6.20.2.2.1** Suitable non-metallic materials may be used to manufacture service and structural equipment.

Service and structural equipment welded to the shell shall be welded in such a way that the shell is protected from loss of leakproofness due to accidental stresses.

The following methods of protection may be used:

- Underframe connection: securing by means of a pad ensuring distribution of dynamic loads;
- Supports for upper gangway, access ladder, drainage pipes, valve control mechanisms and other load transmission brackets: securing by means of weld-on reinforcement plate;
- Appropriate dimensioning or other protective measures (e.g. designated breaking point).

The items of equipment of tank-wagons (the filling and discharge devices, measuring instruments and safety devices) shall be so arranged as to rule out the possibility of their being wrenched off or damaged during carriage or handling. They shall be compatible with the substances carried and meet the requirements of 6.20.2.1.1.

Piping shall be designed, constructed and installed so as to avoid the risk of damage due to thermal expansion, contraction, mechanical shock or vibration.

In the event of overturning by 180°, the service equipment shall withstand pressure that is equal to the sum of the pressure of the liquid column of the substance carried and the vapour pressure at 50 °C without a loss of hermeticity.

The gaskets shall be made of a material compatible with the substance carried and shall be replaced as soon as their effectiveness is impaired as a result of ageing.

Gaskets ensuring the leakproofness of fittings requiring manipulation during normal use of tanks shall be so designed and arranged that manipulation of the fittings incorporating them does not damage them.

- 6.20.2.2.2** Each bottom-discharge opening in tanks which are referred to in Column 12 of Table A of Chapter 3.2, with a tank code including the letter "A" in its third part (see 4.3.4.1.1) shall be equipped with at least two mutually independent closures, mounted in series, comprising:

- an internal primary stop-valve made of a malleable metal, and

- a closing device at the end of each pipe which may be a screw-threaded plug, a blank flange or an equivalent device. This closing device shall be sufficiently tight so that the substance is contained without loss. Measures shall be taken to enable the safe release of pressure in the discharge pipe before the closing device is completely removed.

Each bottom-discharge opening in tanks which are referred to, in Column (12) of Table A of Chapter 3.2, with a tank code including the letter "B" in its third part (see 4.3.3.1.1 or 4.3.4.1.1) shall be equipped with at least three mutually independent closures, mounted in series, comprising

- an internal primary stop-valve made of malleable metal mounted inside the shell or in a welded flange or companion flange;

- a duplicate stop-valve of malleable metal; and

- a closing device at the end of each pipe which may be a screw-threaded plug, a blank flange or an equivalent device. This closing device shall be sufficiently tight so that the substance is contained without loss. Measures shall be taken to enable the safe release of pressure in the discharge pipe before the closing device is completely removed.

In the case of tanks intended for the carriage of certain crystallisable or highly viscous substances and shells fitted with a protective lining, the internal stop-valve may be replaced by an external stop-valve provided with additional protection.

The internal stop-valve shall be operable either from above or from below. Internal stop-valve control devices shall be so designed as to prevent any unintended opening through impact or an inadvertent act.

The internal shut-off device shall continue to be effective in the event of damage to the external control device.

In order to avoid any loss of contents in the event of damage to the external fittings (pipes, lateral shut-off devices), the internal stop-valve and its seating shall be protected against the danger of being wrenched off by external stresses or shall be so designed as to resist them. The filling and discharge devices (including flanges or threaded plugs) and protective caps (if any) shall be capable of being secured against any unintended opening.

The position and direction of closure of shut-off devices shall be clearly apparent.

All openings of tanks which are referred to in Column (12) of Table A of Chapter 3.2, by a tank code including letter "C" or "D" in its third part (see 4.3.3.1.1 and 4.3.4.1.1) shall be situated above the surface level of the liquid. These tanks shall have no pipes or pipe connections below the surface level of the liquid. The cleaning openings are, however, permitted to be situated below the surface level of the liquid for tanks referred to by a tank code including letter "C" in its third part. This opening shall be capable of being sealed by a flange so closed as to be leak-proof and whose design shall be approved by the competent authority or by a body designated by that authority.

6.20.2.2.3

Tanks that are not hermetically closed may be fitted with vacuum (inlet) valves or with self-operating ventilation valves to avoid an unacceptable negative internal pressure (vacuum) in the shell; these valves shall be set to relieve at a vacuum setting not greater than the vacuum pressure for which the tank has been designed (see 6.20.2.1.7). Hermetically closed tanks shall not be fitted with vacuum valves or with self-operating ventilation valves.

Tanks of the tank code SGAH, S4AH or L4BH, fitted with these valves which open at a negative pressure of not less than 21 kPa (0.21 bar) shall be considered as being hermetically closed. For tanks intended for the carriage of solid substances (powdery or granular) of packing group II or III only, which do not liquefy during transport, the negative pressure (vacuum) may be reduced to not less than 5 kPa (0.05 bar).

Vacuum valves and self-operating ventilation valves and breather devices (see 6.20.2.2.6) used on tanks intended for the carriage of substances meeting the flash-point criteria of Class 3,

shall prevent the immediate passage of flame into the shell by means of a suitable protective device.

If the protective device consists of a suitable flame trap or flame arrester, it shall be positioned as close as possible to the shell or the shell compartment. For multi-compartment tanks, each compartment shall be protected separately.

For tanks with self-operating ventilation valves, the connection between the self-operating ventilation valve and the bottom valve shall be arranged so as to preclude the valves from opening and the contents from escaping onto the external surface of the tank in case of mishandling or an accidental impact.

6.20.2.2.4 The shell or each of its compartments shall be provided with an opening large enough to permit inspection.

With the concurrence of the competent authority, these openings shall be provided with closures designed in conformance with document No. 42A0 of the *List*. Hinged dome covers for tanks with a test pressure of more than 0.6 MPa (6 bar) shall not be permitted.

6.20.2.2.5 (Reserved)

6.20.2.2.6 Tanks intended for the carriage of liquids having a vapour pressure of not more than 110 kPa (1.1 bar) (absolute) at 50 °C shall have a breather device and a safety device to prevent the contents from spilling out if the tank overturns; otherwise they shall conform to 6.20.2.2.7 or 6.20.2.2.8.

6.20.2.2.7 Tanks intended for the carriage of liquids having a vapour pressure of more than 110 kPa (1.1 bar) at 50 °C and a boiling point of more than 35 °C shall have a safety valve set at not less than 150 kPa (1.5 bar) (gauge pressure) and which shall be fully open at a pressure not exceeding the effective test pressure; otherwise they shall conform to 6.20.2.2.8. In each specific case, the opening pressure shall be determined in conformance with document No. 42A1 of the *List*.

6.20.2.2.8 Tanks intended for the carriage of liquids having a boiling point of not more than 35 °C shall have a safety valve set at not less than 300 kPa (3 bar) gauge pressure and which shall be fully open at a pressure not exceeding the test pressure; otherwise they shall be hermetically closed⁷. In each specific case, the opening pressure shall be determined in conformance with document No. 42A1 of the *List*.

6.20.2.2.9 Movable parts such as covers, closures, etc., which are liable to come into frictional or percussive contact with aluminium shells intended for the carriage of flammable liquids having a flash-point of not more than 60 °C or for the carriage of flammable gases shall not be made of unprotected corrodible steel.

6.20.2.2.10 If tanks required to be hermetically closed are equipped with safety valves, these shall be preceded by a bursting disc, and the following conditions shall be observed:

- the arrangement of the bursting disc and safety valve shall be such as to satisfy the competent authority;
- a pressure gauge or another suitable indicator shall be provided in the space between the bursting disc and the safety valve, to ascertain the of the disc;
- the minimum burst pressure of the disc shall be greater than or equal to 1.02 times the effective design pressure;
- the maximum burst pressure of the membrane shall be less than or equal to 1.20 times the effective design pressure.

6.20.2.2.11 Glass level-gauges or level-gauges made of other fragile materials that are in direct contact with the contents of the shell shall not be used.

⁷ For the definition of "hermetically closed tank" see 1.2.1.

6.20.2.3 Conformance analysis (official design type approval)

6.20.2.3.1 The competent authority or a body designated by that authority shall perform a conformance analysis and, based on its outcomes, issue to the applicant a certificate of conformance (declaration of conformance) concerning the tank of the tank-wagon attesting that it has been made as required by the design documentation and Technical Requirements.

The certificate (declaration) of conformance concerning the tank of the tank-wagon shall show:

- information about the tests performed;
- the number of the design documentation and/or Technical Specifications for the tank of a tank-wagon.

The Technical Specifications for a tank-wagon shall indicate the set of design documentation and/or Technical Requirements associated with the tank of the tank wagon used as a construction element of the tank wagon.

The Technical Specifications and Operating Manual of the a tank wagon, as approved by the competent authority, certify the conformance of the tank-wagon to the design requirements set out in 6.20.2.1, requirements to equipment set out in 6.20.2.2, and special requirements to the substances of various class for the carriage of which the tank-wagon is intended. These documents shall also specify the following:

- the tank code in accordance with 4.3.3.1.1 or 4.3.4.1.1. If the effective design pressure or effective test pressure are greater than the corresponding values of the design pressure or test pressure determined in accordance with the requirements of 4.3.3.1.1 or 4.3.4.1.1, the second part of the tank code shall specify the values of the effective design pressure or effective test pressure;
- the alphanumeric codes of special provisions of construction (TC), equipment (TE) and type approval (TA) of 6.20.4 which are shown in column (13) of Table A of Chapter 3.2 for those substances for the carriage of which the tank has been approved;
- the substances and/or group of substances for the carriage of which the tank has been approved⁸.

The documents shall indicate the UN number, proper shipping name, packing group, and, if necessary, technical name of the goods.

With the exception of substances of Class 2 and those listed in 4.3.4.1.3, the listing of approved substances may be dispensed with⁷. In such cases, groups of substances permitted on the basis of the tank code shown in the tank hierarchy in 4.3.4.1.2 shall be accepted for carriage taking into account any relevant special provision.

The characteristics of the goods for the carriage of which the tank-wagon is designed shall be compatible with the characteristics of the tank-wagon.

Copies of the certificate of conformance (type approval) and operating manual shall be included into the set of technical documentation (see 4.3.2.1.7) for each newly built (refurbished) tank-wagons and/or batch of newly built (refurbished) tank-wagons.

6.20.2.3.2 (Reserved)

6.20.2.3.3 (Reserved)

6.20.2.3.4 In the event that modifications have been made to the construction of a tank-wagon that has a valid Certificate of Conformance (Declaration of Conformance or Certificate), the competent authority or an organization authorized by the competent authority shall apply a due procedure to verify the conformance of the construction to the requirements of the valid Certificate of

⁸ *The names of goods and/or group of goods for the carriage of which the tank-wagon is designed may be skipped in the Technical Specifications or Operating Manual of the tank-wagon if they are not required by national or international regulations.*

Conformance (Declaration of Conformance or Certificate), or to issue a new Certificate of Conformance (Declaration of Conformance or Certificate).

6.20.2.4 Inspections and tests

6.20.2.4.1 Each shell and its equipment shall either together or separately undergo an initial inspection before being put into service. This inspection shall include:

- a check of conformity to the approved Technical Specifications in conformance with which the tank-wagon shell was built;
- a check of the design characteristics⁹,
- an internal and external examination;
- a hydraulic pressure test¹⁰ at the test pressure indicated on the plate prescribed in 6.20.2.5.1;
- a leakproofness test¹¹ of the shell and its equipment, and a functional test of the shell equipment.

The hydraulic pressure test of the shell and its equipment shall be administered after all the other tests (inspections), and after all the detected defects have been corrected.

Except in the case of Class 2, the test pressure for the hydraulic pressure test depends on the design pressure and shall be at least equal to the pressure indicated below:

Design pressure (bar)	Test pressure (bar)
G ¹²	G ¹²
1.5	1.5
2.65	2.65
4	4
10	4
15	4
21	10 (4 ¹³)

The test pressure for goods of Class 2 shall be determined in accordance with 6.20.3.4.2.

In any case, the value of the test pressure for hydraulic testing shall not be less than the value of the effective test pressure determined by the formula:

$$P_{eff.test} = 1,25P_{eff.calc} \frac{[\sigma]_{20}}{[\sigma]_t}, \text{ where}$$

$P_{eff.calc}$ = the effective design pressure in MPa determined under 6.20.2.1.15.1; $[\sigma]_{20}$, $[\sigma]_t$ = permissible stress in the material of the shell at 20 °C and at the design temperature t , respectively, in MPa.

For the hydraulic test of the shell of a tank wagon, the pressure shall be equal to the test pressure or effective test pressure, whichever has the greater value.

The hydraulic pressure test shall be administered prior to the installation of thermal insulation and/or an outside casing as may be necessary.

If the shells and their equipment are tested separately, they shall be jointly subjected to a leakproofness test after assembly in accordance with 6.20.2.4.3.

⁹ The check of the design characteristics shall also include tests in accordance with 6.20.2.1.23, the taking of weld test-pieces (work samples), and the tests prescribed in 6.20.5.

¹⁰ In special cases and with the agreement of the competent authority, the hydraulic pressure test may be replaced by a pressure test using another liquid or gas, where such a test does not present any danger.

¹¹ For the pressure and substance to be used in leakproofness tests, see 6.20.2.4.3.

¹² G – Minimum design pressure according to the general requirements of 6.20.2.1.14 (see 4.3.4.1).

¹³ Minimum test pressure for UN No. 1744 BROMINE or UN No. 1744 BROMINE SOLUTION.

The leakproofness test shall be carried out separately on each compartment of compartmented shells.

6.20.2.4.2 Shells and their equipment shall undergo periodic inspections no later than every 8 years.

These periodic inspections shall include:

- An external and internal examination;
- A leakproofness test in accordance with 6.20.2.4.3 of the shell with its equipment;
- A check of the satisfactory operation of all the equipment;
- A hydraulic pressure test (for the test pressure for the shells and compartments if applicable, see 6.20.2.4.1).

Sheathing for thermal or other insulation shall be removed only to the extent required for reliable technical appraisal of the shell.

In the case of tanks intended for the carriage of powdery or granular substances, and with the agreement of the expert approved by the competent authority, the periodic hydraulic pressure tests may be omitted and replaced by leakproofness tests in accordance with 6.20.2.4.3 at a pressure at least equal to the maximum working pressure.

6.20.2.4.3 Shells and their equipment shall undergo intermediate inspections at least once every 4 years after the initial inspection and each periodic inspection. The periodicity of intermediate inspections shall be specified in the operating manual for the tank wagon. These intermediate inspections may be performed before or within three months after the specified date.

If an intermediate inspection is performed more than three months before the due date, another intermediate inspection shall be performed at the latest 4 years after this date.

These intermediate inspections shall include a leakproofness test of the shell with its equipment and check of the satisfactory operation of all the equipment. The tank shall be subjected to an effective internal pressure at least equal to the maximum working pressure. For tanks intended for the carriage of liquids or solids in the granular or powdery state, when a gas is used for the leakproofness test it shall be carried out at a pressure at least equal to 25% of the maximum working pressure. In all cases, it shall not be less than 20 kPa (0.2 bar) (gauge pressure).

The leakproofness test shall be carried out separately on each compartment of compartmented shells.

6.20.2.4.4 When the safety of the tank or of its equipment may have been impaired as a result of repairs, alterations or accident, an exceptional check shall be carried out.

The scope of an exceptional check shall be determined as a result of an inspection of the tank that has been identified as the one whose safety may have been impaired.

If an exceptional check fulfilling the requirements of 6.20.2.4.2 has been performed, then the exceptional check may be considered to be a periodic inspection.

6.20.2.4.5 The inspections in accordance with 6.20.2.4.1-6.20.2.4.4 may be carried out only by organizations approved by the competent authority that have all the necessary equipment and appropriately trained personnel and authorized under the relevant national laws to perform such inspections. Inspections in accordance with 6.20.2.4.1-6.20.2.4.4 of tank-wagons intended for the carriage of Class 2 goods shall be performed only by specialized organizations in compliance the national law. The results of inspections, and the due date of the next inspection, shall be entered into the tank's datasheet or appropriately documented in another way.

A copy of these documents containing the results of the inspection shall be attached to the tank record of each tank in operation (see 4.3.2.1.7).

6.20.2.4.6 (Reserved)

6.20.2.5 Marking

6.20.2.5.1 Every tank shall be fitted with a corrosion-resistant metal plate permanently attached to the tank in a place readily accessible for inspection. The following particulars at least shall be marked on the plate by stamping or by any other similar method. These particulars may be engraved directly on the walls of the shell itself, if the walls are so reinforced that the strength of the shell is not impaired:

- approval number¹⁴;
- manufacturer's name or mark;
- manufacturer's serial number;
- year of manufacture;
- test pressure (gauge pressure)¹⁵;
- external design pressure (see 6.20.2.1.7)¹⁵;
- capacity of the shell¹⁵, and in the case of multiple-compartment shells, the capacity of each compartment¹⁵ followed by the symbol "S" when the shells or the compartments of more than 7 500 litres are divided by surge plates into sections of not more than 7 500 litres capacity;
- design temperature of the wall¹⁵;
- date and type of the most recent inspection: "month, year" followed by a "P" when the inspection is the initial inspection or a periodic inspection in accordance with 6.20.2.4.1 or a periodic inspection in accordance with 6.20.2.4.2, or "month, year" followed by an "L" when the inspection is an intermediate inspection in accordance with 6.20.2.4.3;
- stamp of the expert or company's official stamp (see 6.20.2.4.5), who or which carried out the inspection;
- material of the shell and, where appropriate, the protective lining, and reference to materials standards, if available.

In addition, the maximum working pressure allowed shall be inscribed on pressure-filled or pressure-discharge tanks¹⁵.

Note: *The test pressure for hydraulic testing shall be determined taking into account the value of the effective test pressure (see 6.20.2.4.1 and 6.20.3.4.2)*

6.20.2.5.2 The following particulars shall be inscribed on both sides of the tank-wagon (on the tank itself or on plates):

- vehicle keeper mark or name of operator;
- capacity of the shell¹⁵;
- unladen mass of tank-wagon¹⁵;
- load capacity of the tank-wagon¹⁵;
- for the substances according to 4.3.4.1.3, the proper shipping name of the substance(s) accepted for carriage;
- tank code according to 4.3.4.1.1;
- for substances other than those according to 4.3.4.1.3, the alphanumeric codes of all special

¹⁴ *The number of the approved Technical Specifications for the tank-wagon shall be indicated as the approval number.*

¹⁵ *Add the units of measurement after the numerical values.*

provisions TC and TE which are shown in column 13 of Table A of Chapter 3.2 for the substances to be carried in the tank;

- the letters ГИ (GI), date (month, year) of the next periodic inspection in accordance with 6.20.2.4.2, and the letters “ИГ” (IG), date (month, year) of the next intermediate inspection in accordance with 6.20.2.4.3 or with the TT special provisions of 6.20.4 for the substance(s) accepted for carriage. If the next inspection is an inspection in accordance with 6.20.2.4.3, the date shall be followed by the letter “L”.

6.20.2.5.3 The marks or inscriptions set out in 6.20.2.5.1 and 6.20.2.5.2 shall be in the Russian language. The owner country may duplicate them in its national language.

6.20.2.6 Requirements for tanks which are designed, constructed, inspected and tested according to documents

Note: Persons or bodies identified in documents as having responsibilities in accordance with those documents shall meet the similar requirements of Annex 2 to SMGS as priority requirements.

6.20.2.6.1 To meet the requirements of Chapter 6.20, the documents referenced in the table below shall be applied. Their respective requirements shall be deemed to be met if, depending on the specific circumstances, the documents listed in column 2 of the Table below have been applied. In all cases the requirements of Chapter 6.20 listed in column 3 shall have priority and prevail.

Table: Binding documents

Technical Regulatory Document Reference Number	Title of document	Applicable sections and paragraphs	Applicable to conformance analysis	Date of withdrawal of the conformance analysis
(1)	(2)	(3)	(4)	(5)
List, Document 33A		6.20.2.1.1, 6.20.2.1.2, 6.20.2.1.4; 6.20.2.3		
List, Document 33B		6.20.2.1.1, 6.20.2.1.2, 6.20.2.1.4; 6.20.2.3	Until 30 June 2025	
List, Document 33B1		6.20.2.1.1, 6.20.2.1.2, 6.20.2.1.4, 6.20.2.1.7	Mandatory from 1 July 2025	
List, Document 33C		6.20.2.1.1, 6.20.2.1.2, 6.20.2.1.4, 6.20.2.1.7		
List, Document 33D		6.20.2.1.10		
List, Document 42A2		6.20.2.1.28, 6.20.3.1.6, 6.20.4 TE 22		

6.20.2.6.2 Inspections and tests

To meet the requirements of Chapter 6.20 concerning inspections and tests of tanks of tank-wagons indicated in column 3, documents specified in the table below may be applied in accordance with the instructions contained in column 4. The documents shall be applied in accordance with Section 1.1.5. The scope of application of each document is defined in the clause defining the scope of a given document, unless otherwise stipulated in the table below.

Number of Technical Regulatory Document	Title of document	Applicable subsections and paragraphs	Applicability
(1)	(2)	(3)	(4)
List, Document № 42B		6.20.2.4, 6.20.3.4	Until further notice
List, Document № 5A		6.20.2.4, 6.20.3.4	Until further notice

6.20.2.7 Requirements for tanks which are not designed, constructed, inspected and tested according to documents

Tanks that are designed, constructed, and inspected (tested) without the application of documents listed in 6.20.2.6 shall be designed, constructed and inspected (tested) in accordance with the requirements of such technical codes that guarantee the same level of safety and are approved by the competent authority.

Tanks shall meet the minimum requirements set out in Section 6.20.2.

For inspection (testing) and marking, the document referenced in 6.20.2.6.2 may also be used.

6.20.3 SPECIAL REQUIREMENTS APPLICABLE TO CLASS 2

6.20.3.1 Construction of shells

6.20.3.1.1 Shells intended for the carriage of compressed or liquefied gases or pressure-dissolved gases shall be made of steel.

In the case of weldless shells, by derogation from 6.20.2.1.12 a minimum elongation at fracture of 14%, and also a stress σ lower than or equal to limits hereafter given according to the material may be accepted:

- When the ratio R_e/R_m (of the minimum guaranteed characteristics after heat treatment) is higher than 0.66 without exceeding 0.85: $\sigma \leq 0.75 R_e$;
- When the ratio R_e/R_m (of the minimum guaranteed characteristics after heat treatment) is higher than 0.85: $\sigma \leq 0.5 R_m$.

6.20.3.1.2 The requirements of 6.20.5 apply to the materials and construction of welded shells.

6.20.3.1.3 For tanks with double-walled shells intended to carry refrigerated liquid gases, the wall thickness of the inner receptacle may, notwithstanding the requirements of 6.20.2.1.18, be at least 3 mm if a metal is used which at the minimum temperature has a minimum tensile strength $R_m = 490$ MPa and a minimum coefficient of elongation $A = 30\%$.

If other metals are used, an equivalent minimum wall thickness shall be demonstrably maintained; this thickness is to be calculated according to the formula in footnote 5 to 6.20.2.1.18, where $R_{m0} = 490$ MPa and a coefficient of elongation $A_0 = 30\%$.

The outer shell shall in this case have a minimum wall thickness of 6 mm where mild steel is concerned. If other materials are used, an equivalent minimum wall thickness shall be maintained, which shall be calculated according to the formula given in 6.20.2.1.18.

6.20.3.1.4 (Reserved)

6.20.3.1.5 (Reserved)

Other requirements to the construction of tank-wagons

6.20.3.1.6 Tank-wagons shall be fitted with buffers with a nominal energy absorption capacity of at least 140 kJ. This requirement shall apply irrespective of the presence or absence of special provision TE22 in column 13 of Table A, Chapter 3.2 concerning substances to be carried in the tank-wagon.

6.20.3.2 Items of equipment

6.20.3.2.1 The discharge pipes of tanks shall be capable of being closed by blank flanges or some other equally reliable device. For tanks intended for the carriage of refrigerated liquefied gases, these blank flanges or other equally reliable devices may be fitted with pressure-release openings of a maximum diameter of 1.5 mm.

6.20.3.2.2 Shells intended for the carriage of liquefied gases may be provided with, in addition to the openings prescribed in 6.20.2.2.2 and 6.20.2.2.4, openings for the fitting of thermometers, manometers, level gauges, and with bleed holes as required for their normal operation and safety.

6.20.3.2.3 The internal stop-valve of all filling and all discharge openings of tanks intended for the carriage of liquefied flammable or toxic gases shall be instant-closing and shall close automatically in the event of an unexpected flow of the substance in excess of the value indicated in the valve's specifications, or in the event of an unintended movement of the tank. It may also be possible to operate the internal stop-valve by remote control.

6.20.3.2.4 All openings, other than those accommodating safety valves and closed bleed holes, of tanks intended for the carriage of liquefied flammable and/or toxic gases shall, if their nominal diameter is more than 1.5 mm, shall be equipped with an internal shut-off device.

Openings that have nominal diameters of not more than 6 mm and are designed for the fitting of gauges or devices to monitor the process of discharge/filling may be equipped with external protective devices in place of internal shut-off devices.

6.20.3.2.5 Notwithstanding the requirements of 6.20.2.2.2, 6.20.3.2.3 and 6.20.3.2.4, tanks intended for the carriage of refrigerated liquefied gases may be equipped with external instant-closing valves in place of internal devices, if the external devices afford protection against external damage at least equivalent to that afforded by the wall of the shell.

6.20.3.2.6 If there are thermometers, they shall not project directly into the gas or liquid through the shell.

6.20.3.2.7 Filling and discharge openings situated in the upper part of tanks shall be equipped with, in addition to what is prescribed in 6.20.3.2.3, a second, external, closing device. This device shall be capable of being closed by a blank flange or some other equally reliable device.

6.20.3.2.8 Safety valves shall meet the requirements of 6.20.3.2.9 to 6.20.3.2.12 below.

6.20.3.2.9 Tanks intended for the carriage of compressed or liquefied gases or pressure-dissolved gases, may be fitted with spring-loaded safety valves.

Unless the competent authority prescribes otherwise, these valves shall be capable of opening automatically under a pressure which shall not exceed 1.5 times the effective design pressure of the tank to which they are fitted. The full opening pressure of a valve shall not be greater than the effective test pressure.

The valves shall be of such a type as to resist dynamic stresses, including liquid surge. The use of dead weight or counter weight valves is prohibited. The required capacity of the safety valves

shall be calculated in accordance with the formula contained in 6.7.3.8.1.1.

Safety valves shall be designed to prevent or be protected from the entry of water or other foreign matter which may impair their correct functioning. Any protection shall not impair their performance.

6.20.3.2.10 (Reserved)

6.20.3.2.11 Tanks intended for the carriage of refrigerated liquefied gases shall be equipped with two or more independent safety valves capable of opening at the maximum working pressure indicated on the tank. Two of these safety valves shall be individually sized to allow (each of them separately and independently from each other) the gases formed by evaporation during normal operation to escape from the tank in such a way that the pressure does not at any time exceed by more than 10% the working pressure indicated on the tank.

One of the safety valves may be replaced by a bursting disc which shall be such as to burst at the test pressure.

In the event of loss of the vacuum in a double-walled tank, or of destruction of 20% of the insulation of a single-walled tank, the combination of a pressure valve and a bursting disk shall permit an outflow such that the pressure in the shell cannot exceed the test pressure. The provisions of 6.20.2.1.7 shall not apply to vacuum-insulated tanks.

6.20.3.2.12 These pressure relief devices of tanks intended for the carriage of refrigerated liquefied gases shall be so designed as to function faultlessly even at their lowest working temperature. The reliability of their operation at that temperature shall be established and checked either by testing each device or by testing a specimen device of each design-type.

6.20.3.2.13 (Reserved)

Thermal insulation

6.20.3.2.14 If tanks intended for the carriage of liquefied gases are equipped with thermal insulation, such insulation shall consist of either:

- a sun shield covering not less than the upper third but not more than the upper half of the tank surface and separated from the shell by an air space at least 40 mm across; or
- a complete cladding, of adequate thickness, of insulating materials.

6.20.3.2.15 Tanks intended for the carriage of refrigerated liquefied gases shall be thermally insulated. Thermal insulation shall be ensured by means of a continuous sheathing. If the space between the shell and the sheathing is under vacuum (vacuum insulation), the protective sheathing shall be so designed as to withstand without deformation an external pressure of at least 100 kPa (1 bar) (gauge pressure). By derogation from the definition of "design pressure" in 1.2.1, external and internal reinforcing devices may be taken into account in the calculations. If the sheathing is so closed as to be gas-tight, a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas-tightness of the shell or of its items of equipment. The device shall prevent the infiltration of moisture into the heat-insulating sheath. For type testing of the effectiveness of the insulation system, see 6.20.3.4.11.

6.20.3.2.16 Tanks intended for the carriage of liquefied gases having a boiling point below $-182\text{ }^{\circ}\text{C}$ at atmospheric pressure shall not include any combustible material either in the thermal insulation or in the means of attachment.

The means of attachment for vacuum insulated tanks may, with the approval of the competent authority, contain plastics substances between the shell and the sheathing.

6.20.3.2.17 By derogation from the requirements of 6.20.2.2.4 shells intended for the carriage of refrigerated liquefied gases need not have an inspection opening.

6.20.3.2.18 – 6.20.3.2.28 (Reserved)

6.20.3.3 Conformance verification (Type approval)

No special requirements.

6.20.3.4 Inspections and tests

6.20.3.4.1 The materials of every welded shell shall be tested according to the method described in 6.20.5.

6.20.3.4.2 The basic requirements for the test pressure are given in 4.3.3.2.1 to 4.3.3.2.4 and in the table in 4.3.3.2.5. In no case the test pressure shall be less than the effective test pressure calculated according to the formula:

$$P_{\text{eff.test}} = 1,25 P_{\text{eff.calc.}} \frac{[\sigma]_{20}}{[\sigma]_t}, \text{ where}$$

where $P_{\text{eff.calc.}}$ = effective design pressure in MPa determined in accordance with 6.20.2.1.15.1, $[\sigma]_{20}$, $[\sigma]_t$ = permitted values of stress in the shell material at 20 °C and design pressure t in MPa, respectively.

The value of pressure in a hydraulic pressure test of refrigerated vessels that have vacuum in the insulation spacing is determined according to the formula:

$$P_{\text{test}} = 1,25 P_{\text{calc.}} - 0,1$$

6.20.3.4.3 The first hydraulic pressure test shall be carried out before thermal insulation is placed in position. When the shell, its fittings, piping and items of equipment have been tested separately, the tank shall be subjected to a leakproofness test after assembly.

6.20.3.4.4 The capacity of each shell intended for the carriage of compressed gases filled by mass, liquefied gases or dissolved gases shall be determined by a body authorized by the competent authority (see 6.20.2.4.5), by weighing or volumetric measurement of the quantity of water which fills the shell. The measurement of shell capacity shall be accurate to within 1%. Determination by a calculation based on the dimensions of the shell is not permitted. The maximum filling masses (in kg/l) shall be prescribed by the competent authority or an organization authorized by the competent authority in accordance with 4.3.3.2.2 and 4.3.3.2.3.

If a shell is filled by level, no determination of the shell's capacity is required. In such a case, the operating manual and/or technical documentation intended for the person responsible for the filling shall indicate the minimum permissible temperature at which the substance is filled.

6.20.3.4.5 Checking of the welds shall be carried out in accordance with the $\lambda=1$ requirements of 6.20.2.1.23.

6.20.3.4.6 a) By derogation from the requirements of 6.20.2.4.2, the periodic inspections shall take place at least after eight years of service and thereafter at least every 12 years in the case of tanks intended for the carriage of refrigerated liquefied gases.

b) The intermediate inspections according to 6.20.2.4.3 shall be carried out at least six years after each periodic inspection.

By derogation from the requirements of 6.20.2.4.2, the periodic inspections of tanks intended for the carriage of compressed or liquefied gases (except for UN 1005 Ammonia Anhydrous) or pressure-dissolved gases may be carried out at least every ten years.

By derogation from the requirements of 6.20.2.4.2

6.20.3.4.7 In the case of vacuum-insulated tanks, the hydraulic-pressure test and the check of the internal condition may, with the consent of the competent authority, be replaced by a leakproofness test and measurement of the vacuum.

6.20.3.4.8 If, at the time of periodic inspections, openings have been made in shells intended for the carriage of refrigerated liquefied gases, the method by which they are hermetically closed before the shells are returned to service shall be approved by the competent authority and shall guarantee the integrity of the shell.

6.20.3.4.9 Leakproofness tests of tanks intended for the carriage of gases shall be performed at a pressure of not less than:

- For compressed gases, liquefied gases and dissolved gases: 20% of the test pressure;
- For refrigerated liquefied gases: 90% of the maximum working pressure.

Leakproofness tests of the service equipment and detachable connectors of tanks intended for the carriage of compressed, liquefied, and pressure-dissolved gases shall be performed at a pressure not less than the effective design pressure.

6.20.3.4.10 Holding times for tanks carrying refrigerated liquefied gases

The reference holding time for tanks carrying refrigerated liquefied gases shall be determined on the basis of the following:

- a) The effectiveness of the insulation system, determined in accordance with 6.20.3.4.11;
- b) The lowest set pressure of the pressure limiting device(s);
- c) The initial filling conditions;
- d) An assumed ambient temperature of 30 °C;
- e) The physical properties of the individual refrigerated liquefied gas intended to be carried.

6.20.3.4.11 The effectiveness of the insulation system (heat influx in Watts) shall be determined by type testing the tanks. This test shall consist of either:

- a) A constant pressure test (for example at atmospheric pressure) during which the loss of refrigerated liquefied gas is measured over a period of time; or
- b) A closed system test during which the rise in pressure in the shell is measured over a period of time.

When performing the constant pressure test, variations in atmospheric pressure shall be taken into account. When performing either test corrections shall be made for any variation of the ambient temperature from the assumed ambient temperature reference value of 30 °C.

Note: ISO 21014:2006 "Cryogenic vessels – Cryogenic insulation performance" details methods of determining the insulation performance of cryogenic vessels and provides a method of calculating the holding time.

6.20.3.4.12 – (Reserved)

6.20.3.4.18

6.20.3.5 Marking

6.20.3.5.1 The following additional particulars shall be marked by stamping or by any other similar method on the plate prescribed in 6.20.2.5.1, or directly on the walls of the shell itself if the walls are so reinforced that the strength of the tank is not impaired.

- 6.20.3.5.2** On tanks intended for the carriage of only one substance:
- The proper shipping name of the gas and, in addition for gases classified under an n.o.s. entry, the technical name¹⁶.
- This indication shall be supplemented:
- In the case of tanks intended for the carriage of compressed gases filled by volume (pressure), by an indication of the maximum filling pressure at 15 °C;
 - In the case of tanks intended for the carriage of compressed gases filled by mass, and of liquefied gases, refrigerated liquefied gases or dissolved gases by an indication of the maximum permissible load mass in kg and of the filling temperature if below minus 20 °C.
- 6.20.3.5.3** On tanks intended for the carriage of many substances:
- The proper shipping names of the gases and, in addition for gases classified under an n.o.s. entry, the technical name of the gases¹⁶ for whose carriage the tank is approved.
- These particulars shall be supplemented by an indication of the maximum permissible load mass in kg for each gas.
- 6.20.3.5.4** On tanks intended for the carriage of refrigerated liquefied gases:
- the maximum working pressure¹⁷;
 - reference holding time (in days or hours) for each gas¹⁷;
 - the associated initial pressures (in bar gauge or kPa gauge)¹⁷
- 6.20.3.5.5** On tanks equipped with thermal insulation:
- the inscription "thermally insulated" or "thermally insulated by vacuum".
- 6.20.3.5.6** In addition to the particulars prescribed in 6.20.2.5.2, the following particulars shall be inscribed:
- on both sides of the tank-wagon (on the tank itself or on plates):
- a) the tank code according to the tank-wagon's technical requirements and/or operating manual (see 6.20.2.3.1) with the indication of the actual test pressure of the tank;
 - the inscription: "minimum filling temperature allowed: ...". It is permissible to provide this information only in the operating manual of the tank-wagon;
 - b) where the tank is intended for the carriage of one substance only:
 - the proper name of the gas and, in addition for gases classified under an n.o.s. entry, the technical name¹⁶;
 - c) where the tank is intended for the carriage of many substances:

¹⁶ *Instead of the proper shipping name or the proper shipping name of the n.o.s. entry followed by the technical name, the use of the following names is permitted:*

- for UN No. 1078 refrigerant gas, n.o.s: mixture F1, mixture F2, mixture F3;
- for UN No. 1060 methylacetylene and propadiene mixtures, stabilized: mixture P1, mixture P2;
- for UN No. 1965 hydrocarbon gas mixture, liquefied, n.o.s: mixture A, mixture A01, mixture A02, mixture A0, mixture A1, mixture B1, mixture B2, mixture B, mixture C. The names customary in the trade and mentioned in 2.2.2.3, Classification code 2F, UN No. 1965, Note 1 may be used only as a complement;
- for UN No. 1010 Butadienes, stabilized: 1,2-Butadiene, stabilized, 1,3-Butadiene, stabilized.

¹⁷ *Add the units of measurements after the numerical values.*

- the proper shipping name of the load and, for gases classified under an n.o.s. entry, the technical name¹⁶ of all gases to whose carriage the tank is assigned;

d) where the shell is equipped with thermal insulation:

- the inscription "thermally insulated" (or "thermally insulated by vacuum"), in an official language of the country of registration and also, if that language is not Russian, in Russian, unless any agreements concluded between the countries concerned in the transport operation provide otherwise. If the transport operation precedes a transport operation which is not regulated by SMGS Annex 2, this inscription may be duplicated in English, German, or French.

6.20.3.5.7 The load limits in accordance with 6.20.2.5.2

- for compressed gases filled by mass,
- for liquefied or refrigerated, liquefied gases and
- for gases dissolved under pressure

shall correspond to the maximum permissible load mass of the tank, determined for the substance carried; in the case of tanks intended for the carriage of many substances, the name in full of the particular gas being carried shall be stated together with the load limit. The replaceable panels (information boards) shall be designed and be capable of being secured so that they cannot close or become loose from the frame during carriage (as a result of vibration or unintentional actions).

6.20.3.5.8 (Reserved)

6.20.3.5.9 (Reserved)

6.20.3.5.10 – 6.20.3.5.13 (Reserved)

6.20.3.6 (Reserved)

6.20.3.7 (Reserved)

6.20.4 SPECIAL PROVISIONS

Note: For liquids having a flash-point of not more than 60 °C and for flammable gases, see also 6.20.2.1.26, 6.20.2.1.27 и 6.20.2.2.9.

When they are shown under an entry in Column 13 of Table A of Chapter 3.2, the following special provisions apply:

a) Construction (TC)

TC 1 The requirements of 6.20.5 are applicable to the materials and construction of these shells 6.20.5.

TC 2 Shells, and their items of equipment, shall be made of aluminium not less than 99.5% pure or of suitable steel not liable to cause hydrogen peroxide to decompose. The wall thickness may be reduced below one set out in 6.20.2.1.17, provided that the shell meets the strength requirements of national or international standards. In any case, the wall thickness less than 15 mm may be allowed only in the case, when this lower value of the wall thickness has been calculated in accordance with 6.20.2.1.17.

TC 3 Shells shall be made of austenitic steel.

TC 4 Shells shall be provided with an enamel or equivalent protective lining if the material of the shell is attacked by UN No. 3250 chloroacetic acid.

TC 5 Shells shall be provided with a lead lining not less than 5 mm thick or an equivalent lining.

- TC 6** Where the use of aluminium is necessary for tanks, such tanks shall be made of aluminium not less than 99% pure or an aluminium alloy; the wall thickness need not exceed 15 mm even where calculation in accordance with 6.20.2.1.17 gives a higher value. In any case, the wall thickness less than 15 mm may be allowed only in the case, when this lower value of the wall thickness has been calculated in accordance with 6.20.2.1.17.
- TC 7** (Reserved)
- b) Items of equipment (TE)**
- TE 1** (Reserved)
- TE 2** (Reserved)
- TE 3** Tanks shall in addition meet the following requirements: the heating device shall not penetrate into, but shall be exterior to the shell. However, a pipe used for extracting the phosphorus may be equipped with a heating jacket. The device heating the jacket shall be so regulated as to prevent the temperature of the phosphorus from exceeding the filling temperature of the shell. Other piping shall enter the shell in its upper part; openings shall be situated above the highest permissible level of the phosphorus and be capable of being completely enclosed under lockable caps.
- The tank shall be equipped with a gauging system for verifying the level of the phosphorus and, if water is used as a protective agent, with a fixed gauge mark showing the highest permissible level of the water.
- TE 4** Shells shall be equipped with thermal insulation made of materials which are not readily flammable.
- TE 5** If shells are equipped with thermal insulation, such insulation shall be made of materials which are not readily flammable.
- TE 6** Tanks may be equipped with a device of a design which precludes its obstruction by the substance carried and which prevents leakage and the build-up of excess overpressure or underpressure inside the shell.
- TE 7** The shell-discharge system shall be equipped with two mutually independent shut-off devices mounted in series, the first taking the form of a quick-closing internal stop-valve and the second that of an external stop-valve, one at each end of the discharge pipe. A blank flange, or another device providing the same measure of security, shall also be fitted at the outlet of each external stop-valve. The internal stop-valve shall be such that if the pipe is wrenched off the stop-valve will remain integral with the shell and in the closed position.
- TE 8** The connections to the external pipe-sockets of tanks shall be made of materials not liable to cause decomposition of hydrogen peroxide.
- TE 9** Tanks shall be fitted in their upper part with a shut-off device preventing any build-up of excess pressure inside the shell due to the decomposition of the substances carried, any leakage of liquid, and any entry of foreign matter into the shell.
- TE 10** The shut-off devices of tanks shall be so designed as to preclude obstruction of the devices by solidified substance during carriage.
- Where tanks are sheathed in thermally-insulating material, the material shall be of an inorganic nature and entirely free from combustible matter.
- TE 11** Shells and their service equipment shall be so designed as to prevent the entry of foreign matter, leakage of liquid or any building up of dangerous excess pressure inside the shell due to the decomposition of the substances carried. A safety valve preventing the entry of foreign matter also fulfils this provision.
- TE 12** Tanks shall be equipped with thermal insulation complying with the requirements of 6.20.3.2.14. The sun shield and any part of the tank not covered by it, or the outer sheathing of a complete lagging, shall be painted white or coated with bright (reflective) metal. The paint shall be

cleaned before each transport journey and renewed in case of yellowing or deterioration. The thermal insulation shall be free from combustible matter.

Tanks shall be fitted with temperature sensing devices.

Tanks shall be fitted with safety valves and emergency pressure-relief devices. Vacuum-relief devices may also be used. Emergency pressure-relief devices shall operate at pressures determined according to both the properties of the organic peroxide and the construction characteristics of the tank. Fusible elements shall not be permitted in the body of the shell.

Tanks shall be fitted with spring-loaded safety valves to prevent significant pressure build-up within the shell of the decomposition products and vapours released at a temperature of 50 °C. The capacity and start-to-discharge pressure of the safety-valve(s) shall be based on the results of the tests specified in special provision TA 2. The start-to-discharge pressure shall however in no case be such that liquid could escape from the valve(s) if the tank were overturned.

The emergency-relief devices may be of the spring-loaded or frangible types designed to vent all the decomposition products and vapours evolved during a period of not less than one hour of complete fire-engulfment as calculated by the following formula:

$$q = 70961 \cdot F \cdot A^{0,82}$$

where q = heat absorption, in W; A = wetted area, in m²; F = insulation factor; $F = 1$ for non-insulated tanks, or

$$F = \frac{U(923-T_{PO})}{47032} \text{ for insulated tanks}$$

where $U = K/L$ = heat transfer coefficient of the insulation, W·m⁻²·K⁻¹;

K = heat conductivity of insulation layer, W·m⁻¹·K⁻¹;

L = thickness of insulation layer, m;

T_{PO} = temperature of peroxide at relieving conditions, K.

The start-to-discharge pressure of the emergency-relief device(s) shall be higher than that above specified and based on the results of the tests referred to in special provision TA 2. The emergency-relief devices shall be dimensioned in such a way that the maximum pressure in the tank never exceeds the test pressure of the tank.

Note: An example of a method to determine the size of emergency-relief devices is given in Appendix 5 of the Manual of Tests and Criteria.

For tanks equipped with thermal insulation consisting of a complete cladding, the capacity and setting of the emergency-relief device(s) shall be determined assuming a loss of insulation from 1% of the surface area.

Vacuum-relief devices and spring-loaded safety valves of tanks shall be provided with flame arresters unless the substances to be carried and their decomposition products are non-combustible. Due attention shall be paid to the reduction of the relief capacity caused by the flame arrester.

TE 13 Tanks shall be thermally insulated and fitted with a heating device on the outside.

TE 14 Tanks shall be equipped with thermal insulation. The thermal insulation directly in contact with the shell shall have an ignition temperature at least 50 °C higher than the maximum design temperature of the tank and/or the element of the heating system.

TE 15 (Reserved)

TE 16 No part of the tank-wagon may be of wood, unless this is protected by a suitable coating.

TE 17 (Reserved)

TE 18	(Reserved)
TE 19	(Reserved)
TE 20	Notwithstanding the other tank-codes which are permitted in the hierarchy of tanks of the rationalized approach in 4.3.4.1.2, tanks shall be equipped with a safety valve.
TE 21	The closures shall be protected with lockable caps.
TE 22	Tank-wagons shall be fitted with an automatic coupling device equipped with energy absorption elements capable of absorbing at least 140 kJ at each end of the wagon.
TE 23	Tanks shall be equipped with a device of a design which precludes its obstruction by the substance carried and which prevents leakage and the build-up of excess overpressure or underpressure inside the shell.
TE 24	(Reserved)
TE 25	Shells of tank-wagons shall also be protected against impact from the outside in the event of an accident or derailment or, failing that, the protections shall limit damage from such possible impact in the following way.

Protective shield at each end of wagons fitted with automatic couplers.

If a protective shield is used at each end of the wagon, the following requirements shall apply:

- the protective shield shall cover the tank end to a height of at least 1100 mm, measured from the top edge of the headstock, the couplers shall be fitted with top and bottom anti-creep devices. The protective shield shall, over the entire height of the shield, be at least 1200 mm wide;
- central sheets of the protective shields shall have a minimum wall thickness of 12 mm;
- the protective shield and its attachment points shall be such that the possibility of the tank ends being penetrated by the protective shield itself is minimized.

The wall thickness specified above relates to reference steel. If other materials are used, except if mild steel is used, the equivalent thickness shall be calculated in accordance with the formula in 6.20.2.1.18. The values of R_m and A to be used shall be specified minimum values according to material standards.

b) Conformance analysis (official type approval) (TA)

TA 1	Tanks shall not be approved for the carriage of organic substances.
TA 2	This substance may be carried in tank-wagons under the conditions laid down by the competent authority of the country of origin, if, on the basis of the tests mentioned below, the competent authority is satisfied that such a transport operation can be carried out safely. If the country of origin is not a Party to the SMGS Agreement, these conditions shall be recognized by the competent authority of the first country that is a Party to the SMGS Agreement reached by the consignment. For the type approval tests shall be undertaken: - to prove the compatibility of all materials normally in contact with the substance during carriage; - to provide data to facilitate the design of the emergency pressure-relief devices and safety valves taking into account the design characteristics of the tank; and - to establish any special requirements necessary for the safe carriage of the substance. The test results shall be included in the report for the type approval.

TA 3 This substance may be carried only in tanks with the tank code LGAV or SGAV; the hierarchy in 4.3.4.1.2 is not applicable.

TA 4 (Reserved)

TA 5 This substance may only be carried in tanks with tank code S2.65AN(+); the hierarchy in 4.3.4.1.2 is not applicable.

d) Inspections and tests (TT)

TT 1 (Reserved)

TT 2 The condition of the lining of shells shall be inspected every year by an expert or a company (see 6.20.2.4.5) approved by the competent authority, who or which shall inspect the inside of the shell (see special provision TU 43 in 4.3.5).

TT 3 (Reserved)

TT 4 Tanks shall be inspected every 4 years for resistance to corrosion, by means of suitable instruments (e.g. by ultrasound).

TT 5 The hydraulic pressure tests shall take place at least every 4 years.

TT 6 Periodic inspections that include hydraulic pressure tests, shall take place at least every four years..

TT 7 Notwithstanding the requirements of 6.20.2.4.2, the periodic internal inspection may be replaced by a programme approved by the competent authority.

TT 8 Tanks on which the proper shipping name required for the entry UN 1005 AMMONIA, ANHYDROUS is marked in accordance with 6.20.3.5.1 to 6.20.3.5.3 and constructed of fine-grained steel with a yield strength of more than 400 MPa in accordance with the material standard, shall be subjected at each periodic inspection according to 6.20.2.4.2, to magnetic particle inspections to detect surface cracking.

For the lower part of each shell at least 20% of the length of each circumferential and longitudinal weld shall, together with all nozzle welds and any repair or ground areas, be inspected.

If the mark of the substance on the tank or tank plate is removed, a magnetic particle inspection shall be carried out and these actions recorded in the inspection certificate attached to the tank record.

Such magnetic particle inspections shall be carried out by a competent person qualified for this method.

TT 9 (Reserved)

TT 10 The periodic inspections according to 6.20.2.4.2 shall take place at least every four years.

e) Marking (TM)

Note: These particulars shall be in an official language of the country of approval and also, if that language is not Russian, in Russian, unless any agreements concluded between the countries concerned in the transport operation provide otherwise. If the transport operation precedes a transport operation which is not regulated by SMGS Annex 2, these inscriptions may be duplicated in English, German, or French.

TM 1 Tanks shall bear in addition to the particulars prescribed in 6.20.2.5.2, the words: "DO NOT OPEN DURING CARRIAGE. LIABLE TO SPONTANEOUS COMBUSTION." (see also the Note above).

TM 2 Tanks shall bear in addition to the particulars prescribed in 6.20.2.5.2, the words: "DO NOT OPEN DURING CARRIAGE. GIVES OFF FLAMMABLE GASES ON CONTACT WITH WATER." (see also the Note above).

- TM 3** Tanks shall also bear, on the plate prescribed in 6.20.2.5.1, the proper shipping name and the maximum permissible load mass in kg for this substance.
- TM 4** For tanks the following additional particulars shall be marked by stamping or by any other similar method on the plate prescribed in 6.20.2.5.2 or directly on the shell itself, if the walls are so reinforced that the strength of the tank is not impaired:
- the chemical name with the approved concentration of the substance concerned.
- TM 5** Tanks shall bear, in addition to the particulars referred to in 6.20.2.5.1 the date (month and year) of the most recent inspection of the internal condition of the shell.
- TM 6** Tank-wagons shall bear distinguishing bands in accordance with 5.3.5.
- TM 7** The trefoil symbol, as described in 5.2.1.7.6, shall be marked by stamping or any other equivalent method on the plate described in 6.20.2.5.1. This trefoil may be engraved directly on the walls of the shell itself, if the walls are so reinforced that the strength of the shell is not impaired.
- 6.20.5 REQUIREMENTS CONCERNING THE MATERIALS AND CONSTRUCTION OF SHELLS OF TANK-WAGONS**
- 6.20.5.1 Materials and shells**
- 6.20.5.1.1** a) Shells intended for the carriage of:
- compressed, liquefied gases or dissolved gases of Class 2;
 - UN Nos. 1380, 2845, 2870, 3194 3391, 3392, 3393 and 3394 of Class 4.2;
 - UN No. 1052 hydrogen fluoride, anhydrous and UN No.1790 hydrofluoric acid with more than 85% hydrogen fluoride of Class 8,
- shall be made of steel.
- b) Shells constructed of fine-grained steels for the carriage of:
- corrosive gases of Class 2 and UN No. 2073 ammonia solution;
 - UN No. 1052 hydrogen fluoride, anhydrous and UN No.1790 hydrofluoric acid with more than 85% hydrogen fluoride of Class 8,
- shall be heat-treated for thermal stress relief.
- Thermal stress relief shall not be required if there is no risk of corrosion due to stress cracking.
- c) Shells intended for the carriage of refrigerated liquefied gases of Class 2, shall be made of steel, aluminium, aluminium alloy, copper or copper alloy (e.g. brass). However, shells made of copper or copper alloy shall be allowed only for gases containing no acetylene; ethylene, however, may contain not more than 0.005% acetylene.
- d) Only materials appropriate to the lowest and highest working temperatures of the shells and of their fittings and accessories may be used.
- 6.20.5.1.2** The following materials shall be allowed for the manufacture of shells:
- a) steels not subject to brittle fracture at the lowest working temperature (see 6.20.5.2.1):
- mild steels (except for refrigerated liquefied gases of Class 2);
 - fine-grained steels, down to a temperature of –60 °C;
 - nickel steels (with a nickel content of 0.5 to 9%), down to a temperature of minus 196 °C, depending on the nickel content;
 - austenitic chrome-nickel steels, down to a temperature of minus 270 °C;

- austenitic-ferritic stainless steels, down to a temperature of minus 60 °C;

b) aluminium not less than 99.5% pure or aluminium alloys (see aluminium not less than 99.5% pure or aluminium alloys (see 6.20.5.2.2);

c) deoxidized copper not less than 99.9% pure, or copper alloys having a copper content of over 56% (see 6.20.5.2.3).

Other materials may be used if approved by the competent authority.

6.20.5.1.3 a) Shells made of steel, aluminium or aluminium alloys shall be either seamless or welded.

b) Shells made of austenitic steel, copper or copper alloy may be hard-soldered if allowed by the competent authority.

6.20.5.1.4 The fittings and accessories may either be screwed to the shells or be secured thereto as follows:

a) Shells made of steel, aluminium or aluminium alloy: by welding;

b) Shells made of austenitic steel, of copper or of copper alloy: by welding or, if allowed by the competent authority, by hard-soldering.

6.20.5.1.5 The construction of shells and their attachment to the underframe of the wagon shall be such as to preclude with certainty any such reduction in the temperature of the load-bearing components as would be likely to render them brittle. The means of attachment of shells shall themselves be so designed that even when the shell is at its lowest working temperature they still possess the necessary mechanical properties.

6.20.5.2 Test requirements

6.20.5.2.1 *Steel shells*

The materials used for the manufacture of shells and the weld beads shall, at their lowest working temperature, but at least at –20 °C, meet at least the following requirements as to impact strength:

- The minimum impact strength KCV of the principal metal shall be at least 27 J/cm², or KCU at least 29 J/cm².

- The minimum impact strength KCV when the V-notch is situated in the weld and/or heat-affected zone shall be at least 20 J/cm², and the minimum KCU at least 30 J/cm²;

- Tests to determine the impact strength when the V-notch is situated in the weld or heat-affected zone may be performed on test-pieces with a V-notch or U-notch as required by the standard or Technical Requirements used to manufacture the item.

In the case of austenitic steels, only the weld bead need be subjected to an impact-strength test.

For working temperatures below –196 °C the impact-strength test is not performed at the lowest working temperature, but at –196 °C.

6.20.5.2.2 *Shells made of aluminium or aluminium alloy*

The welded seams of shells shall meet the requirements laid down by the competent authority.

6.20.5.2.3 *Shells made of copper or copper alloy*

It is not necessary to carry out tests to determine whether the impact strength is adequate.

6.20.5.3 Impact-strength tests

6.20.5.3.1 For sheets less than 10 mm but not less than 5 mm thick, test-pieces having a cross-section of

10 mm x e mm, where "e" represents the thickness of the sheet, shall be used. Machining to 7.5 mm or 5 mm is permitted if it is necessary. The minimum value of impact strength shall be required to meet 6.20.5.2.1 in every case.

Note: No impact-strength test shall be carried out on sheets less than 5 mm thick, or on their weld seams.

6.20.5.3.2

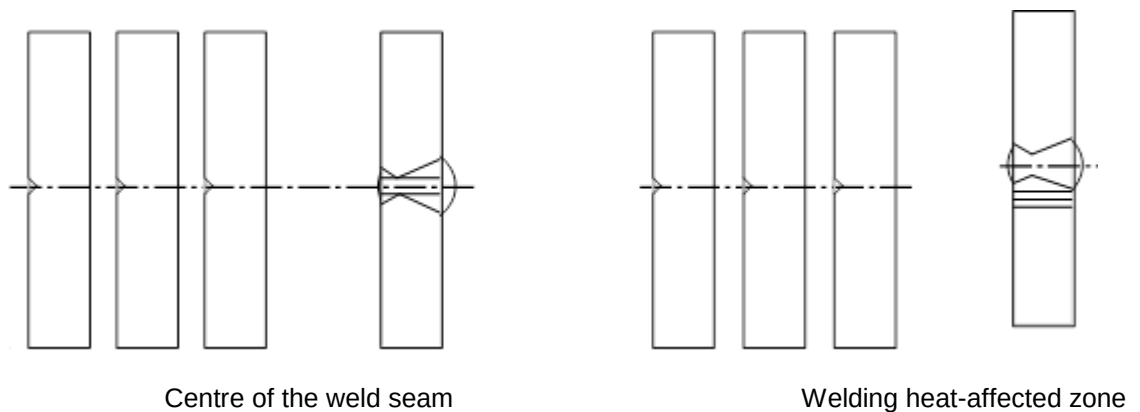
a) For the purpose of testing sheets, the impact strength shall be determined on three test-pieces. Test-pieces shall be taken at right angles to the direction of rolling; however, for mild steel they may be taken in the direction of rolling.

b) For testing weld seams the test-pieces shall be taken as follows:

when $e < 10$ mm:

three test-pieces with the notch at the centre of the weld;

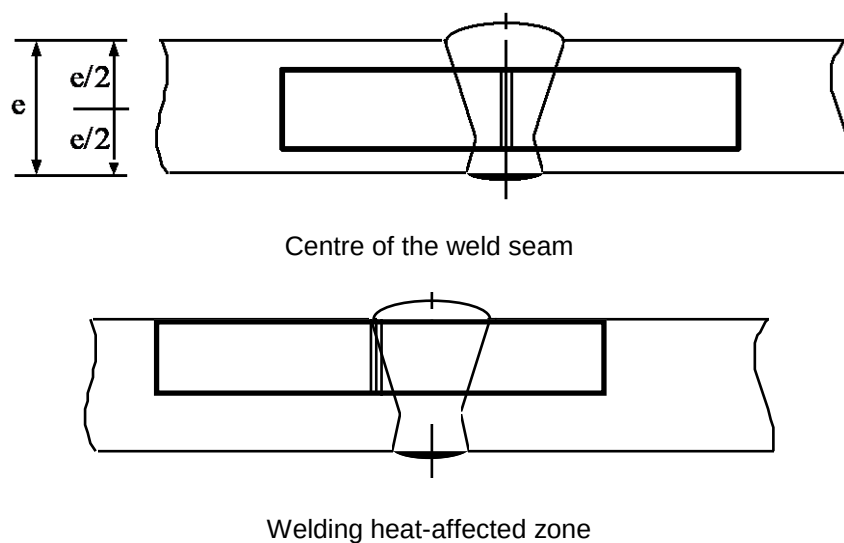
three test-pieces with the notch in the centre of the weld heat-affected zone (the V-notch to cross the fusion boundary at the centre of the specimen).



when $10 \text{ mm} < e < 20 \text{ mm}$:

Three test-pieces from the centre of the weld;

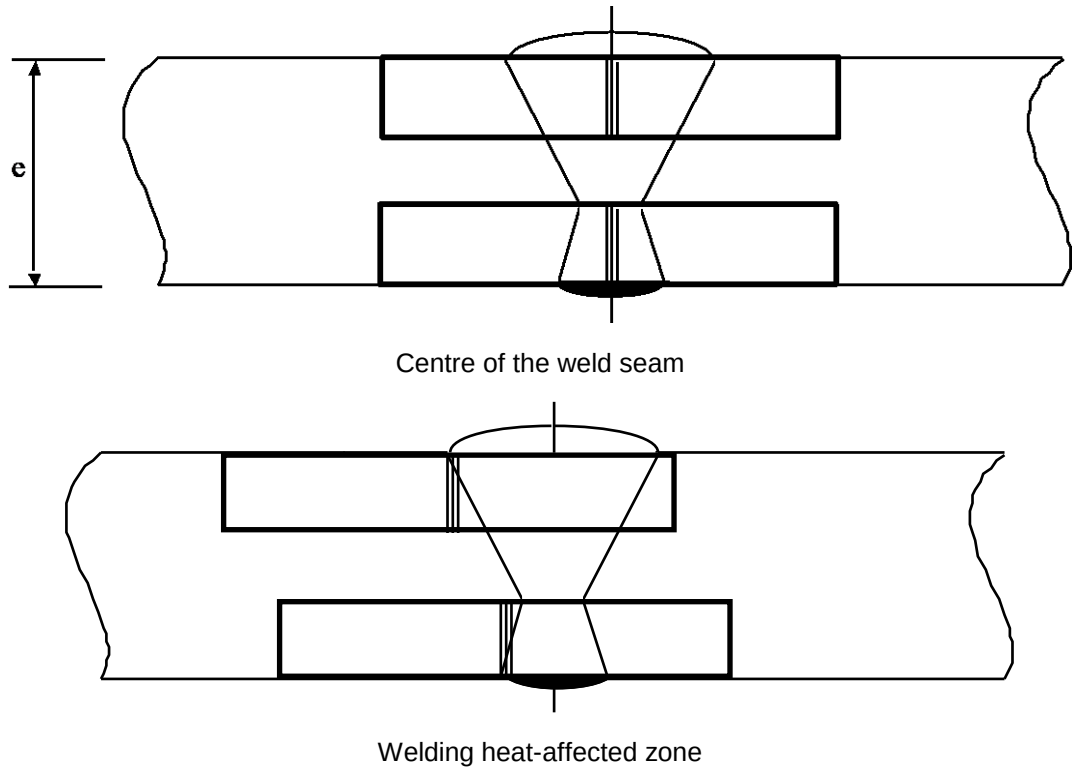
Three test-pieces from the heat affected zone (the V-notch to cross the fusion boundary at the centre of the specimen).



when $e > 20$ mm:

Two sets of three test-pieces, one set on the outer face, one set on the inner face at each of the points indicated below (the V-notch to cross the fusion boundary at the centre of the specimen)

for those taken from the heat affected zone).



- 6.20.5.3.3** a) For sheets, the average of the three tests shall meet the requirements of 6.20.5.2.1.
b) For welds and heat affected zone, the average value obtained from the three test-pieces shall meet the requirements of 6.20.5.2.1; when U-notched test-pieces are used; not more than one of the individual values may be below the minimum value and then not below 25 J/cm².
- 6.20.5.3.4** If the requirements prescribed in 6.20.5.3.3 for weld seams and heat affected zones are not met, a retest may be performed on twice as many test-pieces.
- 6.20.5.3.5** In a repeated impact test, the impact strength values shall meet the requirements of 6.20.5.3.3.
- 6.20.5.4** **Reference to documents**
(Reserved)

PART 7

PROVISIONS CONCERNING CARRIAGE, LOADING, UNLOADING AND HANDLING OF GOODS

CHAPTER 7.1

GENERAL PROVISIONS

7.1.1 The carriage of dangerous goods is subject to the mandatory use of a particular type of transport equipment in accordance with the provisions of this Chapter and Chapter 7.2 for carriage in packages and Chapter 7.3 for carriage in bulk. In addition, the provisions of Chapter 7.5 concerning loading, unloading and handling shall be observed.
Columns (16), (17) and (18) of Table A of Chapter 3.2 show the particular provisions of this Part that apply to specific dangerous goods.

7.1.2 (Reserved)

7.1.3 Large containers, portable tanks, MEGCs and tank-containers which meet the definition of "container" given in the CSC may not be used to carry dangerous goods unless the large container or the frame of a portable tank or tank-container or MEGCs satisfies the provisions of the CSC.

7.1.4 A large container may be presented for carriage only if it is structurally serviceable. "Structurally serviceable" means that the container is free from major defects in its structural components, e.g. top and bottom side rails, doorsill and header, floor cross members, corner posts, and corner fittings. "Major defects" are dents or bends in structural members greater than 19 mm in depth, regardless of length; cracks or breaks in structural members; more than one splice or an improper splice (e.g. a lapped splice) in top or bottom end rails or door headers or more than two splices in any one top or bottom side rail or any splice in a door sill or corner post; door hinges and hardware that are seized, twisted, broken, missing or otherwise inoperative; non-closing gaskets and seals; any distortion of the overall configuration sufficient to prevent proper alignment of handling equipment, mounting and securing on a chassis or wagon.
In addition, deterioration in any component of the container, such as rusted metal in side walls or disintegrated fibreglass is unacceptable, regardless of the material of construction. Normal wear, including oxidization (rust), slight dents and scratches and other damage that do not affect serviceability or weather-tightness are, however, acceptable.
Prior to loading the container shall also be checked to ensure that it is free from any residue of a previous load and that the interior floor and walls are free from protrusions.

7.1.5 (Reserved)

7.1.6 (Reserved)

7.1.7 (Reserved)

CHAPTER 7.2

PROVISIONS CONCERNING CARRIAGE IN PACKAGES

- 7.2.1** Unless otherwise provided in 7.2.2 to 7.2.4, dangerous goods loaded in packages may be carried:
- a) in closed wagons or in closed containers; or
 - b) in sheeted wagons or in sheeted containers¹ or
 - c) in open wagons (unsheeted) or in open containers² (unsheeted).
- 7.2.2** Packages comprising packagings made of materials sensitive to moisture shall be carried in closed or sheeted wagons or in closed or sheeted containers¹.
- 7.2.3** (Reserved)
- 7.2.4** When an alphanumeric code beginning with the letter “W” is shown in column (16) of Table A of Chapter 3.2, the following special provisions apply:
- W1** Packages shall be carried in closed or sheeted wagons or in closed or sheeted containers¹;
- W2** Substances and articles of Class 1 shall be loaded into closed wagons or closed containers. Articles which, because of their dimensions or their mass, cannot be loaded into closed wagons or closed containers may equally be carried in open wagons or open containers. They shall be covered by sheets. Only wagons fitted with regulation sheet steel spark-guards shall be used for the carriage of substances and articles of divisions 1.1, 1.2, 1.3, 1.5 and 1.6, even when these substances and articles are loaded into large containers. For wagons fitted with a combustible floor, the sheet steel spark-guards shall not be fixed directly to the floor of the wagon.
- Military consignments of substances and articles of Class 1 which form part of military equipment and of the structure of military material, may also be loaded into open wagons under the following conditions:
- consignments shall be accompanied by the competent military authority or, by order of this authority,
 - means of initiation not having at least two effective protective devices shall be removed, unless the substances and articles are placed in locked military vehicles;
- W3** For free-flowing powdery substances and for fireworks the floor of a wagon or container shall have a non-metallic surface or covering;
- W4** (Reserved)
- W5** Packages may not be carried in small containers;
- W6** (Reserved)
- W7** Packages shall be carried in a closed wagon or in a closed container provided with adequate ventilation;
- W8** For the carriage of packages bearing an additional label in accordance with Model No. 1, only wagons fitted with regulation sheet steel spark-guards shall be used, even when these substances are loaded in large containers. For wagons fitted with a combustible floor, the sheet steel spark-guards shall not be fixed directly to the floor of the wagon.
- W9** Packages shall be carried in closed wagons or in movable-roof wagons or in closed containers.
- W10** IBCs shall be carried in closed or sheeted wagons or closed or sheeted containers¹.
- W11** IBCs other than metal or rigid plastics IBCs shall be carried in closed or sheeted wagons or closed or sheeted containers¹.
- W12** IBCs of type 31HZ2 (31HA2, 31HB2, 31HN2, 31HD2 and 31HH2) shall be carried in closed wagons or containers.
- W13** When packed in 5H1, 5L1 or 5 M1 bags, they shall be carried in closed wagons or containers.
- W14** Aerosols and gas bottles carried for the purposes of reprocessing or disposal under special provision 327 in Chapter 3.3 shall only be carried in ventilated or open wagons and containers.
- W15** IBCs shall be carried in closed wagons or in closed containers.

¹ Carriage in sheeted wagons or sheeted containers to or in transit through the territory of the Republic of Belarus, Republic of Kazakhstan, the Russian Federation or the Ukraine shall be carried out according to agreement to be reached.

² Carriage in open (unsheeted) wagons or in open containers to or in transit through the territory of the Republic of Belarus, Republic of Kazakhstan, the Russian Federation or the Ukraine shall be carried out according to agreement to be reached.

CHAPTER 7.3

PROVISIONS CONCERNING CARRIAGE IN BULK

7.3.1 GENERAL PROVISIONS

7.3.1.1 Goods may not be carried in bulk in bulk containers, containers or wagons unless:

either a special provision, identified by the code "BK" or a reference to a specific paragraph, explicitly authorizing this mode of carriage is indicated in column 10 of Table A of Chapter 3.2 and the relevant conditions of 7.3.2 are satisfied in addition to those of this section; or

- a) either a special provision, identified by the code "BK" or a reference to a specific paragraph, explicitly authorizing this mode of carriage is indicated in column (10) of Table A of Chapter 3.2 and the relevant conditions of 7.3.2 are satisfied in addition to those of this section; or.
- b) a special provision, identified by the code "VC" or a reference to a specific paragraph, explicitly authorizing this mode of carriage is indicated in column (17) of Table A of Chapter 3.2 and the conditions of this special provision, together with any additional provision identified by the code "AP", as laid down in 7.3.3 are satisfied in addition to those of this section.

Empty packagings, uncleaned, may be carried in bulk if the dangerous goods they have contained are allowed for this mode of carriage. The instructions for carriage in bulk mentioned in columns (10) or (17) of Table A of Chapter 3.2 for these goods shall be applied.

***Note:** For carriage in tanks, see provisions in Chapters 4.2 and 4.3.*

- 7.3.1.2** Substances which may become liquid at temperatures likely to be encountered during carriage are not permitted for carriage in bulk.
- 7.3.1.3** Bulk containers, containers or bodies of wagons shall be siftproof and shall be so closed that none of the contents can escape under normal conditions of carriage including the effect of vibration, or by changes of temperature, humidity or pressure.
- 7.3.1.4** Substances shall be loaded and evenly distributed in a manner that minimises movement that could result in damage to the bulk container, container or wagon or leakage of the dangerous goods.
- 7.3.1.5** When a wagon, a container, a bulk container is fitted with venting devices, the devices shall be kept clear and operable.
- 7.3.1.6** Substances shall not react dangerously with the material of the bulk container, container, wagon, gaskets, equipment including lids and tarpaulins and with protective coatings which are in contact with the contents or significantly weaken them. Bulk containers, containers or wagons shall be so constructed or adapted that the goods cannot penetrate between wooden floor coverings or come into contact with those parts of the bulk container, container or wagon that may be affected by the materials or residues thereof.
- 7.3.1.7** Before being filled and handed over for carriage, each bulk container, container or wagon shall be inspected and cleaned to ensure that it does not contain any residue on the interior or exterior of the bulk container, container or wagon that could:
- cause a dangerous reaction with the substance intended for carriage;
 - detrimentally affect the structural integrity of the bulk container, container or wagon; or
 - affect the dangerous goods retention capabilities of the bulk container, container or wagon.
- 7.3.1.8** During carriage, no dangerous residues shall adhere to the outer surfaces of bulk containers, containers or of the bodies of wagons.
- 7.3.1.9** If several closure systems are fitted in series, the system which is located nearest to the substance to be carried shall be closed first before filling.
- 7.3.1.10** Empty bulk containers, containers or wagons which have carried a dangerous solid substance in bulk shall be treated in the same manner as is required by Annex 2 to SMGS for a filled bulk container, container or wagon, unless adequate measures have been taken to nullify any hazard.

7.3.1.11 If bulk containers, containers or wagons are used for the carriage in bulk of goods liable to cause a dust explosion, or evolve flammable vapours (e.g. for certain wastes) measures shall be taken to exclude sources of ignition and prevent dangerous electrostatic discharge during carriage, filling or discharge of the substance.

7.3.1.12 Substances, for example wastes, which may react dangerously with one another and substances of different classes and goods not subject to Annex 2 to SMGS, which are liable to react dangerously with one another shall not be mixed together in the same bulk container, container or wagon. (See 1.2.1 for the term "Dangerous reactions"). Dangerous reactions are:

- a) combustion and/or evolution of considerable heat;
- b) emission of flammable and/or toxic gases;
- c) formation of corrosive liquids; or
- d) formation of unstable substances.

7.3.1.13 Before a bulk container, container or wagon is filled it shall be visually examined to ensure it is structurally serviceable, its interior walls, ceiling and floors are free from protrusions or damage and that any inner liners or substance retaining equipment are free from rips, tears or any damage that would compromise its cargo retention capabilities.

The term "Structurally serviceable", where relevant to the means of transport concerned, means the bulk container, container or wagon does not have major defects in its structural components, such as top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings of a bulk container or container. Major defects, where relevant to the means of transport concerned, include:

- a) bends, cracks or breaks in the structural or supporting members that affect the integrity of the bulk container, container or of the body of the wagon;
- b) more than one splice or an improper splice (such as a lapped splice) in top or bottom end rails or door headers;
- c) more than two splices in any one top or bottom side rail;
- d) any splice in a door sill or corner post;
- e) door hinges and hardware that are seized, twisted, broken, missing, or otherwise inoperative;
- f) gaskets and seals that do not seal;
- g) any distortion of the overall configuration of a bulk container or container great enough to prevent proper alignment of handling equipment, mounting and securing on a chassis or wagon or vehicle, or insertion into ships' cells;
- h) any damage to lifting attachments or handling equipment interface features; or
- i) any damage to service or operational equipment.

7.3.2 PROVISIONS FOR THE CARRIAGE IN BULK WHEN THE PROVISIONS OF 7.3.1.1 (a) ARE APPLIED

7.3.2.1 In addition to the general provisions of section 7.3.1, the provisions of this section are applicable. The codes "BK1" and "BK2" in column 10 of Table A of Chapter 3.2 have the following meanings:

BK1: Carriage in bulk in sheeted bulk containers is permitted;

BK2: Carriage in bulk in closed bulk containers is permitted;

BK3: Carriage in flexible bulk containers is permitted.

7.3.2.2 The bulk container used shall conform to the requirements of Chapter 6.11.

7.3.2.3 Goods of Class 4.2

The total mass carried in a bulk container shall be such that its spontaneous ignition temperature is greater than 55°C.

7.3.2.4 Goods of Class 4.3

These goods shall be carried in bulk containers which are watertight.

7.3.2.5 Goods of Class 5.1

Bulk containers shall be so constructed or adapted that the goods cannot come into contact with wood or any other incompatible material.

7.3.2.6 Goods of Class 6.2

7.3.2.6.1 Animal material of Class 6.2.

Animal material containing infectious substances (UN Nos. 2814, 2900 and 3373) is authorized for carriage in bulk containers provided the following conditions are met:

- a) Sheeted bulk containers BK1 are permitted provided that they are not filled to maximum capacity to avoid substances coming into contact with the sheeting. Closed bulk containers BK2 are also permitted.
- b) Closed and sheeted bulk containers, and their openings, shall be leak-proof by design or by the fitting of a suitable liner.
- c) The animal material shall be thoroughly treated with an appropriate disinfectant before loading prior to carriage.
- d) Sheeted bulk containers shall be covered by an additional top liner weighted down by absorbent material treated with an appropriate disinfectant.
- e) Closed or sheeted bulk containers shall not be re-used until after they have been thoroughly cleaned and disinfected.

Note: Additional provisions may be required by appropriate national health authorities.

7.3.2.6.2 Wastes of Class 6.2 (UN 3291).

- a) (Reserved)
- b) Closed bulk containers and their openings shall be leakproof by design. These bulk containers shall have non porous interior surfaces and shall be free from cracks or other features which could damage packagings inside, impede disinfection or permit inadvertent release.
- c) Wastes of UN No. 3291 shall be contained within the closed bulk container in UN type tested and approved sealed leak-proof plastics bags tested for solids of packing group II and marked in accordance with 6.1.3.1. Such plastics bags shall be capable of passing the tests for tear and impact resistance according to ISO 7765-1:1988 "Plastics film and sheeting – Determination of impact resistance by the free-falling dart method – Part 1: Staircase methods" and ISO 6383-2:1983 "Plastics – Film and sheeting – Determination of tear resistance – Part 2: Elmendorf method". Each bag shall have an impact resistance of at least 165 g and a tear resistance of at least 480 g in both parallel and perpendicular planes with respect to the length of the bag. The maximum net mass of each plastics bag shall be 30 kg.
- d) Single articles exceeding 30 kg such as soiled mattresses may be carried without the need for a plastics bag when authorized by the competent authority.
- e) Wastes of UN No. 3291 which contain liquids shall only be carried in plastics bags containing sufficient absorbent material to absorb the entire amount of liquid without it spilling in the bulk container.
- f) Wastes of UN No. 3291 containing sharp objects shall only be carried in UN type tested and approved rigid packagings meeting the provisions of packing instructions P621, IBC620 or LP621.
- g) Rigid packagings specified in packing instructions P621, IBC620 or LP621 may also be used. They shall be properly secured to prevent damage during normal conditions of carriage. Wastes carried in rigid packagings and plastics bags together in the same closed bulk container shall be adequately segregated from each other, e.g. by suitable rigid barriers or dividers, mesh nets or otherwise securing, such that they prevent damage to the packagings during normal conditions of carriage.
- h) Wastes of UN No. 3291 in plastics bags shall not be compressed in a closed bulk container in such a way that bags may be rendered no longer leak-proof.
- i) The closed bulk container shall be inspected for leakage or spillage after each journey. If any wastes of UN No. 3291 have leaked or been spilled in the closed bulk container, it shall not be re-used until after it has been thoroughly cleaned and, if necessary, disinfected or decontaminated with an appropriate agent. No other goods shall be carried together with UN No. 3291 other than medical or veterinary wastes. Any such other wastes carried in the same closed bulk container shall be inspected for possible contamination.

7.3.2.7 Material of Class 7

For the carriage of unpackaged radioactive material, see 4.1.9.2.4.

7.3.2.8 Goods of Class 8

These goods shall be carried in bulk containers which are watertight.

7.3.2.9 Goods of Class 9

7.3.2.9.1 For UN 3509, only closed bulk containers (code BK 2) may be used. Bulk containers shall be made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, and shall have a means of retaining any free liquid that might escape during carriage, e.g. absorbent material. Packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be carried in bulk containers which have been so constructed or adapted that the goods cannot come into contact with wood or any other combustible material.

7.3.2.10 Use of flexible bulk containers

Note: Flexible bulk containers marked in accordance with 6.11.5.5 but which were approved in a country which is not an SMGS Contracting State may nevertheless be used for carriage under Annex 2 to SMGS.

7.3.2.10.1 Before a flexible bulk container is filled it shall be visually examined to ensure it is structurally serviceable, its textile slings, load-bearing structure straps, body fabric, lock device parts including metal and textile parts are free from protrusions or damage and that inner liners are free from rips, tears or any damage.

7.3.2.10.2 For flexible bulk containers, the period of use permitted for the carriage of dangerous goods shall be two years from the date of manufacture of the flexible bulk container.

7.3.2.10.3 A venting device shall be fitted if a dangerous accumulation of gases may develop within the flexible bulk container. The vent shall be so designed that the penetration of foreign substances or ingress of water is prevented under normal conditions of carriage.

7.3.2.10.4 Flexible bulk containers shall be filled in such a way that when loaded the ratio of height to width does not exceed 1.1. The maximum gross mass of the flexible bulk containers shall not exceed 14 tonnes.

7.3.3 PROVISIONS FOR CARRIAGE IN BULK WHEN THE PROVISIONS OF 7.3.1.1 b) ARE APPLIED

7.3.3.1 In addition to the general provisions of section 7.3.1, the provisions of this section are applicable, when they are shown under an entry in column 17 of Table A of Chapter 3.2. Sheeted or closed wagons or sheeted or closed containers used under this section need not be in conformity with the requirements of Chapter 6.11. The codes VC 1, VC 2 and VC 3 in column 17 of Table A of Chapter 3.2 have the following meanings:

Note: Where a VC 1 code is shown in column (17) of Table A of Chapter 3.2, a BK 1 bulk container may therefore also be used for land transport provided the additional provisions in 7.3.3.2 are fulfilled. Where a VC 2 code is shown in column (17) of Table A of Chapter 3.2, a BK 2 bulk container may therefore also be used for land transport provided the additional provisions in 7.3.3.2 are fulfilled.

VC1 Carriage in bulk in sheeted wagons, sheeted containers or sheeted bulk containers is permitted.

VC2 Carriage in bulk in closed wagons, closed containers or closed bulk containers is permitted.

VC3 Carriage in bulk is permitted in specially equipped wagons or large containers in accordance with standards specified by the competent authority of the country of origin. If the country of origin is not an SMGS Contracting State, the conditions laid down shall be recognized by the competent authority of the first country Contracting State to SMGS reached by the consignment.

7.3.3.2 When the VC bulk codes are used, the following additional provisions shown in column 17 of Table A of Chapter 3.2 shall apply:

7.3.3.2.1 Goods of Class 4.1

AP1 Wagons and containers shall have a metal body and where fitted the sheet shall be non-combustible.

AP2 Wagons and containers shall have adequate ventilation.

7.3.3.2.2 Goods of Class 4.2

AP1 Wagons and containers shall have a metal body and where fitted the sheet shall be non-combustible.

7.3.3.2.3 Goods of Class 4.3

AP2 Wagons and containers shall have adequate ventilation.

AP3 Sheeted wagons and sheeted containers shall be used only when the substance is in pieces. It is not permitted to transport this substance in powder, granular, dust or ashes form.

AP4 Closed wagons and closed containers shall be equipped with hermetically closed openings used for filling and discharging to prevent the exit of gas and exclude the ingress of moisture.

AP5 The cargo doors of the closed wagons or closed containers shall be marked with the following in letters not less than 25 mm high:

**"WARNING
NO VENTILATION
OPEN WITH CAUTION"**

This shall be in a language considered appropriate by the consignor.

7.3.3.2.4 Goods of Class 5.1

AP6 If the wagon or container is made of wood or other combustible material, an impermeable surfacing resistant to combustion or a coating of sodium silicate or similar substance shall be provided. Sheeting shall also be impermeable and non-combustible.

AP7 Carriage in bulk shall only be as a wagon or a container full load.

7.3.3.2.5 Goods of Class 6.1

AP7 Carriage in bulk shall only be as a wagon or a container full load.

7.3.3.2.6 Goods of Class 8

AP7 Carriage in bulk shall only be as a wagon or a container full load.

AP8 The design of the load compartment of wagons or containers shall take account of any residual currents and dynamic impacts from the displacement of batteries.

The load compartments of wagons or containers shall be of steel resistant to the corrosive substances contained in the batteries. Less resistant steels may be used when there is a sufficiently great wall thickness or a plastics lining/layer resistant to the corrosive substances.

Note: *Steel exhibiting a maximum rate of progressive reduction of 0.1 mm per year under the effects of the corrosive substances may be considered as resistant.*

The load compartments of wagons or containers shall not be loaded above the top of their walls.

Carriage is also permitted in small plastics containers which shall be capable of withstanding, when fully loaded, a drop from a height of 0.8 m onto a hard surface at -18 °C, without breakage.

7.3.3.2.7 Goods of Class 9

AP2 Wagons and containers shall have adequate ventilation.

AP9 Carriage in bulk is permitted for solids (substances or mixtures, such as preparations or wastes) containing on average not more than 1 000 mg/kg of substance to which this UN number is assigned. At no point of the load shall the concentration of this substance or these substances be higher than 10 000 mg/kg.

AP10 Wagons and containers shall be made leak tight or fitted with a leak tight and puncture resistant sealed liner or bag, and shall have a means of retaining any free liquid that might escape during carriage, e.g. absorbent material. Packagings, discarded, empty, uncleaned with residues of Class 5.1 shall be carried in wagons and containers which have been so constructed or adapted that the goods cannot come into contact with wood or any other combustible material.

AP 11 In accordance with VC 3 in 7.3.3.1, for the purpose of carriage in bulk of molten aluminium, "standards specified by the competent authority of the country of origin" means that the following requirements shall be met.

1. General requirements

1.1 Vat means a containment intended for the carriage of molten aluminium of UN No. 3257, including its shell, refractory lining and service and structural equipment.

1.2 Vats shall be insulated so as not to exceed a surface temperature of 130 °C during carriage and shall be so positioned that the means of containment cannot be touched by other persons under normal conditions of carriage. The surface temperature shall in no case have a detrimental effect on the functioning of the wagon.

1.3 The vats shall be secured on the wagon in accordance with the load securing principles of 7.5.7.1.

1.4 Vats need not be affixed with large placards and markings in accordance with Chapter 5.3 if these placards and markings have been affixed to the wagon.

2. Fire and explosion protection

The risk of fire by the thermal influence of the molten aluminium on the vat, the wagon or load securing aids, and the risk of explosion resulting from escaping vapours or chemical reaction of gases that have evolved, shall be prevented (e.g. by using inert gases).

3. Construction of vats

Vats shall be made of steel. Vats shall be designed and manufactured for a test pressure of 4 bar in accordance with EN 13445-3:2014. In the course of construction, the manufacturer shall specify the weld seams that are subject to the highest stresses. The hydrostatic pressure and surge effect of the molten aluminium shall be taken into account when deciding the dimensions of the vats and their attachment to the vehicle/wagon. The forces in 6.8.2.1.2 shall be taken into account.

The vat closures shall be designed in accordance with Document 54 of the *List* and shall remain leak-proof if a vat with contents (lateral position and top of the vat) overturns.

The filling and discharge openings shall be protected by the construction of the vat, e.g. by collars, deflectors, cages or equivalent constructions.

The protective device on the top of the vat shall be designed so as to withstand, without permanent deformation, a static load, applied vertically on the filling cover, equal to twice the maximum permissible mass of the vat multiplied by the acceleration of free fall (g).³

The refractory lining shall be suitable to withstand the contents and it shall be suitable as insulation material.

The refractory lining shall be so designed that its leak-proofness remains intact, whatever the deformation liable to occur in normal conditions of carriage (see 6.8.2.1.2).

The inspection body performing inspections in accordance with 6.8.2.4.1 or 6.8.2.4.4, shall verify and confirm the ability of the manufacturer or the maintenance or repair shop to perform welding operations and the operation of a

³ for the purposes of calculations, $g = 9.81 \text{ m/s}^2$

weld quality assurance system. Welding work on the sheet metal jacket, in particular on load-bearing parts, may only be carried out by approved welding companies.

Seals on vat covers and closures shall be selected and applied so that they prevent molten aluminium from flowing out if a full vat overturns.

4. Inspection and tests of vats

The inspections and tests described in 4.1 to 4.5 shall be carried out by an inspection body approved by the competent authority. The inspections and tests shall be carried out in accordance with the applicable requirements of Document 5B of the *List*. Test reports on the results of the tests performed shall be issued.

4.1 Type examination of vats

The construction design and workmanship shall be tested as part of a type examination procedure to ensure that the vats comply with the construction requirements of Document 54 of the *List*. The weld seams subject to the highest stresses shall be identified in the type examination report.

4.2 Initial inspection

Vats shall be tested and inspected before they are placed in service.

The test shall at least include:

- a) A check to ensure that the vat is in line with the type examination documents;
- b) A check of conformity to the type;
- c) An examination of the external condition;
- d) A hydraulic pressure test at a test pressure of 4 bar; at this stage, the vats shall not have a refractory lining;
- e) An examination of the internal condition (visual inspection of the internal metal surface of the vat before the refractory lining is fitted and visual inspection of the refractory lining);
- f) A check of satisfactory operation of the equipment.

The hydraulic pressure test can also be carried out with an alternative seal.

4.3 Intermediate inspection

Vats shall undergo an intermediate inspection no later than six years after the initial inspection and each periodic inspection.

The intermediate inspection shall at least include:

- a) An examination of the documents;
- b) An examination of the external condition, including the integrity of the flange and cover connections;
- c) Measurement of the wall thickness to check the required minimum wall thickness;
- d) Non-destructive testing of weld seams that are subject to the highest stresses by magnetic particle testing, penetration testing, ultrasonic testing or radiographic testing;
- e) An examination of the internal condition (visual inspection of the refractory lining) by an expert under the responsibility of the operator;
- f) A check of satisfactory operation of the equipment.

These intermediate inspections may be performed within three months before the specified date, without any influence on the time frame of other inspections according to 4.3 and 4.4.

4.4 Periodic inspection

Each time the refractory lining is renewed, or no later than twelve years after the initial or most recent periodic inspection, a periodic inspection shall be carried out.

The periodic inspection shall at least include:

- a) An examination of the documents;
- b) An examination of the external condition, including the integrity of the flange and cover connections;
- c) An examination of the internal condition (visual inspection of the internal metal surface of the vat before the refractory lining is fitted and visual inspection of the refractory lining);
- d) Non-destructive testing of all weld seams that are subject to the highest stresses shall be carried out by magnetic particle testing, penetration testing, ultrasonic testing or radiographic testing;
- e) Measurement of the wall thickness to check the required minimum wall thickness;
- f) Hydraulic pressure test at a test pressure of 4 bar, at this stage, the vats shall not have a refractory lining;
- g) A check of satisfactory operation of the equipment.

The hydraulic pressure test can also be carried out with an alternative seal.

4.5 Exceptional inspection of vats

When the safety of the vat or of its equipment may have been impaired as a result of repairs, alterations or accident, an exceptional inspection shall be carried out on the parts affected by the repairs or alterations. If the exceptional inspection fulfilling the requirements of 4.4 has been performed, then the exceptional inspection may be considered to be a periodic inspection. If an exceptional inspection fulfilling the requirements of 4.3 has been performed, then the exceptional inspection may be considered to be an intermediate inspection. The inspection body shall decide the detailed scope of the exceptional inspection, taking into account Document No. 5B of the *List*, Table A1.

5. Marking of vats

Vats shall be marked with a plate by analogy with 6.8.2.5.1, except the approval number and external design pressure. For the tests and inspections in accordance with 4.2 and 4.4, the marking shall be followed by "P". For the tests and inspections in accordance with 4.3, the marking shall be followed by "L".

6. Requirements for operation

The owner or the operator shall keep a copy of the type examination report, the results of the initial tests and inspections and all subsequent tests and inspections in the vat file.

Every renewal and repair of the refractory lining shall be recorded by the operator or manufacturer.

Seals shall be checked with each filling and renewed if necessary.

Vats shall be positioned on the transport vehicles in such a way that the discharge openings face or are opposite to the direction of travel.

AP 12 The waste may be carried in bulk provided that it is contained in a bag of the size of the load compartment, referred to as a "container-bag".

The container-bag is intended to be loaded only when placed inside a bulk load compartment with rigid walls. It is not intended for handling or to be used alone outside of this compartment.

For the purposes of this provision, container-bags shall have at least two components.

The inner component shall be dust-tight to prevent the release of dangerous quantities of asbestos fibres during carriage. The inner component shall be a polyethylene or polypropylene film.

The outer component shall be polypropylene and shall be fitted with a zipper system. It shall ensure the mechanical resistance of a container-bag loaded with waste to the shocks and stresses in normal conditions of carriage, in particular when a load compartment loaded with container-bags is transferred between vehicles/wagons and storage facilities.

Container-bags shall:

- a) Be designed to resist perforation or tearing by contaminated waste or objects due to their angles or roughness;
- b) Have a zipper system that is sufficiently tight to prevent the release of dangerous quantities of asbestos fibres during carriage. Laced or flapped fasteners are not authorized.

The load compartment shall have rigid metal walls of sufficient strength for its intended use. The walls shall be sufficiently high to completely contain the container-bag. Provided the container-bag offers similar protection, the sheeting of the wagon can be omitted when using the VC 1 provision.

Objects contaminated with free asbestos from damaged structures or buildings, as well as construction site waste contaminated with free asbestos from demolished or rehabilitated structures or buildings as mentioned in special provision 678 (b) 3), 4) and 5), shall be carried in a container-bag placed inside a second container-bag of the same type. The total mass of the contained waste shall not exceed 7 tonnes.

In all cases, the maximum mass of the waste shall not exceed the capacity specified by the container-bag manufacturer.

CHAPTER 7.4

PROVISIONS CONCERNING CARRIAGE IN TANKS

Dangerous goods may only be carried in tanks when a portable tank instruction is shown in column (10) or when a tank code is shown in column (12) of Table A of Chapter 3.2, or when a competent authority has issued an approval in accordance with the conditions specified in 6.7.1.3. The requirements of Chapters 4.2, 4.3 or 4.5 as applicable shall be observed during carriage.

CHAPTER 7.5

PROVISIONS CONCERNING LOADING, UNLOADING AND HANDLING

7.5.1 GENERAL PROVISIONS

7.5.1.1 The requirements in force in accordance with national law shall be complied with for the loading of goods, provided they do not conflict with the requirements of this Chapter.

7.5.1.2 Unless otherwise specified in Annex 2 to SMGS, the loading shall not be carried out if:

- an examination of the documents;
- a visual inspection of the wagon or of the container(s), bulk container(s), MEGC(s), tank-container(s), portable tank(s) or road vehicle(s), if any, as well as of their equipment used in loading and unloading,

shows that the wagon, a container, a bulk-container, an MEGC, a tank-container, a portable tank, a road vehicle or their equipment do not comply with the regulatory provisions.

The interior and exterior of a wagon or container shall be inspected prior to loading to ensure that there is no damage that could affect its integrity or that of the packages to be loaded in it.

7.5.1.3 The unloading shall not be carried out if the above-mentioned inspections reveal deficiencies that might affect the safety or the security of the unloading.

7.5.1.4 In accordance with the special provisions of 7.5.11 and in conformity with column 18 of Table A of Chapter 3.2, certain dangerous goods shall only be forwarded as a wagon or a container full load.

7.5.1.5 When orientation arrows are required according to 5.2.1.10, packages and overpacks shall be oriented in accordance with such marks.

Note: Liquid dangerous goods shall be loaded below dry dangerous goods whenever practicable.

7.5.1.6 All means of containment shall be loaded and unloaded in conformity with a handling method for which they have been designed and, where required, tested.

7.5.2 MIXED LOADING PROHIBITION

7.5.2.1 Packages bearing different danger labels shall not be loaded together in the same wagon or container unless mixed loading is permitted according to the following Table based on the danger labels they bear 4.1+1 и 5.2+1.

The mixed loading prohibitions for packages shall also apply to the mixed loading of packages and small containers and the mixed loading of small containers in a wagon or large container in which small containers are carried.

Note 1: In accordance with 5.4.1.4.2, separate transport documents shall be drawn up for consignments that cannot be loaded together in the same wagon or container.

Note 2: For packages containing substances or articles only of Class 1 and bearing a label conforming to models Nos. 1, 1.4, 1.5 or 1.6, irrespective of any other danger labels required for these packages, mixed loading shall be permitted in accordance with 7.5.2.2. The Table in 7.5.2.1 shall only apply when such packages are loaded together with packages containing substances or articles of other classes.

Table of mixed loading of dangerous goods in the same wagon or container 7.5.2.1.

Danger label number	1	1.4	1.5	1.6	2.1, 2.2, 2.3	3	4.1	4.1 + 1	4.2	4.3	5.1	5.2	5.2 +1	6.1	6.2	7A, 7B, 7C	8	9, 9A
1	See. 7.5.2.2										г)							б)
1.4					а)	а)	а)		а)	а)	а)	а)		а)	а)	а)	а)	а), б), в)
1.5																		б)
1.6																		б)
2.1, 2.2, 2.3		а)			+					+				+	+		+	+
3		а)				+	+			+				+	+	+	+	+
4.1		а)				+	+		+	+				+	+	+	+	+
4.1 + 1								+										
4.2		а)					+		+	+				+	+	+	+	+
4.3		а)			+	+	+		+	+				+	+	+	+	+
5.1	г)	а)									+							
5.2		а)										+	+					
5.2 +1												+	+					
6.1		а)			+	+	+		+	+				+	+	+	+	+
6.2		а)			+	+	+		+	+				+	+	+	+	+
7A, 7B, 7C		а)				+	+		+	+				+	+	+	+	+
8		а)			+	+	+		+	+				+	+	+	+	+
9, 9A	б)	а), б), в)	б)	б)	+	+	+		+	+				+	+	+	+	+

Designation:

+ Mixed loading permitted.

а) Mixed loading permitted with the substances and articles of Classification Code 1.4S.

Note: Mixed loading with the substances and articles of Classification Code 1.4S shall not be permitted in the territory of the Russian Federation.

- b) Mixed loading permitted between goods of Class 1 and life-saving appliances of Class 9 (UN Nos. 2990, 3072 and 3268).
- c) Mixed loading permitted between safety devices, pyrotechnic of Division 1.4, compatibility group G, (UN No. 0503) and safety devices, electrically initiated of Class 9 (UN No. 3268).
- d) Mixed loading permitted between blasting explosives (except UN No. 0083 explosive, blasting, type C) and ammonium nitrate (UN Nos. 1942 and 2067), ammonium nitrate emulsion or suspension or gel (UN No. 3375) and alkali metal nitrates and alkaline earth metal nitrates provided the aggregate is treated as blasting explosives under Class 1 for the purposes of placarding, segregation, stowage and maximum permissible load. Alkali metal nitrates include caesium nitrate (UN 1451), lithium nitrate (UN 2722), potassium nitrate (UN 1486), rubidium nitrate (UN 1477) and sodium nitrate (UN 1498). Alkaline earth metal nitrates include barium nitrate (UN 1446), beryllium nitrate (UN 2464), calcium nitrate (UN 1454), magnesium nitrate (UN 1474) and strontium nitrate (UN 1507).

7.5.2.2 Packages containing substances or articles of Class 1, bearing a label conforming to models Nos. 1, 1.4, 1.5 or 1.6 which are assigned to different compatibility groups shall not be loaded together in the same wagon or container, unless mixed loading is permitted in accordance with Table 7.5.2.2 for the corresponding compatibility groups.

Table 7.5.2.2

Compatibility Group	B	C	D	E	F	G	H	J	L	N	S
B	X		¹⁾								X
C		X	X	X		X				²⁾³⁾	X
D	¹⁾	X	X	X		X				²⁾³⁾	X
E		X	X	X		X				²⁾³⁾	X
F					X						X
G		X	X	X		X					X
H							X				X
J								X			X
L									⁴⁾		
N		²⁾³⁾	²⁾³⁾	²⁾³⁾						²⁾	X
S	X	X	X	X	X	X	X	X		X	X

Designation: X - Mixed loading permitted.

- 1) Packages containing articles of compatibility group B and those containing substances or articles of compatibility group D may be loaded together in one wagon or in one container provided they are effectively segregated such that there is no danger of transmission of detonation from the articles of compatibility group B to the substances or articles of compatibility group D. Segregation shall be achieved by the use of separate compartments or by placing one of the two types of explosive in a special containment system. Either method of segregation shall be approved by the competent authority.
- 2) Different types of articles of division 1.6, compatibility group N, may be carried together as articles of division 1.6, compatibility group N, only when it is proven by testing or analogy that there is no additional hazard of sympathetic detonation between the articles. Otherwise they should be treated as hazard division 1.1.
- 3) When articles of compatibility group N are carried with substances or articles of compatibility groups C, D or E, the articles of compatibility group N should be considered as having the characteristics of compatibility group D.
- 4) Packages containing substances and articles of compatibility group L may be loaded together in one wagon or in one container with packages containing the same type of substances and articles of that compatibility group.

7.5.2.3 (Reserved)

- 7.5.2.4** Mixed loading of dangerous goods packed in limited quantities with any type of explosive substances and articles, except those of Division 1.4 and UN Nos. 0161 and 0499, is prohibited.

Note: *For carriage in the territory of the Russian Federation, mixed loading of dangerous goods packed in limited quantities with any type of explosive substances and articles, except those of Division 1.4 and UN Nos. 0161 and 0499, is prohibited.*

7.5.3. BARRIER WAGONS AND LOADING ARRANGEMENT OF LARGE CONTAINERS ONTO A WAGON

- 7.5.3.1** Every wagon, large container, portable tank or road vehicle containing substances or articles of Class 1 and bearing a placard conforming to models Nos. 1, 1.5 or 1.6, shall be separated on the same train from wagons, large containers, portable tanks, or road vehicles bearing a placard conforming to models Nos. 2.1, 3, 4.1, 4.2, 4.3, 5.1 or 5.2 or road vehicles for which the transport document indicates that they are containing packages bearing a label conforming to models Nos. 2.1, 3, 4.1, 4.2, 4.3, 5.1 or 5.2 by a protective distance.

The requirement for this protective distance is met if the space between the buffer head of a wagon or the end wall of a large container, portable tank or road vehicle and the buffer head of another wagon or the end wall of another large container, portable tank, or road vehicle is:

- a) at least 18 m, or
- b) occupied by two 2-axle wagons or a wagon with 4 or more axles.

- 7.5.3.2** During making up of trains and conducting shunting operations with wagons in which dangerous goods are carried, the protective distance standards specified in column 21 b of Table A in Chapter 3.2 shall be observed⁴.

- 7.5.3.2.1** When there is a decimal in the column above, then:

- the numerator shall have the minimum protective distance standards for the carriage of dangerous goods in packages or in bulk;
- the denominator shall have the minimum protective distance standards for the carriage of dangerous goods in containers.

The symbol “–” (dash) entered in column 21b means that no protective distance shall be required for the carriage of the said dangerous goods.

The lack of information in column 21b means that the minimum protective distance standards for the carriage of the said dangerous goods have not been developed.

- 7.5.3.2.2** The protective distance standard means the minimum number of physical wagons (being empty or loaded with unhazardous goods) which separate the wagons loaded with dangerous goods from the locomotive and coaches with people:

- The first digit means that it shall be from the hauling locomotive;
- The second digit means that it shall be from the bank locomotive;
- The third digit means that it shall be from coaches with people;

The symbol “0” means that no protective distance is required.

7.5.4 PRECAUTIONS WITH RESPECT TO FOODSTUFFS, OTHER ARTICLES OF CONSUMPTION AND ANIMAL FEEDS

If special provision CW28 is indicated for a substance or article in column (18) of Table A of Chapter 3.2, packages as well as uncleaned empty packagings, including large packagings and intermediate bulk containers (IBCs), bearing labels conforming to models Nos. 6.1 or 6.2 and those bearing labels conforming to model No. 9 containing goods of UN Nos. 2212, 2315, 2590, 3151, 3152 or 3245, shall not be stacked on or loaded in immediate proximity to packages known to

⁴ These requirements shall not apply to the carriage of dangerous goods from Hungary, Republic of Poland and Slovak Republic or in transit through the territory of above-mentioned states.

contain foodstuffs, other articles of consumption or animal feeds in wagons, in containers and at places of loading, unloading or transshipment.

When these packages, bearing the said labels, are loaded in immediate proximity of packages known to contain foodstuffs, other articles of consumption or animal feeds and unless the packages bearing the said labels are provided with an additional packaging or are completely covered (e.g. by a sheeting, a fibreboard cover or other measures) they shall be kept apart from the latter:

- a) by complete partitions which should be as high as the packages bearing the said labels;
- b) by packages not bearing labels conforming to models Nos. 6.1, 6.2 or 9 or packages bearing labels conforming to model No.9 but not containing goods of UN Nos. 2212, 2315, 2590, 3151, 3152 or 3245; or
- c) by a space of at least 0.8 m.

7.5.5 (Reserved)

7.5.6 SAFETY MEASURES FOR SHUNTING OPERATIONS AND WAGON FRAGMENTATION IN HUMP YARDS⁵.

If a code beginning with the letter “M” is indicated in column 21c) of Table A in Chapter 3.2, the following provisions shall be applied:

- M1 – “No Humping”

Wagon shunting operations shall be conducted by means of pulling or “removal” by the locomotive on the part of the hump yard with protective distance standards being observed very carefully, without jolts and abrupt stops. The impact speed of wagons with dangerous goods during their coupling with other wagons or locomotives shall not exceed 3 km/h. Handling of such wagons in hump yard shall be performed by means of a locomotive only. In accordance with 5.4.1.1.n), the mark “No Humping in hump yard No.” shall be put down in the consignment note by the consignor;

- M2 – “Humping with great precaution”

Wagons with dangerous goods shall be permitted to hump only if provided that any impact is excluded of the wagons on those already positioned on the hump yard tracks and on those with further uncouplings which are forwarded onto these hump yard tracks. In accordance with 5.4.1.1.1 n) the mark “Humping with great precaution” shall be put down in the consignment note by the consignor;

- M3 – “Humping with great precaution” for the carriage of goods contained in glass packages

Wagons with dangerous goods are permitted to hump only if provided that any impact of the wagons on those already positioned on the hump yard tracks and, with further uncouplings being forwarded onto these hump yard tracks, is excluded. In accordance with 5.4.1.1.1 n), the consignor shall put down “Humping with great precaution” in the consignment note.

7.5.7 HANDLING AND STOWAGE

- 7.5.7.1** Where appropriate the wagon or container shall be fitted with devices to facilitate securing and handling of the dangerous goods. Packages containing dangerous substances and unpackaged dangerous articles shall be secured by suitable means capable of restraining the goods (such as fastening straps, sliding slat-boards, adjustable brackets) in the wagon or container in a manner that will prevent any movement during carriage which would change the orientation of the packages or cause them to be damaged. When dangerous goods are carried with other goods (e.g. heavy machinery or crates), all goods shall be securely fixed or packed in the wagons or containers so as to prevent the release of dangerous goods. Movement of packages may also be prevented by filling any voids by the use of dunnage or

⁵ These requirements shall not apply to Hungary, Republic of Poland and Slovak Republic.

by blocking and bracing. Where restraints such as banding or straps are used, these shall not be over-tightened to cause damage or deformation of the package⁶.

7.5.7.2 Packages shall not be stacked unless designed for that purpose. Where different design types of packages that have been designed for stacking are to be loaded together, consideration shall be given to their compatibility for stacking with each other. Where necessary, stacked packages shall be prevented from damaging the package below by the use of load-bearing devices.

7.5.7.3 During loading and unloading, packages containing dangerous goods shall be protected from being damaged.

Note: *Particular attention shall be paid to the handling of packages during their preparation for carriage, the type of wagon or container on which they are to be carried and to the method of loading or unloading, so that accidental damage is not caused through dragging or mishandling the packages.*

7.5.7.4 The provisions of 7.5.7.1 shall also apply to the loading, stowage and removal of containers, tank-containers, portable tanks and MEGCs on to and from wagons. When tank-containers, portable tanks and MEGCs do not include, by construction, corner castings as defined in ISO 1496-1 Series 1 freight containers – Specification and testing – Part 1: General cargo containers for general purposes, it shall be verified that the systems used on the tank-containers, portable tanks or MEGCs are compatible with the system on the wagon.

7.5.7.5 (Reserved)

7.5.7.6 Loading of flexible bulk containers

7.5.7.6.1 Flexible bulk containers shall be carried within a wagon or container with rigid sides and ends that extend at least two-thirds of the height of the flexible bulk container.

Note: *When loading flexible bulk containers in a wagon or container particular attention shall be paid to the guidance on the handling and stowage of dangerous goods referred to in 7.5.7.1.*

7.5.7.6.2 Flexible bulk containers shall be secured by suitable means capable of restraining them in the wagon or container in a manner that will prevent any movement during carriage which would change the position of the flexible bulk container or cause it to be damaged. Movement of the flexible bulk containers may also be prevented by filling any voids by the use of dunnage or by blocking and bracing. Where restraints such as banding or straps are used, these shall not be over-tightened to cause damage or deformation to the flexible bulk containers.

7.5.7.6.3 Flexible bulk containers shall not be stacked.

7.5.8 CLEANING AFTER UNLOADING

7.5.8.1 Cleaning of wagons and containers after unloading of packaged dangerous goods

7.5.8.1.1 If, when wagons or containers, except for the wagons which do not belong to the carrier, which have contained packaged dangerous goods are unloaded, some of the contents are found to have escaped, spilled, peculiarly smelled or scattered, the wagon or container shall be cleaned and, if necessary, it shall be washed out and decontaminated by cleansers at the consignee's expense.

7.5.8.1.2 After unloading of wagons and containers, except for the wagons which do not belong to the carrier, which have contained goods with the hazardous label by sample of Nos. 6.1, 6.2, 8 as well as packaged goods with the UN No. 3245 Microorganisms genetically modified, the consignee shall provide the carrier with a written confirmation note which contains information that during unloading of a wagon or a container the contents are not found to have escaped, spilled, peculiarly smelled or scattered, but if some contents are found to have escaped,

⁶ Guidance on the stowage of dangerous goods can be found in the IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code) (see e.g. Chapter 9 Packing cargo into CTUs and Chapter 10 Additional advice on the packing of dangerous goods). Other guidance is also available from competent authorities and bodies.

spilled, peculiarly smelled or scattered, that the wagon or container is treated and cleaned from residues of the goods carried (washed out or decontaminated by means of eco-friendly facilities, depending on the features of goods), and also that the wagon or container is serviceable for further operation. The written confirmation note shall be signed, if it is stipulated by domestic rules, by a representative of the sanitary inspection authority or any other competent body set up in accordance with the domestic legislation. The consignee shall bear responsibility for authenticity of data indicated in the written confirmation note.

7.5.8.1.3 After unloading of a wagon and a container which have contained goods with the hazardous label by sample of No.7, the consignee shall provide decontamination of the wagon and container, if it is required, and provide the carrier with a written confirmation note which contains information on the lack of „removable contamination” on the wagon and the container.

7.5.8.1.4 If at the point of unloading no cleaning and treatment of a wagon and container has been conducted in accordance with the requirements of 7.5.8.1.1, then the wagon or container shall be transported under the conditions of the previously transported dangerous goods.

7.5.8.1.5 For operations of goods transshipment from one track gauge wagons onto wagons of another track gauge, in the event of leakage, spillage or dispersal of dangerous goods, the method for execution of work to clean, decontaminate and return the wagons may be determined on the basis of individual bilateral agreements between the border railways. In this case the provisions of 7.5.8.1.2 shall not be applied.

7.5.8.2 Wagons or containers which have been loaded with dangerous goods in bulk shall be properly cleaned before reloading unless the new load consists of the same dangerous goods as the preceding load.

7.5.9 Carriage of dangerous goods accompanied by guides of the consignor (consignee)

When a special provision of CW47, CW55, CW64, CW66, CW67, CW68 or CW69 is indicated for the specific positions in column 18 of Table A in Chapter 3.2, the carriage of such goods shall be accompanied by guides of the consignor (consignee) in accordance with requirements specified in a specific special provision of CW.

The guides accompanying the dangerous goods shall have knowledge of the manual to accompany such goods, being developed and adopted by the consignor, hazardous characteristics of the dangerous goods, measures to provide first aid, safety measures in case of emergency, and shall see en route that safety measures and terms established for such goods are observed.

The consignor shall provide the guides or the team of specialists with required individual protecting equipment and special clothing, medical kit, tool outfit, decontamination and firefighting primary facilities as well as necessary auxiliary materials.

The provisions of Chapter IV “Special conditions of the carriage of goods of individual types” in Annex 1 “Rules for the Carriage of Goods” to SMGS shall apply in other respects of the carriage of dangerous goods accompanied by guides of the consignor (consignee).

7.5.10 (Reserved)

7.5.11 ADDITIONAL PROVISIONS APPLICABLE TO CERTAIN CLASSES OR SPECIFIC GOODS

In addition to the provisions of 7.5.1 to 7.5.4 and of 7.5.7 to 7.5.8, the following special provisions shall apply when an alphanumeric code beginning with "CW" is shown in column 18 of Table A of Chapter 3.2:

CW1 Before loading, the floor of the wagon or large container shall be carefully cleaned by the consignor. No metal objects in the interior of the wagon or container other than those forming part of the construction of the wagon or container shall be allowed to protrude. The doors and ventilator shutters of the wagons or containers shall be closed. Packages shall be so loaded and stowed in the wagon or container that they are protected against any chafing or bumping;

CW2 (Reserved)

CW3 (Reserved)

- CW4** Substances and articles of compatibility group L shall only be carried as a full load or as a wagon load;
- CW5 – CW8** (Reserved)
- CW9** Packages shall not be thrown or subjected to impact;
- CW10** Cylinders as defined in 1.2.1 shall be laid parallel to or at right angles to the longitudinal axis of the wagon or container; however, those situated near the forward transverse wall shall be laid at right angles to the said axis. Short cylinders of large diameter (about 30 cm and over) may be stowed longitudinally with their valve-protecting devices directed towards the middle of the wagon or container. Cylinders which are sufficiently stable or are carried in suitable devices (for example: protective rings, cushions made of planks with cutouts for the cylinders), effectively preventing them from overturning may be placed upright. When cylinders are placed upright, the doorway openings of the wagons of 1520 mm track gauge shall be safeguarded by means of planks of 40 mm thickness to ensure that the goods can avoid leaning on the doorway.
Cylinders which are laid flat shall be securely and appropriately wedged, attached or secured so that they cannot shift.
- CW11** Receptacles shall always be placed in the position for which they were designed and be protected against any possibility of being damaged by other packages;
- CW12** When pallets loaded with articles are stacked, each tier of pallets shall be evenly distributed over the lower tier, if necessary by the interposition of a material of adequate strength;
- CW13** If any substances have leaked and been spilled in a wagon or container, it may not be re-used until after it has been thoroughly cleaned and, if necessary, disinfected or decontaminated. Any other goods and articles carried in the same wagon or container shall be examined for possible contamination;
- CW14** Goods shall be shielded from direct sunlight and heat during carriage.

Packages shall be stored only in cool, well-ventilated places away from heat sources.
- CW15** (Reserved)
- CW16** Consignments of UN No. 1749 chlorine trifluoride with a gross mass of more than 500 kg shall only be carried as a wagon load or as a full load and in quantities not exceeding 5000 kg per wagon or large container;
- CW 17** Packages containing substances of this Class which are to be carried at a specific ambient temperature shall only be carried as a wagon load or as a full load. The conditions of carriage shall be agreed between the consignor and the carrier;
- CW 18** Packages shall be so stowed that they are readily accessible;
- CW19** (Reserved)
- CW 21** (Reserved)
- CW22** Wagons and large containers shall be thoroughly cleaned before loading. Packages shall be loaded so that a free circulation of air within the loading space provides a uniform temperature of the load. Packages shall be protected from being damaged by other packages. If the contents of one

- wagon or large container exceed 5000 kg of readily flammable solid substances and/or organic peroxide, the load shall be divided into stacks of not more than 5000 kg separated by air spaces of at least 0.05 m. Packages shall be protected from being damaged by other packages;
- CW23** When handling packages, special measures shall be taken to ensure that they do not come into contact with water;
- CW24** Before loading, wagons and containers shall be thoroughly cleaned and in particular be free of any combustible debris (straw, hay, paper, etc.). The use of readily flammable materials for stowing packages is prohibited;
- CW25** (Reserved)
- CW26** The wooden parts of a wagon or container which have come into contact with these substances shall be removed and burnt;
- CW28** See 7.5.4;
- CW29** Packages shall be stored upright;
- CW30** (Reserved);
- CW31** Wagons or large containers which have contained substances of this Class as wagon loads or as full loads shall be checked, after unloading, for any residues of the load;
- CW32** (Reserved)
- CW33** **Note 1:** *“Critical group” means a group of members of the public which is reasonably homogeneous with respect to its exposure for a given radiation source and given exposure pathway and is typical of individual receiving the highest effective dose by the given exposure pathway from the given source.*
Note 2: *“Members of the public” means in a general sense, any individuals in the population except when subject to occupational or medical exposure.*
Note 3: *“Workers” are any persons who work, whether full time, part-time or temporarily, for an employer and who have recognised rights and duties in relation to occupational radiation protection.*

(1) Segregation

- (1.1) Packages, overpacks, containers and tanks containing radioactive material and unpackaged radioactive material shall be segregated during carriage:
- a) from workers in regularly occupied working areas:
- in accordance with Table A below; or
 - by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;
- Note:** *Workers subject to individual monitoring for the purposes of radiation protection shall not be considered for the purposes of segregation.*
- b) from members of the public, in areas where the public has regular access:
- in accordance with Table A below; or
 - by distances calculated using a dose criterion of 1 mSv in a year and conservative model parameters;
- c) from undeveloped photographic film and mailbags:
- in accordance with Table B below; or
 - by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of radioactive

material for 0.1 mSv per consignment of such film;

Note: Mailbags shall be assumed to contain undeveloped film and plates and therefore be separated from radioactive material in the same way.

d) from other dangerous goods in accordance with 7.5.2.

Table A: Minimum distances between packages of category II-YELLOW or of category III-YELLOW and persons

Sum of transport indexes not more than	Exposure time per year (hours)			
	Areas where members of the public have regular access		Regularly occupied working areas	
	50	250	50	250
	Segregation distance in metres, no shielding material intervening, from:			
2	1	3	0.5	1
4	1.5	4	0.5	1.5
8	2.5	6	1.0	2.5
12	3	7.5	1.0	3
20	4	9.5	1.5	4
30	5	12	2	5
40	5.5	13.5	2.5	5.5
50	6.5	15.5	3	6.5

Table B: Minimum distances between packages of category II-YELLOW or of category III-YELLOW and packages bearing the word "FOTO", or mailbags

Total number of packages not more than		Sum of transport indexes not more than	Journey or storage duration, in hours							
CATEGORY			1	2	4	10	24	48	120	240
III- YELLOW	II- YELLOW		Minimum distances in metres							
		0.2	0.5	0.5	0.5	0.5	1	1	2	3
		0.5	0.5	0.5	0.5	1	1	2	3	5
	1	1	0.5	0.5	1	1	2	3	5	7
	2	2	0.5	1	1	1.5	3	4	7	9
	4	4	1	1	1.5	3	4	6	9	13
	8	8	1	1.5	2	4	6	8	13	18
1	10	10	1	2	3	4	7	9	14	20
2	20	20	1.5	3	4	6	9	13	20	30
3	30	30	2	3	5	7	11	16	25	35
4	40	40	3	4	5	8	13	18	30	40
5	50	50	3	4	6	9	14	20	32	45

(1.2) Category II-YELLOW or III-YELLOW packages or overpacks shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorized to accompany such packages or overpacks.

(1.3) (Reserved)

(2) Activity limits

The total activity in a wagon, for carriage of LSA material or SCO in Industrial Packages Type 1 (Type IP-1), Type 2 (Type IP-2), Type 3 (Type IP-3) or unpackaged, shall not exceed the limits shown in Table C below. For SCO-III, the limits in Table C below may be exceeded provided that the transport plan contains precautions which are to be employed during carriage to obtain an overall level of safety at least equivalent to that which would be provided if the limits had been applied.

Table C: Wagon activity limits for LSA material and SCO in industrial packages or unpackaged

Nature of material or object	Activity limit for wagon
LSA-I	No limit
LSA-II and LSA-III non-combustible solids	No limit
LSA-II and LSA-III combustible solids, and all liquids and gases	100 A ₂
SCO	100 A ₂

(3) Stowage during carriage and storage in transit

- (3.1) Consignments shall be securely stowed.
- (3.2) Provided that its average surface heat flux does not exceed 15 W/m² and that the immediately surrounding cargo is not in bags, a package or overpack may be carried or stored among packaged general cargo without any special stowage provisions except as may be specifically required by the competent authority in an applicable certificate of approval.
- (3.3) Loading of containers and accumulation of packages, overpacks and containers shall be controlled as follows:
- Except under the condition of exclusive use, and for consignments of LSA-I material, the total number of packages, overpacks and containers in a single wagon shall be so limited that the total sum of the transport indexes in the wagon does not exceed the values shown in Table D below;
 - The dose rate under routine conditions of carriage shall not exceed 2 mSv/h at any point on the external surface of the wagon or container, and 0.1 mSv/h at 2 m from the external surface of the wagons or container, except for consignments carried under exclusive use for which the dose rate limits around the wagon are set forth in (3.5) (b) and (c).
 - The total sum of the criticality safety indexes in a container and or wagon shall not exceed the values shown in Table E below.

Table D: Transport Index limits for containers and wagons not under exclusive use

Type of container or wagon	Limit on total sum of transport indexes in a container or wagon
Large container	50
Wagon	50

Table E: Criticality Safety Index for containers and wagons containing fissile material

Type of container or wagon	Limit on total sum of criticality safety indexes in a container or wagon	
	Not under exclusive use	Under exclusive use
Large container	50	100
Wagon	50	100

- (3.4) Any package or overpack having either a transport index greater than 10, or any consignment having a criticality safety index greater than 50, shall be carried only under exclusive use.

- (3.5) For consignments under exclusive use, the dose rate shall not exceed:
- a) 10 mSv/h at any point on the external surface of any package or overpack, and may only exceed 2 mSv/h provided that:
 - I) the wagon is equipped with an enclosure which, during routine conditions of carriage, prevents the access of unauthorized persons to the interior of the enclosure,
 - II) provisions are made to secure the package or overpack so that its position within the wagon enclosure remains fixed during routine conditions of carriage, and
 - III) there is no loading or unloading during the shipment;
 - b) 2 mSv/h at any point on the outer surfaces of the wagon, including the upper and lower surfaces, or, in the case of an open wagon, at any point on the vertical planes projected from the outer edges of the wagon, on the upper surface of the load, and on the lower external surface of the wagon; and
 - c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the wagon, or, if the load is carried in an open wagon, at any point 2 m from the vertical planes projected from the outer edges of the wagon.
- (4) Additional requirements relating to carriage and storage in transit of fissile material.**
- (4.1) Any group of packages, overpacks, and containers containing fissile material stored in transit in any one storage area shall be so limited that the total sum of the CSIs in the group does not exceed 50. Each group shall be stored so as to maintain a spacing of at least 6 m from other such groups.
 - (4.2) Where the total sum of the criticality safety indexes in a wagon or container exceeds 50, as permitted in Table E above, storage shall be such as to maintain a spacing of at least 6 m from other groups of packages, overpacks or containers containing fissile material or other wagons carrying radioactive material.
 - (4.3) Fissile material meeting one of the provisions (a) to (f) of 2.2.7.2.3.5 shall meet the following requirements:
 - a) Only one of the provisions (a) to (f) of 2.2.7.2.3.5 is allowed per consignment;
 - b) Only one approved fissile material in packages classified in accordance with 2.2.7.2.3.5 (f) is allowed per consignment unless multiple materials are authorized in the certificate of approval;
 - c) Fissile material in packages classified in accordance with 2.2.7.2.3.5 (c) shall be carried in a consignment with no more than 45 g of fissile nuclides;
 - d) Fissile material in packages classified in accordance with 2.2.7.2.3.5 (d) shall be carried in a consignment with no more than 15 g of fissile nuclides;
 - e) Unpackaged or packaged fissile material classified in accordance with 2.2.7.2.3.5 (e) shall be carried under exclusive use on a wagon with no more than 45 g of fissile nuclides.
- (5) Damaged or leaking packages, contaminated packagings**
- (5.1) If it is evident that a package is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package shall be restricted and a qualified person shall, as soon as possible, assess the extent of contamination and the resultant dose rate of the package. The scope of the assessment shall include the package, the wagon, the adjacent loading and unloading areas, and, if necessary, all other material which has been carried in the wagon. When necessary, additional steps for the protection of people, property and the environment, in accordance with provisions established by the competent authority, shall be taken to overcome and minimize the consequences of such leakage or damage.
 - (5.2) Packages damaged or leaking radioactive contents in excess of allowable limits for normal conditions of carriage may be removed to an acceptable interim location under supervision, but shall not be forwarded until repaired or reconditioned and decontaminated.
 - (5.3) A wagon and equipment used regularly for the carriage of radioactive material shall be periodically checked to determine the level of contamination. The frequency of such checks shall be related to the likelihood of contamination and the extent to which radioactive material is carried.

- (5.4) Except as provided in paragraph (5.5), any wagon, or equipment or part thereof which has become contaminated above the limits specified in 4.1.9.1.2 in the course of carriage of radioactive material, or which shows a dose rate in excess of 5 µSv/h at the surface, shall be decontaminated as soon as possible by a qualified person and shall not be re-used unless the following conditions are fulfilled:
- a) the non-fixed contamination shall not exceed the limits specified in 4.1.9.1.2;
 - b) the dose rate resulting from the fixed contamination shall not exceed 5 µSv/h at the surface.
- (5.5) A container or wagon, container, intermediate bulk container or tank wagon dedicated to the carriage of unpackaged radioactive material under exclusive use shall be excepted from the requirements of the previous paragraph (5.4) and in 4.1.9.1.2 solely with regard to its internal surfaces and only for as long as it remains under that specific exclusive use.

(6) Other provisions

Where a consignment is undeliverable, the consignment shall be placed in a safe location and the competent authority shall be informed as soon as possible and a request made for instructions on further action.

- CW 34** Prior to carriage of pressure receptacles it shall be ensured that the pressure has not risen due to potential hydrogen generation.
- CW 35** If bags are used as single packagings, they shall be adequately separated to allow for the dissipation of heat.
- CW 36** Packages shall preferably be loaded in open or ventilated wagons or open or ventilated containers. If this is not feasible and packages are carried in other closed wagons or containers, gas exchange between the load compartment and accessible compartments during carriage shall be prevented and the cargo doors of the wagons or containers shall be marked with the following in letters not less than 25 mm high:

“WARNING NO VENTILATION
OPEN WITH CAUTION”.

This shall be in a language considered appropriate by the consignor.

For UN Nos. 2211 and 3314 this mark is not required when the wagon or container is already marked according to special provision 965 of the IMDG Code⁷.

- CW 37** Before loading, these by-products shall be cooled to ambient temperature, unless they have been calcined to remove moisture. Wagons and containers containing bulk loads shall be adequately ventilated and protected against ingress of water throughout the journey. The cargo doors of the closed wagons and closed containers shall be marked with the following in letters not less than 25 mm high:

“WARNING
CLOSED MEANS OF CONTAINMENT
OPEN WITH CAUTION”.

This shall be in a language considered appropriate by the consignor.

- CW 38** The load compartments shall have no sharp internal edges (internal steps, etc.) capable of tearing container-bags during unloading. They shall be inspected before any loading operation.
- The container-bags shall be placed in the load compartments for carriage prior to any filling. The outer component of the container-bags shall be positioned so that the slider of the zipper is placed on the front side of the load compartment when closed. After filling, the container-bags shall be closed in accordance with the manufacturer's instructions.

⁷ Warning mark including the words “CAUTION – MAY CONTAIN FLAMMABLE VAPOUR” with lettering not less than 25 mm high, affixed at each access point in a location where it will be easily seen by persons prior to opening or entering the cargo transport unit.

Once loaded, the container-bags shall not be lifted or transferred from one load compartment to another. Multiple filled container-bags shall not be loaded into the same load compartment.

After any filling operation and after closing, the outer surfaces of the container-bags shall be decontaminated.

Container-bags carried in removable load compartments shall be unloaded with the latter placed on the ground.

The unloading of container-bags filled with roadworks waste or with soil contaminated with free asbestos by tipping the load compartment is authorized, provided that an unloading protocol agreed jointly between the carrier and the consignee is respected to prevent the container-bags from tearing during unloading. The protocol shall ensure that the container-bags do not fall or tear during the unloading operation.

CW46 These goods in packages shall be carried on the 1520 mm gauge railways only in closed wagons and containers that are not owned by the carrier, including the goods arriving from the 1435 mm gauge railways.

Note: *The requirement of this special provision shall not be mandatory for use of the wagons and containers registered in Hungary, Republic of Lithuania, Republic of Latvia, Republic of Poland, Slovak Republic and Republic of Estonia.*

CW 47 These goods in packages shall be allowed for carriage on the 1520 mm gauge railways as a wagon full load, including the goods arriving from the 1435 mm gauge railways, only when they are accompanied by guides of the consignor/consignee (see 7.5.9).

Note: *The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.*

CW48 These goods in packages shall be allowed for carriage on the 1520 mm gauge railways only in closed wagons and containers that are not owned by the carrier, including the goods arriving from the 1435 mm gauge railways.

Note: *The requirement of this special provision shall not be mandatory for use of the wagons and containers registered in Hungary, Republic of Lithuania, Republic of Latvia, Republic of Poland, Slovak Republic and Republic of Estonia.*

CW 49 On the 1520 mm gauge railways, before loading these goods, the floor of the closed wagon shall be strewed with a layer of dry sand of 100 mm thickness. A plank of 150 mm height shall be tightly nailed or otherwise secured to the floor of the wagon around the periphery of the floor inside the wagon.

Note: *The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.*

CW 50 (Reserved)

CW 51 (Reserved)

CW 52 (Reserved)

CW 53 (Reserved)

CW 54 Preparation of wagons and containers shall be performed in the way described below with respect to fire prevention and protection for carriage of the specified dangerous goods as well as the goods that are referred to as not otherwise specified substances under the UN number 1325 (for example, combed hemp, cotton lint and raw cotton) in accordance with paragraph 2 of Chapter 11 of

Annex 3 to SMGS (Technical conditions for stowage and fastening of goods). This special provision shall also be applied to the goods referred to the UN number 1327 and named as hay, chaff or straw as well as to the UN number 3360 and named as cotton wool, cotton fiber, jute fiber, combed flax, dry lime bast, cotton waste, oakum which do not come within the purview of other provisions of Annex 2 to SMGS.

Note: *The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.*

CW55 For carriage in tanks (including: a tank-wagon, tank-container, built-in tank, portable tank, wagon with demountable tank, elements of battery-wagons or UN multiple element gas containers (MEGCs) on the 1520 mm track gauge railways, including those arriving from the 1435 mm track gauge railways, these goods shall be permitted for carriage only when they are accompanied by guides of the consignor/consignee (see 7.5.9).

Note 1: *This special provision shall not apply when empty, uncleaned, tank wagons are returned.*

Note 2: *The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.*

CW56 For the 1520 mm track gauge railways, including those arriving from the 1435 mm track gauge railways, the indicated goods shall be carried as part of a special technological section (of a group of wagons), composed of as follows:

- a tank with water equipped with thermal insulation, on the basis of at least one tank per each three tanks with goods;
- one closed wagon that accommodates the accompanying team as well as technical equipment and stuff;
- a loaded tank and an unloaded tank of the same type designed for carriage of pressure goods.

In this case, the tanks filled with water and the empty tank shall be used as barrier wagon between the tank loaded with the goods and the wagon that accompanies these goods.

The said technological sections shall be composed by the consignor.

It is not permitted to include wagons in the section to which they do not belong. The transport documents shall contain a mark "Section. Do not uncouple".

Note: *The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.*

CW57 On the 1520 mm track gauge railways, including those arriving from the 1435 mm track gauge railways, these goods shall be allowed for carriage in packages loaded only in closed temperature-controlled wagons and containers that do not belong to the carrier.

Note: *The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.*

CW58 These goods shall be carried on the 1520 mm track gauge railways only in closed wagons that do not belong to the carrier, including those arriving from the 1435 mm track gauge railways.

Note: *The requirement of this special provision shall not be mandatory for use of the wagons registered in Hungary, Republic of Lithuania, Republic of Latvia, Republic of Poland, Slovak Republic and Republic of Estonia.*

CW59 These goods that are packed in a limited quantity in accordance with requirements of Chapter 3.4 shall be carried in the territory of the Russian Federation in accordance with the provisions of Chapters 5.3, 5.4, Part 7 as well as their respective columns of Table A, Chapter 3.2 of Annex 2 to SMGS.

CW60 The goods that are referred to the position of n.o.s. (not otherwise specified substances) and have the below-mentioned technical names shall be permitted for carriage on the 1520 mm track gauge railways only in closed wagons and containers that do not belong to the carrier, including those arriving from the 1435 mm track gauge railways.

UN No.	Technical name of goods
1544	Anabasine sulphate, solid
1588	Cadmium cyanide
1992	Diran-A
1993	Product T-185
2810	Pronit
2810	Enit
2927	Aquanite
3140	Anabasine sulphate, solution

Note: *The requirement of this special provision shall not be mandatory for use of wagons and containers registered in Hungary, Republic of Lithuania, Republic of Latvia, Republic of Poland, Slovak republic and Republic of Estonia.*

CW61 The goods that are referred to the position of n.o.s. (not otherwise specified substances) and have the below-mentioned technical names shall be permitted for carriage on the 1520 mm track gauge railways only in closed wagons that do not belong to the carrier, including those arriving from the 1435 mm track gauge railways.

UN No.	Technical name of goods
1544	Cinchonine
1588	Black cyanide
1953	Gas mixtures of monosilane with argon
1953	Gas mixtures of monosilane with hydrogen
2025	Mercuric (II) sulphide
3286	Heptyl
3286	Luminal A

Note: *The requirement of this special provision shall not be mandatory for use of wagons registered in Hungary, Republic of Lithuania, Republic of Latvia, Republic of Poland, Slovak republic and Republic of Estonia.*

CW62 (Reserved)

CW63 The goods that are referred to the position of n.o.s. (not otherwise specified substances) and have the below-mentioned technical names shall be permitted for carriage in packages only in closed temperature-controlled wagons that do not belong to the carrier on the 1520 mm track gauge railways, including those arriving from the 1435 mm track gauge railways.

UN No.	Technical name of goods
2813	Catalyst CN

Note: *The requirement of this special provision shall not be mandatory for use of wagons registered in Hungary, Republic of Lithuania, Republic of Latvia, Republic of Poland, Slovak republic and Republic of Estonia.*

CW64 The goods that are referred to the generalised position or to the position of n.o.s. (not otherwise specified substances) and have the below-mentioned technical names shall be permitted for carriage on the 1520 mm track gauge railways as a wagon full load, including those arriving from the 1435 mm track gauge railways, only when they are accompanied by guides of the consignor/consignee (see 7.5.9):

UN No.	Technical name of goods
1544	Cinchonine
1588	Cadmium cyanide
1588	Black cyanide
1992	Diran-A
1992	Solvent "Decilin"
1992	Samin
1992	Synthin
1993	Product T-185
2025	Mercuric (II) sulphide
2810	Pronit
2810	Enit
2813	Catalyst CN
2927	Aquanite
3286	Heptyl
3286	Luminal A

Note: The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.

CW65 The goods that are referred to the generalised position or position of n.o.s. (not otherwise specified substances) and have the below-mentioned technical names shall be permitted for carriage in packages only in closed wagons and containers that do not belong to the carrier on the 1520 mm track gauge railways, including those arriving from the 1435 mm track gauge railways.

UN No.	Technical name of goods
1992	Samin
1992	Synthin
1993	Dimethyldichlorosilane hydrolysate
1993	"Product 119-296T" ethoxysilane composition
2922	Slavsilan
2923	Triphenylchlorosilane
2924	Dimethylchlorosilane
2985	Dimethylchloromethylchlorosilane
2985	Methylvinylchlorosilane
2985	Methylchloromethyldichlorosilane
2985	Triethylchlorosilane
2988	Phenylchlorosilane
2988	Ethylchlorosilane

Note: The requirement of this special provision shall not be mandatory for use of wagons and containers registered in Hungary, Republic of Lithuania, Republic of Latvia, Republic of Poland, Slovak republic and Republic of Estonia.

CW66 For carriage in tanks (including: tank-wagon, tank-container, built-in tank, portable tank, wagon with demountable tank, elements of battery-wagons or UN multiple element gas containers (MEGCs) on the 1520 mm track gauge railways, including those arriving from the 1435 mm track gauge railways, these goods shall be allowed for carriage only when they are accompanied by guides of the consignor/consignee (see 7.5.9).

Note 1: *The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.*

CW67 For carriage in tanks (including: tank-wagon, tank-container, built-in tank, portable tank, wagon with demountable tank, elements of battery-wagons or UN multiple element gas containers (MEGCs) on the 1520 mm track gauge railways, including those arriving from the 1435 mm track gauge railways, the goods that are referred to the generalised position or position of n.o.s. (not otherwise specified substances) and have the below-mentioned technical names shall be permitted for carriage only when they are accompanied by guides of the consignor/consignee (see 7.5.9).

UN No.	Technical name of goods
1992	Solvent "Decilin"
1992	Samin
1992	Synthin
1993	Product T-185

Note 1: *This special provision shall not apply when empty, uncleaned, tank wagons are returned except for carriage on the territory of the Russian Federation.*

Note 2: *The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.*

CW68 For carriage in tanks (including: tank-wagon, tank-container, built-in tank, portable tank, wagon with demountable tank, elements of battery-wagons or UN multiple element gas containers (MEGCs) on the 1520 mm track gauge railways, including those arriving from the 1435 mm track gauge railways, the goods that are referred to the generalised position or position of n.o.s. (not otherwise specified substances) and have the below-mentioned technical names shall be permitted for carriage only when they are accompanied by guides of the consignor/consignee (see 7.5.9).

UN No.	Technical name of goods
3161	Vinyl
3286	Heptyl

Note 1: *This special provision shall not apply when empty, uncleaned, tank wagons are returned.*

Note 2: *The requirement of this special provision shall not be mandatory for Hungary, Republic of Poland and Slovak Republic.*

CW69 Empty, uncleaned, tanks (including: tank-wagon, tank-container, built-in tank, portable tank, wagon with demountable tank, elements of battery-wagons or UN multiple element gas containers (MEGCs) used for these goods shall be carried on the territory of the Republic of Kazakhstan and Russian Federation when they are accompanied when they are accompanied by guides of the consignor/consignee (cm. see 7.5.9).

Note: *The requirement of this special provision is not mandatory for other countries.*

CW70 These goods in packages shall be not permitted to load in one wagon or container together with dangerous goods of other Classes and goods of this Class with other UN numbers.

CHAPTER 7.6

(Reserved)

CHAPTER 7.7

(Reserved)