

## IMO IMDG Amendment 42-24 Changes

The following document presents, in a systematic way, the changes introduced in the IMO IMDG Amendment 42-24 (2024 edition) in comparison with the 40-22 amendment (2022 edition). For better understanding please consider that:

### *Reference marks*

The following symbols placed against an item indicate changes from the previous edition, in accordance with Amendment 42-24 to the IMDG Code:

- Insertion of an item
- ⊗ Deletion of an item
- △ Change to an item

## PART 1. General provisions, definitions and training

### Chapter 1.1. General provisions

#### 1.1.1.6 Application of standards

Where the application of a standard is required and there is any conflict between the standard and the provisions of this Code, the provisions of this Code take precedence. The requirements of the standard that do not conflict with the provisions of this Code shall be applied as specified, including the requirements of any other standard, or part of a standard, referenced within that standard as normative.

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

#### △ 1.1.1.10 Devices containing dangerous goods, which are in use or intended for use during transport

- △ For devices containing dangerous goods, which are in use or intended for use during transport, see 5.5.4.

### Chapter 1.2. Definitions, units of measurement and abbreviations

- *Degree of filling* means the ratio, expressed in %, of the volume of liquid or solid introduced at 15°C into the means of containment and the volume of the means of containment ready for use.

- △ *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, including IBCs, 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 plastics 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 6.1.1.3 or 6.5.4.1 shall include performance of the appropriate mechanical design type tests 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.

## PART 2. Classification

### Chapter 2.0 Introduction

- △ **2.0.6.2** Such articles may in addition contain cells or batteries. Lithium 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, subsection 38.3. For articles containing pre-production prototype lithium cells or batteries transported for testing, or for articles containing lithium 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. Where a lithium battery installed in an article is damaged or defective, the battery shall be removed.

## Chapter 2.1 Class 1 – Explosives

### 2.1.1.3 Definitions

For the purposes of this Code, the following definitions apply:

- .1 *Explosive substance* means a solid or liquid substance (or a mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.
- △ .2 *Pyrotechnic substance* means an explosive substance designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative self-sustaining exothermic chemical reactions.
- .3 *Explosive article* means an article containing one or more explosive substances.
- .4 *Mass explosion* means one which affects almost the entire load virtually instantaneously.
- .5 *Phlegmatized* means that a substance (or "phlegmatizer") has been added to an explosive to enhance its safety in handling and transport. 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).

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### Chapter 2.1 – Class 1 – Explosives

- .6 *Explosive or pyrotechnic effect* means, in the context of 2.1.1.1.3, an effect produced by self-sustaining exothermic chemical reactions including shock, blast, fragmentation, projection, heat, light, sound, gas and smoke.

## Chapter 2.3 Class 3 – Flammable liquids

- △ 2.3.1.4 *Liquid desensitized explosives* are explosive substances which are dissolved or suspended in water or other liquid substances, to form a homogeneous liquid mixture to suppress their explosive properties. Entries in the Dangerous Goods List for liquid desensitized explosives are UN 1204, UN 2059, UN 3064, UN 3343, UN 3357, UN 3379 and UN 3555.



### Chapter 2.4 Class 4 – Flammable solids; substances liable to spontaneous combustion; substances which, in contact with water, emit flammable gases

■ 2.4.2.2.1.3 *Metal powders* means powders of metals or metal alloys.

#### 2.4.2.2.2 *Classification of flammable solids*

△ 2.4.2.2.2.1 Powdered, granular or pasty substances shall be classified as readily combustible solids of class 4.1 when the time of burning of one or more of the test runs, performed in accordance with the test method described in the *Manual of Tests and Criteria*, part III, subsection 33.2, is less than 45 s or the rate of burning is more than 2.2 mm/s. Metal powders shall be classified in class 4.1 when they can be ignited and the reaction spreads over the whole length of the sample in 10 min or less.

2.4.2.2.2.2 Solids which may cause fire through friction shall be classified in class 4.1 by analogy with existing entries (such as matches) until definitive criteria are established.

#### 2.4.2.2.3 *Assignment of packing groups*

△ 2.4.2.2.3.1 Packing groups are assigned on the basis of the test methods referred to in 2.4.2.2.2.1. For readily combustible solids (other than metal powders), packing group II shall be assigned if the burning time is less than 45 s and the flame passes the wetted zone. Packing group II shall be assigned to metal powders if the zone of reaction spreads over the whole length of the sample in five minutes or less.

#### 2.4.2.3.2.3 *List of currently assigned self-reactive substances in packagings*

△ In the column "Packing Method" codes "OP1" to "OP8" refer to packing methods in packing instruction P520. Self-reactive substances to be transported shall fulfil the classification and the control and emergency temperatures (derived from the SADT) as listed. For substances permitted in IBCs, see packing instruction IBC520, and for those permitted in tanks, see portable tank instruction T23. The formulations not listed in this subsection but listed in packing instruction IBC520 of 4.1.4.2 and in portable tank instruction T23 of 4.2.5.2.6 may also be transported packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.

### Chapter 2.5 Class 5 – Oxidizing substances and organic peroxides

#### 2.5.3.2.4 *List of currently assigned organic peroxides in packagings*

△ **Note:** Packing Method codes "OP1" to "OP8" refer to packing methods in packing instruction P520. Peroxides to be transported shall fulfil the classification and the control and emergency temperatures (derived from the SADT) as listed. For substances permitted in IBCs, see packing instruction IBC520, and for those permitted in tanks, see portable tank instruction T23. The formulations not listed in this subsection but listed in packing instruction IBC520 of 4.1.4.2 and in portable tank instruction T23 of 4.2.5.2.6 may also be transported packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.

△	3104	CYCLOHEXANONE PEROXIDE(S)	≤ 91			≥ 9	OP6		(13)
		DI-2,4-DICHLOROBENZOYL PEROXIDE	≤ 52 as a paste with silicon oil				OP5		
		DIBENZOYL PEROXIDE	≤ 77			≥ 23	OP6		
		2,5-DIMETHYL-2,5-DI(BENZOYLPEROXY)HEXANE	≤ 82			≥ 18	OP5		
		2,5-DIMETHYL-2,5-DIHYDROPEROXYHEXANE	≤ 82			≥ 18	OP6		
		ORGANIC PEROXIDE, SOLID, SAMPLE					OP2		(11)
■		METHYL ETHYL KETONE PEROXIDE(S)	see remark (33)	≥ 41		≥ 9	OP8		(33) (34)
■		DIBENZOYL PEROXIDE	≤ 42	≥ 38		≥ 13	OP8		
■	Exempt	2,5-DIMETHYL-2,5-DI-( <i>tert</i> -BUTYLPEROXY) HEXANE	≤ 22		≥ 78				(29)



- (33) Available oxygen  $\leq$  10%
- (34) Sum of diluent type A and water  $\geq$  55%, and in addition methyl ethyl ketone

### Chapter 2.6 Class 6 – Toxic and infectious substances

UN number and proper shipping name	Microorganism
UN 2814 Infectious substance, affecting humans (cont.)	Hantavirus causing hemorrhagic 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 Monkeypox virus (cultures only)

### Chapter 2.7 Class 7 – Radioactive material

#### 2.7.1.3 Definitions of specific terms

$A_1$  and  $A_2$

$A_1$  means the activity value of special form radioactive material which is listed in the table in 2.7.2.2.1 or derived in 2.7.2.2.2 and is used to determine the activity limits for the provisions of this Code.

$A_2$  means the activity value of radioactive material, other than special form radioactive material, which is listed in the table in 2.7.2.2.1 or derived in 2.7.2.2.2 and is used to determine the activity limits for the provisions of this Code.

*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:

- .1 natural uranium or depleted uranium which is unirradiated;
- .2 natural uranium or depleted uranium which has been irradiated in thermal reactors only;
- .3 material with fissile nuclides less than a total of 0.25 g;
- .4 any combination of .1, .2 and/or .3.

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 this Code.

### Chapter 2.9 Class 9 – Miscellaneous dangerous substances and articles and environmentally hazardous substances

2.9.2.2 The substances and articles of class 9 are subdivided as follows:

■ **Sodium ion batteries**

- 3551 SODIUM ION BATTERIES with organic electrolyte
- 3552 SODIUM ION BATTERIES CONTAINED IN EQUIPMENT, with organic electrolyte or
- 3552 SODIUM ION BATTERIES PACKED WITH EQUIPMENT, with organic electrolyte.

**Capacitors**

- 3499 CAPACITOR, ELECTRIC DOUBLE LAYER (with an energy storage capacity greater than 0.3 Wh)
- 3508 CAPACITOR, ASYMMETRIC (with an energy storage capacity greater than 0.3 Wh)

**Life-saving appliances**

- 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
- 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 this Code.
- 3556 VEHICLE, LITHIUM ION BATTERY POWERED
- 3557 VEHICLE, LITHIUM METAL BATTERY POWERED
- 3558 VEHICLE, SODIUM ION BATTERY POWERED

2.9.4 Lithium batteries

- **Note:** The term “make available” means that manufacturers and subsequent distributors ensure that the test summary for lithium cells or batteries or equipment with installed lithium cells or batteries is accessible so that the consignor or other persons in the supply chain can confirm compliance.

## Chapter 2.10 Marine Pollutants

- △ 2.10.2.7 Marine pollutants also meeting the criteria for inclusion in a hazard class from 1 to 9 (except class 7), and packaged 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 the provisions of 5.2.1.6, 5.3.2.3, 5.4.1.4.3.6 and 7.1.4.2 of this Code. These provisions do not apply to substances transported under UN 3077 or UN 3082 (see special provision 375).

### ■ 2.9.5 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 transported under these entries if they meet the following provisions:

- .1 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, subsection 38.3.
- .2 Each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under conditions normally encountered during transport.
- .3 Each cell and battery is equipped with an effective means of preventing external short circuits.
- .4 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.).
- .5 Cells and batteries shall be manufactured under a quality management program as prescribed under 2.9.4.5.1 to 2.9.4.5.9.
- .6 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, subsection 38.3, paragraph 38.3.5.

## PART 3. Dangerous goods list, special provisions and exceptions

### Chapter 3.1 General

- △ 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:

- .1 UN 1057 LIGHTERS or LIGHTER REFILLS – The proper shipping name is the most appropriate of the following possible combinations:  
LIGHTERS  
LIGHTER REFILLS;
- .2 UN 2583 ALKYL SULPHONIC ACIDS, SOLID or ARYL SULPHONIC ACIDS, SOLID with more than 5% free sulphuric acid – The proper shipping name is the most appropriate of the following:  
ALKYL SULPHONIC ACIDS, SOLID  
ARYL SULPHONIC ACIDS, SOLID;
- .3 UN 2793 FERROUS METAL BORINGS, SHAVINGS, TURNINGS 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 TURNINGS  
FERROUS METAL CUTTINGS.



#### 3.1.4.4 The following segregation groups are identified.

### 2 Ammonium compounds (SGG2)

- 0004 Ammonium picrate dry or wetted with less than 10% water, by mass
- 0222 Ammonium nitrate, with more than 0.2% combustible substances
- 0402 Ammonium perchlorate
- 1310 Ammonium picrate, wetted with not less than 10% water, by mass
- 1439 Ammonium dichromate
- 1442 Ammonium perchlorate
- 1444 Ammonium persulphate
- 1546 Ammonium arsenate
- 1630 Mercury ammonium chloride
- 1727 Ammonium hydrogendifluoride, solid
- 1835 Tetramethylammonium hydroxide aqueous solution with more than 2.5% but less than 25% tetramethylammonium hydroxide
- △ 1835 Tetramethylammonium hydroxide aqueous solution with not more than 2.5% tetramethylammonium hydroxide
- 3560 Tetramethylammonium hydroxide aqueous solution with not less than 25% tetramethylammonium hydroxide

### 18 Alkalis (SGG18)

- 1835 Tetramethylammonium hydroxide aqueous solution with more than 2.5% but less than 25% tetramethylammonium hydroxide
- △ 1835 Tetramethylammonium hydroxide aqueous solution with not more than 2.5% tetramethylammonium hydroxide
- 3560 Tetramethylammonium hydroxide aqueous solution with not less than 25% tetramethylammonium hydroxide

## Chapter 3.2 Dangerous goods list

### 3.2.1 Structure of the Dangerous Goods List

The Dangerous Goods List is divided into 18 columns as follows:

- |            |   |
|------------|---|
| Column 1   | <b>UN No.</b> – this column contains the United Nations number assigned to a dangerous good by the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods (UN List).   |
| Column 2   | <b>Proper shipping name (PSN)</b> – this column contains the proper shipping names in upper-case characters, which may have to be followed by additional descriptive text in lower-case characters (see 3.1.2). Proper shipping names may be shown in plural where isomers of similar classification exist. Hydrates may be included under the proper shipping name for the anhydrous substances. Unless otherwise indicated for an entry in the Dangerous Goods List, the word “SOLUTION” in a proper shipping name means one or more named dangerous goods dissolved in a liquid that is not otherwise subject to this Code. When a flashpoint is mentioned in this column, the data is based on closed-cup (c.c.) methods. |
| Column 3   | <b>Class or division</b> – this column contains the class and, in the case of class 1, the division and the compatibility group assigned to the substance or article according to the classification system described in part 2, chapter 2.1.   |
| Column 4   | <b>Subsidiary hazard(s)</b> – this column contains the class number(s) of any subsidiary hazard(s) which have been identified by applying the classification system described in part 2. This column also identifies a dangerous good as a marine pollutant as follows:<br><br><div style="margin-left: 20px;"> <p>☞ – Marine pollutant: a non-exhaustive list of known marine pollutants, based on previous criteria and assignment. The absence of the symbol ☞ or the presence of a “–” in that column does not preclude the application of 2.10.3.</p> </div>   |
| △ Column 5 | <b>Packing group</b> – this column contains the packing group number (i.e. I, II or III) where assigned to the substance. If more than one packing group is indicated for the entry, the packing group of the substance or formulation to be transported shall be determined, based on its properties, through application of the hazard grouping criteria as provided in part 2.   |

■	0514	FIRE SUPPRESSANT DISPERSING DEVICES	1.4S	–	–	407	0	E0	P135	–	–	–
	1001	ACETYLENE, DISSOLVED	2.1	–	–	–	0	E0	P200	–	–	–
	1002	AIR, COMPRESSED	2.2	–	–	392 397	120 mL	E1	P200	–	–	–
	1003	AIR, REFRIGERATED LIQUID	2.2	5.1	–	–	0	E0	P203	–	–	–
	1005	AMMONIA, ANHYDROUS	2.3	8 P	–	23 379	0	E0	P200	–	–	–
△	1006	ARGON, COMPRESSED	2.2	–	–	378 392 406	120 mL	E1	P200	–	–	–
	1008	BORON TRIFLUORIDE	2.3	8	–	373	0	E0	P200	–	–	–
	1009	BROMOTRIFLUOROMETHANE (REFRIGERANT GAS R 13B1)	2.2	–	–	–	120 mL	E1	P200	–	–	–
△	1010	BUTADIENES, STABILIZED or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 20% butadienes	2.1	–	–	386 402	0	E0	P200	–	–	–
△	1013	CARBON DIOXIDE	2.2	–	–	378 392 406	120 mL	E1	P200	–	–	–
△	1046	HELIUM, COMPRESSED	2.2	–	–	378 392 406 974	120 mL	E1	P200	–	–	–
△	1066	NITROGEN, COMPRESSED	2.2	–	–	378 392 406	120 mL	E1	P200	–	–	–
△	1204	NITROGLYCERIN SOLUTION IN ALCOHOL with not more than 1% nitroglycerin	3	–	II	28	1 L	E0	P001	PP5	IBC02	–
△	1361	CARBON, animal or vegetable origin	4.2	–	II	978	0	E0	P002	–	IBC06	–
△	1361	CARBON, animal or vegetable origin	4.2	–	III	978	0	E0	P002 LP02	–	IBC08	B3
△	1362	CARBON, ACTIVATED	4.2	–	III	979	0	E1	P002	PP11 PP31	IBC08	B3
	1363	COPRA	4.2	–	III	29 926 973	0	E0	P003 LP02	PP20	IBC08	B3 B6



△	1391	ALKALI METAL DISPERSION or ALKALINE EARTH METAL DISPERSION	4.3	–	I	182 183	0	E0	P402	PP31	–	–
△	1835	TETRAMETHYLAMMONIUM HYDROXIDE AQUEOUS SOLUTION with more than 2.5% but less than 25% tetramethylammonium hydroxide	8	6.1	II	279 408 409	1 L	E2	P001	–	IBC02	–
△	1835	TETRAMETHYLAMMONIUM HYDROXIDE AQUEOUS SOLUTION with not more than 2.5% tetramethylammonium hydroxide	8	–	III	223 408 409	5 L	E1	P001 LP01	–	IBC03	–
△	2028	BOMBS, SMOKE, NON-EXPLOSIVE with corrosive liquid, without initiating device	8	–	–	–	0	E0	P803	–	–	–
△	2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	3	–	I	28 198	0	E0	P001	–	–	–
△	2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	3	–	II	28 198	1 L	E0	P001	–	IBC02	–
△	2059	NITROCELLULOSE SOLUTION, FLAMMABLE with not more than 12.6% nitrogen, by dry mass, and not more than 55% nitrocellulose	3	–	III	28 198 223	5 L	E0	P001 LP01	–	IBC03	–
△	2303	ISOPROPENYLBENZENE	3	– P	III	–	5 L	E1	P001 LP01	–	IBC03	–
△	2555	NITROCELLULOSE WITH WATER (not less than 25% water, by mass)	4.1	–	II	28 394	0	E0	P406	PP31	–	–
△	2556	NITROCELLULOSE WITH ALCOHOL (not less than 25% alcohol, by mass, and not more than 12.6% nitrogen, by dry mass)	4.1	–	II	28 394	0	E0	P406	PP31	–	–
△	2795	BATTERIES, WET, FILLED WITH ALKALI, electric storage	8	–	–	295 401	1 L	E0	P801	–	–	–
△	2803	GALLIUM	8	–	III	365	5 kg	E0	P800	PP41	–	–
△	2870	ALUMINIUM BOROXYDRIDE IN DEVICES	4.2	4.3	–	–	0	E0	P002	PP13	–	–
△	2907	ISOSORBIDE DINITRATE MIXTURE with not less than 60% lactose, mannose, starch, or calcium hydrogen phosphate	4.1	–	II	28 127	0	E0	P406	PP26 PP80	IBC06	B12 B21

△ 2956	5- <i>tert</i> -BUTYL-2,4,6-TRINITRO- <i>m</i> -XYLENE (MUSK XYLENE)	4.1	–	III	133	0	E0	P409	–	–	–
△ 3064	NITROGLYCERIN SOLUTION IN ALCOHOL with more than 1% but not more than 5% nitroglycerin	3	–	II	28 359	0	E0	P300	–	–	–
△ 3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	9	–	III	274 335 375 966 967 969	5 kg	E1	P002 LP02	PP12	IBC08	B3
△ 3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9	–	III	274 335 375 969	5 L	E1	P001 LP01	PP1	IBC03	–
△ 3090	LITHIUM METAL BATTERIES (including lithium alloy batteries)	9	–	–	188 230 310 376 377 384 387	0	E0	P903 P908 P909 P910 P911 LP903 LP904 LP905 LP906	–	–	–
△ 3091	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries)	9	–	–	188 230 310 360 376 377 384 387 390	0	E0	P903 P908 P909 P910 P911 LP903 LP904 LP905 LP906	–	–	–
△ 3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	8	II	274	0	E0	P402	–	IBC01	–
△ 3129	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.	4.3	8	III	223 274	0	E1	P001	–	IBC02	–
3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	6.1	I	274	0	E0	P402	–	–	–
△ 3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	6.1	II	274	0	E0	P402	–	IBC01	–
△ 3130	WATER-REACTIVE LIQUID, TOXIC, N.O.S.	4.3	6.1	III	223 274	0	E1	P001	–	IBC02	–
△ 3148	WATER-REACTIVE LIQUID, N.O.S.	4.3	–	I	274	0	E0	P402	PP31	–	–
△ 3148	WATER-REACTIVE LIQUID, N.O.S.	4.3	–	II	274	500 mL	E2	P402	PP31	IBC01	–
△ 3148	WATER-REACTIVE LIQUID, N.O.S.	4.3	–	III	223 274	1 L	E1	P001	PP31	IBC02	–
△ 3165	AIRCRAFT HYDRAULIC POWER UNIT FUEL TANK (containing a mixture of anhydrous hydrazine and methylhydrazine) (M86 fuel)	3	6.1/8	–	–	0	E0	P301	–	–	–

△ 3171	BATTERY-POWERED VEHICLE or BATTERY-POWERED EQUIPMENT	9	–	–	388 961 962 971	–	–	–	–	–	–
△ 3270	NITROCELLULOSE MEMBRANE FILTERS with not more than 12.6% nitrogen, by dry mass	4.1	–	II	237 286 403	1 kg	E2	P411	–	–	–
△ 3292	BATTERIES, CONTAINING METALLIC SODIUM OR SODIUM ALLOY or CELLS, CONTAINING METALLIC SODIUM OR SODIUM ALLOY	4.3	–	–	239 401	0	E0	P408	–	–	–
△ 3319	NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin, by mass	4.1	–	II	28 272 274	0	E0	P099	–	–	–
△ 3343	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin, by mass	3	–	–	28 274 278	0	E0	P099	–	–	–
△ 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	–	II	28 272 274	0	E0	P408	PP26 PP80	–	–
△ 3357	NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin, by mass	3	–	II	28 274 288	0	E0	P099	–	–	–
△ 3423	TETRAMETHYLAMMONIUM HYDROXIDE, SOLID	6.1	8	I	279 409	0	E5	P002	–	IBC99	–
△ 3480	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	9	–	–	188 230 310 348 376 377 384 387	0	E0	P903 P908 P909 P910 P911 LP903 LP904 LP905 LP906	–	–	–
△ 3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)	9	–	–	188 230 310 348 360 376 377 384 387 390	0	E0	P903 P908 P909 P910 P911 LP903 LP904 LP905 LP906	–	–	–
△ 3482	ALKALI METAL DISPERSION, FLAMMABLE or ALKALINE EARTH METAL DISPERSION, FLAMMABLE	4.3	3	I	182 183	0	E0	P402	PP31	–	–
△ 3506	MERCURY CONTAINED IN MANUFACTURED ARTICLES	8	6.1	–	366	5 kg	E0	P003	PP90		



△	3536	LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries	9	–	–	389	0	E0	–	–	–	–
△	3537	ARTICLES CONTAINING FLAMMABLE GAS, N.O.S.	2.1	See 2.0.6.6	–	274 310 391	0	E0	P006 LP03	–	–	–
△	3538	ARTICLES CONTAINING NON-FLAMMABLE, NON-TOXIC GAS, N.O.S.	2.2	See 2.0.6.6	–	274 310 391 396	0	E0	P006 LP03	–	–	–
	3539	ARTICLES CONTAINING TOXIC GAS, N.O.S.	2.3	See 2.0.6.6	–	274 391	0	E0	–	–	–	–
△	3540	ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.	3	See 2.0.6.6	–	274 310 391	0	E0	P006 LP03	–	–	–
△	3541	ARTICLES CONTAINING FLAMMABLE SOLID, N.O.S.	4.1	See 2.0.6.6	–	274 310 391	0	E0	P006 LP03	–	–	–
△	3546	ARTICLES CONTAINING TOXIC SUBSTANCE, N.O.S.	6.1	See 2.0.6.6	–	274 310 391	0	E0	P006 LP03	–	–	–
△	3547	ARTICLES CONTAINING CORROSIVE SUBSTANCE, N.O.S.	8	See 2.0.6.6	–	274 310 391	0	E0	P006 LP03	–	–	–
△	3548	ARTICLES CONTAINING MISCELLANEOUS DANGEROUS GOODS, N.O.S.	9	See 2.0.6.6	–	274 310 391	0	E0	P006 LP03	–	–	–
	3549	MEDICAL WASTE, CATEGORY A, AFFECTING HUMANS, solid or MEDICAL WASTE, CATEGORY A, AFFECTING ANIMALS only, solid	6.2	–	–	395 975	0	E0	P622 LP622	–	–	–
	3550	COBALT DIHYDROXIDE POWDER, containing not less than 10% respirable particles	6.1	P	I	–	0	E5	P002	–	IBC07	B1 B40
■	3551	SODIUM ION BATTERIES with organic electrolyte	9	–	–	188 230 310 348 376 377 384 400 401	0	E0	P903 P908 P909 P910 P911 LP903 LP904 LP905 LP906	–	–	–
■	3552	SODIUM ION BATTERIES CONTAINED IN EQUIPMENT or SODIUM ION BATTERIES PACKED WITH EQUIPMENT, with organic electrolyte	9	–	–	188 230 310 348 360 376 377 384 400 401	0	E0	P903 P908 P909 P910 P911 LP903 LP904 LP905 LP906	–	–	–
■	3553	DISILANE	2.1	–	–	–	0	E0	P200	–	–	–
■	3554	GALLIUM CONTAINED IN MANUFACTURED ARTICLES	8	–	–	366	5 kg	E0	P003	PP90	–	–
■	3555	TRIFLUOROMETHYL-TETRAZOLE-SODIUM SALT IN ACETONE, with not less than 68% acetone, by mass	3	–	II	28	0	E0	P303	PP26	–	–

■	3556	VEHICLE, LITHIUM ION BATTERY POWERED	9	-	-	384 388 405 961 962	0	E0	P912	-	-	-
■	3557	VEHICLE, LITHIUM METAL BATTERY POWERED	9	-	-	384 388 405 961 962	0	E0	P912	-	-	-
■	3558	VEHICLE, SODIUM ION BATTERY POWERED	9	-	-	384 388 404 405 961 962 977	0	E0	P912	-	-	-
■	3559	FIRE SUPPRESSANT DISPERSING DEVICES	9	-	-	407	0	E0	P902	-	-	-
■	3560	TETRAMETHYLAMMONIUM HYDROXIDE AQUEOUS SOLUTION with not less than 25% tetramethylammonium hydroxide	6.1	8	I	279 408 409	0	E5	P001	-	-	-

### Chapter 3.3 Special provisions applicable to certain substances, materials or articles

- 3.3.1** When column 6 of the Dangerous Goods List indicates that a special provision is relevant to a dangerous good, the meaning and requirement(s) of that special provision are as set out below. Where a special provision includes a requirement for package marking, the provisions of 5.2.1.2.1 to .4 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 this Code.
- 16 Samples of new or existing explosive substances or articles may be transported as directed by the competent authority 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 authority. 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.
  - 26 This substance is not permitted for transport in portable tanks, or intermediate bulk containers with a capacity exceeding 450 L, due to the potential initiation of an explosion when transported in large volumes.
  - △ 28 This substance may be transported under the provisions of class 3 or class 4.1 only if it is so packaged that the percentage of diluent will not fall below that stated, at any time during transport (see 2.3.1.4 and 2.4.2.4). 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.

- 188 Cells and batteries offered for transport are not subject to other provisions of this Code if they meet the following:
- △ .1 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;
  - △ .2 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;
  - △ .3 Each lithium cell or battery meets the provisions of 2.9.4.1, 2.9.4.5, 2.9.4.6 if applicable and 2.9.4.7 or for sodium ion cells or batteries, the provisions of 2.9.5.1, 2.9.5.5 and 2.9.5.6 shall apply;
  - .4 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;
  - .5 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 transport (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;
  - △ .6 Each package shall be marked with the appropriate lithium or sodium ion battery mark, as illustrated in 5.2.1.10;  
**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 for the Safe Transport of Dangerous Goods by Air that bear the mark as shown in 5.2.1.10 (lithium battery mark) and the label shown in 5.2.2.2.2, Model No. 9A shall be deemed to meet the provisions of this special provision.  
 This requirement does not apply to:
    - .1 packages containing only button cell batteries installed in equipment (including circuit boards); and
    - .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 lithium or sodium 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;
  - .7 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; and
  - △ .8 Except when cells or batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass. As used in this special provision "equipment" means apparatus for which the cells or batteries will provide electrical power for its operation.
- 204 Articles containing smoke-producing substance(s) corrosive according to the criteria for class 8 shall be labelled with a "CORROSIVE" subsidiary hazard label (Model No. 8, see 5.2.2.2.2).
- △ Articles containing smoke-producing substance(s) toxic by inhalation according to the criteria for class 6.1 shall be labelled with a "TOXIC" subsidiary hazard label (Model No. 6.1, see 5.2.2.2.2).
- △ 230 Lithium cells and batteries may be transported under this entry if they meet the provisions of 2.9.4. Sodium ion cells and batteries may be transported under this entry if they meet the provisions of 2.9.5.



- △ 252 .1 Ammonium nitrate hot concentrated solutions can be transported under this entry provided:
- .1 The solution contains not more than 93% ammonium nitrate.
  - .2 The solution contains at least 7% water.
  - .3 The solution contains not more than 0.2% combustible material.
  - .4 The solution contains no chlorine compounds in quantities such that the chloride ion level exceeds 0.02%.
  - .5 The pH of an aqueous solution of 10% of the substance is between 5 and 7, measured at 25°C.
  - .6 The maximum allowable transport temperature of the solution is 140°C.
- .2 Additionally, ammonium nitrate hot concentrate solutions are not subject to this Code provided:
- .1 The solution contains not more than 80% ammonium nitrate.
  - .2 The solution contains not more than 0.2% combustible material.
  - .3 The ammonium nitrate remains in solution under all conditions of transport.
  - .4 The solution does not meet the criteria of any other class or division.

- △ 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 transported as component parts and if these articles as presented for transport have been tested in accordance with test series 6(c) of part I 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).

296 These entries apply to life-saving appliances such as liferafts, personal flotation devices and self-inflating slides. UN 2990 applies to self-inflating appliances. UN 3072 applies to life-saving appliances that are not self-inflating. Life-saving appliances may contain:

- .1 signal devices (class 1) which may include smoke and illumination signal flares packed in packagings that prevent them from being inadvertently activated;
- .2 for UN 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;
- .3 class 2.2 compressed or liquefied gases;
- △ .4 electric storage batteries (class 8) and lithium or sodium ion batteries (class 9);
- .5 first aid kits or repair kits containing small quantities of dangerous goods (e.g. classes 3, 4.1, 5.2, 8 or 9 substances); or
- .6 "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 class 2.2 compressed or liquefied gases with no subsidiary hazard 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 provision of this Code.

- △ 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 transported for testing, shall meet the provisions of 2.9.4 with the exception of 2.9.4.1, 2.9.4.5.7, 2.9.4.6.3 if applicable, 2.9.4.6.4 if applicable and 2.9.4.7.
- Note:** "Transported for testing" includes, but is not limited to, testing described in the *Manual of Tests and Criteria*, part III, subsection 38.3, integration testing and product performance testing.
- These cells and batteries shall be packaged in accordance with packing instruction P910 of 4.1.4.1 or LP905 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 P006 of 4.1.4.1 or LP03 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 transported in accordance with special provision 376.
- Cells, batteries or cells and batteries contained in equipment transported for disposal or recycling may be packaged in accordance with special provision 377 and packing instruction P909 of 4.1.4.1.
- 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 controls 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 transport.
- 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 m 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.
- △ 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.
- △ 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.
- △ 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 the provisions of this Code.



- 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:
- .1 the water capacity of the pressure receptacle shall not exceed 0.5 L and the working pressure shall not exceed 25 bar at 15°C;
  - .2 the minimum burst pressure of the pressure receptacle shall be at least four times the pressure of the gas at 15°C;
  - .3 each article shall be manufactured in such a way that unintentional firing or release is avoided under normal conditions of handling, packing, transport and use. This may be fulfilled by an additional locking device linked to the activator;
  - .4 each article shall be manufactured in such a way as to prevent hazardous projections of the pressure receptacle or parts of the pressure receptacle;
  - .5 each pressure receptacle shall be manufactured from material which will not fragment upon rupture;
  - △ .6 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 subparagraph (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 m; and
  - .7 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.
- 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 the present Code, 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 transport; 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:

- .1 acute hazard, such as gas, fire or electrolyte leaking;
- .2 the use or misuse of the cell or battery;
- .3 signs of physical damage, such as deformation to cell or battery casing, or colours on the casing;
- .4 external and internal short circuit protection, such as voltage or isolation measures;
- .5 the condition of the cell or battery safety features; or
- .6 damage to any internal safety components, such as the battery management system.

- △ Cells and batteries shall be transported according to the provisions applicable to UN 3090, UN 3091, UN 3480, UN 3481, UN 3551 and UN 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 P908 of 4.1.4.1 or LP904 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 transport shall be packed and transported in accordance with packing instruction P911 of 4.1.4.1 or LP906 of 4.1.4.3, as applicable. Alternative packing and/or transport conditions may be authorized by the competent authority.

Packages shall be marked "DAMAGED/DEFECTIVE" in addition to the proper shipping name, as stated in 5.2.1.

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 transport.

- △ 377 Lithium metal, lithium ion and sodium ion cells and batteries and equipment containing such cells and batteries transported 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 P909 of 4.1.4.1.

- △ These cells and batteries are not subject to the requirements of section 2.9.4 or 2.9.5.

- △ 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 transported in accordance with special provision 376.

The transport document shall include the following statement: "Transport in accordance with special provision 377".



- △ 379 Anhydrous ammonia adsorbed on a solid or absorbed in a solid contained in ammonia dispensing systems or receptacles intended to form part of such systems are not subject to the other provisions of this Code if the following conditions are observed:
- .1 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;
  - .2 The adsorbent or absorbent material shall not have dangerous properties listed in classes 1 to 8;
  - .3 The maximum contents of a receptacle shall be 10 kg of ammonia; and
  - .4 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 transported 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.

- △ 388 UN 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, transported 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, transported 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, transported 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 transported 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. When vehicles are transported 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 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 this Code.

- Lithium batteries shall meet the provisions of 2.9.4, except that 2.9.4.1, 2.9.4.5.7, 2.9.4.6.3 if applicable, 2.9.4.6.4 if applicable and 2.9.4.7 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 transported for testing, are installed in vehicles.
- Where a lithium battery installed in a vehicle is damaged or defective, the battery shall be removed and transported according to SP376, unless otherwise approved by the competent authority.

- △ 396 Large and robust articles may be transported with connected gas cylinders with the valves open regardless of 4.1.6.1.5 provided:
- .1 the gas cylinders contain nitrogen of UN 1066 or compressed gas of UN 1956 or compressed air of UN 1002;
  - .2 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);
  - .3 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;
  - .4 the gas cylinders, pressure regulators, piping and other components are protected from damage and impacts during transport by wooden crates or other suitable means;
  - .5 the transport document includes the following statement: "Transport in accordance with special provision 396."; and
  - .6 cargo transport units containing articles transported 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.
- 400 Sodium ion cells and batteries and sodium ion cells and batteries contained in or packed with equipment, prepared and offered for transport, are not subject to other provisions of this Code if they meet the following:
- .1 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 shall be easily verifiable (e.g. busbar between terminals).
  - .2 Each cell or battery meets the provisions of 2.9.5.1, 2.9.5.2, 2.9.5.4, 2.9.5.5 and 2.9.5.6.
  - .3 Each package shall be marked according to 5.2.1.9.
  - .4 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.



- .5 Cells and batteries, when installed in equipment shall be protected from damage. 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.
- .6 Each cell, including when it is a component of a battery, shall only contain dangerous goods that are authorized to be transported in accordance with the provisions of chapter 3.4 and in a quantity not exceeding the quantity specified in column 7a of the Dangerous Goods List of chapter 3.2.

- 401 Sodium ion cells and batteries with organic electrolyte shall be transported as UN 3551 or 3552, as appropriate. Sodium ion cells and batteries with aqueous alkali electrolyte shall be transported as UN 2795 BATTERIES, WET, FILLED WITH ALKALI, electric storage.
- 402 Substances transported 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 (NC) membrane filters covered by this entry with NC content not exceeding 53 g/m<sup>2</sup> and an NC net mass not exceeding 300 g per inner packaging, are not subject to these requirements if they meet the following conditions:
  - .1 They are packed with paper separators of minimum 80 g/m<sup>2</sup> placed between each layer of NC membrane filters.
  - .2 They are packed to maintain the alignment of the NC 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/m<sup>2</sup> or aluminium pouches with an oxygen permeability of equal or less than 0.1% according to standard ISO 15105-1:2007.
    - .2 Sheets packed in cardboard of minimum 250 g/m<sup>2</sup> or aluminium pouches with an oxygen permeability of equal or less than 0.1% according to standard ISO 15105-1:2007.
    - .3 Round filters packed in disc holders or cardboard packaging of minimum 250 g/m<sup>2</sup> or single packed in pouches of paper and plastic material of total minimum 100 g/m<sup>2</sup>.

- 404 Vehicles powered by sodium ion batteries, containing no other dangerous goods, are not subject to other provisions of this Code, 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 Vehicles are not subject to the marking or labelling requirements of chapter 5.2 when they are not fully enclosed by packagings, crates or other means that prevent ready identification.
- 406 This entry may be transported in accordance with the limited quantity provisions of chapter 3.4 when transported in pressure receptacles containing not more than 1,000 mL. The pressure receptacles shall meet the requirements of packing instruction P200 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 transport, shall fulfil the criteria for division 1.4S, 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 transported 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 3559 if the following additional conditions are met:
  - .1 The device meets the exclusion criteria in 2.1.3.4.2.2, 2.1.3.4.2.3 and 2.1.3.4.2.4.
  - .2 The suppressant shall be deemed safe for normally occupied spaces in compliance with international or regional standards (e.g. NFPA 2010).
  - .3 The article shall be packaged in a manner such that when activated, temperatures of the outside of the package shall not exceed 200°C.
  - .4 This entry shall be used only with the approval of the competent authority of the country of manufacture.
 This entry does not apply to "SAFETY DEVICES, electrically initiated" described in special provision 280 (UN 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

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#### *Dangerous Goods List, special provisions and exceptions*

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tetramethylammonium hydroxide must be assigned to an appropriate generic or N.O.S. entry (e.g. UN 2927, TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S., etc.), except as follows:

- .1 other formulations containing a surfactant in a concentration > 1% and with not less than 8.75% tetramethylammonium hydroxide must be assigned to UN 2927, TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S., PG I; and
- .2 other formulations containing a surfactant in a concentration > 1% and with more than 2.38% but less than 8.75% tetramethylammonium hydroxide must be assigned to UN 2927, TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S., PG II.



- 409 The provisions of chapter 3.2 from the IMDG Code Amendment 41-22 may continue to be applied until 31 December 2026.
- △ 922 With the exception of the documentation requirements in 5.4.4.2, the provisions of this Code do not apply to LEAD PHOSPHITE, DIBASIC which is accompanied by a certificate from the shipper stating that the substance, as offered for shipment, has been stabilized in such a way that it does not possess properties of class 4.1.
- 923 The temperature shall be checked regularly.
- ⊗
- 926 This substance shall preferably have been weathered for not less than one month before shipment unless a certificate from a person recognized by the competent authority of the country of shipment states a maximum moisture content of 5%.
- 927 *p*-Nitrosodimethylaniline, wetted with more than 50% water is not subject to the provisions of this Code.
- △ 928 The provisions of this Code do not apply:
- to fish meal when acidified and wetted with more than 40% water, by mass, irrespective of other factors;
  - to fish meal manufactured from “white” fish with a moisture content of not more than 12% and a fat content of not more than 5% by mass; or
  - with the exception of the documentation requirements in 5.4.4.2, to consignments of fish meal which are accompanied by a certificate issued by the competent authority of the country of shipment or other recognized authority stating that the product has no self-heating properties when transported in packaged form.
- △ 931 With the exception of the documentation requirements in 5.4.4.2, the provisions of this Code do not apply to a consignment of this substance which is accompanied by a certificate from the shipper stating that it has no self-heating properties.
- 932 Requires a certificate from the maker or shipper, stating that the shipment was stored under cover, but in the open air, in the size in which it was packaged, for not less than 3 days prior to shipment.
- 934 Requires the percentage range of calcium carbide impurity to be shown on the shipping documents.
- △ 935 With the exception of the documentation requirements in 5.4.4.2, the provisions of this Code do not apply to substances which do not evolve flammable gases when wet which are accompanied by a certificate from the shipper, stating that the substance as offered for shipment does not evolve flammable gases when wet.
- 937 The solid hydrated form of this substance is not subject to the provisions of this Code.
- △ 939 With the exception of the documentation requirements in 5.4.4.2, the provisions of this Code do not apply to a consignment of this substance that is accompanied by a shipper’s certificate stating that it does not contain more than 0.05% maleic anhydride.
- △ 954 With the exception of the documentation requirements in 5.4.4.2, the provisions of this Code do not apply to baled hay with a moisture content of less than 14% shipped in closed cargo transport units and accompanied by a certificate from the shipper stating that the product does not present any class 4.1 UN 1327 hazard in transport and that its moisture content is less than 14%.

- △ 961 Vehicles are not subject to the provisions of this Code, other than those in P912, SP388 and SP977 when applicable, if any of the following conditions are met:
- .1 vehicles are stowed on the vehicle, special category and ro-ro spaces or on the weather deck of a ro-ro ship or a cargo space designated by the Administration (flag State) in accordance with SOLAS 74, chapter II-2, regulation 20 as specifically designed and approved for the carriage of vehicles, and there are no signs of leakage from the battery, engine, fuel cell, compressed gas cylinder or accumulator, or fuel tank when applicable. When packed in a cargo transport unit the exception does not apply to container cargo spaces of a ro-ro ship.
  - .2 vehicles powered by a flammable liquid fuel with a flashpoint of 38°C or above, there are no leaks in any portion of the fuel system, the fuel tank(s) contains 450 L of fuel or less and installed batteries are protected from short-circuit;
  - .3 vehicles powered by a flammable liquid fuel with a flashpoint less than 38°C, the fuel tank(s) are empty and installed batteries are protected from short circuit. Vehicles are considered to be empty of flammable liquid fuel when the fuel tank has been drained and the vehicles cannot be operated due to a lack of fuel. Engine components such as fuel lines, fuel filters and injectors do not need to be cleaned, drained or purged to be considered empty. The fuel tank does not need to be cleaned or purged;
  - .4 vehicles powered by a flammable gas (liquefied or compressed), the fuel tank(s) are empty and the positive pressure in the tank does not exceed 2 bar, the fuel shut-off or isolation valve is closed and secured, and installed batteries are protected from short circuit;
  - .5 vehicles solely powered by a wet or dry electric storage battery or a sodium battery, and the battery is protected from short circuit.
  - .6 vehicles solely powered by a sodium ion battery, and the battery is short-circuited in a way that the battery does not contain electrical energy. The short circuiting shall be easily identifiable (e.g. busbar between terminals).
- △ 962 Vehicles, not meeting the conditions of special provision 961 shall be assigned to class 9 and shall meet the following requirements:
- .1 vehicles shall not show signs of leakage from batteries, engines, fuel cells, compressed gas cylinders or accumulators, or fuel tank(s) when applicable;
  - .2 for flammable liquid powered vehicles the fuel tank(s) containing the flammable liquid shall not be more than one fourth full and in any case the flammable liquid shall not exceed 250 L unless otherwise approved by the competent authority;
  - .3 for flammable gas powered vehicles, the fuel shut-off valve of the fuel tank(s) shall be securely closed;
  - △ .4 installed batteries shall meet the provisions of SP388 or SP977, as applicable, and be protected from damage, short circuit, and accidental activation during transport.
  - △ The provisions of this Code relevant to marking, labelling, placarding and marine pollutants shall only apply to vehicles that are fully enclosed by packagings, crates or other means that prevent ready identification (e.g., overpack).
- △ 964 With the exception of the documentation requirements in 5.4.4.2, the provisions of this Code do not apply to this substance when:
- .1 it is transported in non-friable prills or granules form;
  - .2 it does not meet the criteria for class 5.1 based on the result of one of the tests for oxidizing solid substances as reflected in the *UN Manual of Tests and Criteria* (see 34.4.1 or 34.4.3); and
  - .3 it is accompanied by a certificate issued by a laboratory recognized by the competent authority stating the results of the test.
- △ 972 Lithium batteries shall meet the provisions of 2.9.4, except that 2.9.4.1, 2.9.4.5.7, 2.9.4.6.3 if applicable, 2.9.4.6.4 if applicable and 2.9.4.7 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 transported for testing, are installed in machinery or engines. Where a lithium battery installed in an engine or machinery is damaged or defective, the battery shall be removed.



- 977 Sodium ion batteries shall meet the provisions of 2.9.5.
- 978
  - .1 For the purpose of this Code, carbon of animal or vegetable origin means carbon, generated in a production or manufacturing process, not formed in a geological process and not obtained from mining. Carbon covered by this entry is produced by pyrolysis of an organic material such as bone, bamboo, coconut shell, jute or wood.
  - .2 The UN N.4 test according to section 33.4.6 of the UN *Manual of Tests and Criteria* shall not be used to exempt carbon of animal or vegetable origin (UN 1361) from the provisions of this Code.
  - .3 Without testing, the material shall be assigned to at least packing group III.
  - .4 Unless otherwise approved by the competent authority, the following provisions apply:
    - .1 after production, the unpacked material shall be subject to weathering (stored under cover, but in the open air) for a minimum period of 14 days before being packaged for transport; or
    - .2 after pyrolysis, steam and cooling shall be applied to the unpacked material and the material shall be packed under an inert gas atmosphere (e.g. nitrogen); packages shall then be stored under loose cover or in the open air for a minimum of 24 hours before transport.
  - .5 The material shall be packed into packagings only when the temperature of the material does not exceed 40°C on the day of packing.
  - .6 When stowed in a cargo transport unit, minimum headspace in the CTU of 30 cm shall be maintained, and:
    - .1 the stowage height of the package(s) in the unit should not exceed 1.5 m; or
    - .2 the maximum block size of the packages should be 16 m<sup>3</sup> and a minimum of 15 cm of space between blocks should be maintained.
- 979 With the exception of the documentation requirements in 5.4.4.2, the provisions of this Code do not apply to this substance when:
  - .1 it is accompanied by a certificate from the shipper stating that the substance is steam activated carbon; or
  - .2 it is chemically activated carbon, which is accompanied by a certificate issued by a laboratory recognized by the competent authority, stating that the substance does not meet the criteria for class 4.2 based on a negative test result for self-heating substances when tested in accordance with the UN *Manual of Tests and Criteria* (see 33.4.6).

## Appendix B Glossary of terms

- **FIRE SUPPRESSANT DISPERSING DEVICES** 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.

Index. Proper shipping names in alphabetical order

△ BATTERIES, CONTAINING METALLIC SODIUM OR SODIUM ALLOY	–	4.3	3292
BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE, SOLID electric storage	–	8	3028
BATTERIES, NICKEL-METAL HYDRIDE	–	9	3496
■ Batteries, sodium nickel chloride, see	–	4.3	3292
△ BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED containing more than 20% butadienes, stabilized	–	2.1	1010
■ Butylenes mixture, see	–	2.1	1012

△ CELLS, CONTAINING METALLIC SODIUM OR SODIUM ALLOY	–	4.3	3292
■ Dibenzoyl peroxide (concentration ≤ 42%, with diluent type A and water), <i>see</i>	–	5.2	3109
△ Di-(2,4-dichlorobenzoyl) peroxide (concentration ≤ 52%, as a paste, with silicon oil), <i>see</i>	–	5.2	3104
■ 2,5-Dimethyl-2,5-di-( <i>tert</i> -butylperoxy)hexane (concentration ≤ 22%, with inert solid) ( <b>exempt</b> )	–	–	–
■ DISILANE	–	2.1	3553
■ FIRE SUPPRESSANT DISPERSING DEVICES	–	1.4S	0514
■ FIRE SUPPRESSANT DISPERSING DEVICES	–	9	3559
■ GALLIUM CONTAINED IN MANUFACTURED ARTICLES	–	8	3554
Iron perchloride solution, <i>see</i>	–	8	2582
⊗			
Iron powder, pyrophoric, <i>see</i>	–	4.2	1383
△ ISOPROPENYLBENZENE	P	3	2303
■ Methyl ethyl ketone peroxide(s) (available oxygen ≤ 10%, with diluent type A and water), <i>see</i>	–	5.2	3105
△ <i>alpha</i> -Methylstyrene, <i>see</i>	P	3	2303
△ 2-Phenylpropene, <i>see</i>	P	3	2303
■ SODIUM ION BATTERIES with organic electrolyte	–	9	3551
■ SODIUM ION BATTERIES CONTAINED IN EQUIPMENT, with organic electrolyte	–	9	3552
■ SODIUM ION BATTERIES PACKED WITH EQUIPMENT, with organic electrolyte	–	9	3552
△ TETRAMETHYLAMMONIUM HYDROXIDE, SOLID	–	6.1	3423
■ TETRAMETHYLAMMONIUM HYDROXIDE AQUEOUS SOLUTION with not less than 25% tetramethylammonium hydroxide, <i>see</i>	–	6.1	3560
△ TETRAMETHYLAMMONIUM HYDROXIDE AQUEOUS SOLUTION with more than 2.5% but less than 25% tetramethylammonium hydroxide, <i>see</i>	–	8	1835
△ TETRAMETHYLAMMONIUM HYDROXIDE AQUEOUS SOLUTION with not more than 2.5% tetramethylammonium hydroxide, <i>see</i>	–	8	1835
■ TRIFLUOROMETHYLTETRAZOLE-SODIUM SALT IN ACETONE, with not less than 68% acetone, by mass	–	3	3555
■ VEHICLE, LITHIUM ION BATTERY POWERED	–	9	3556
■ VEHICLE, LITHIUM METAL BATTERY POWERED	–	9	3557
■ VEHICLE, SODIUM ION BATTERY POWERED	–	9	3558



## PART 4. Packing and tank provisions

### Chapter 4.1. Use of packagings, including intermediate bulk containers (IBCs) and large packagings

P002	PACKING INSTRUCTION (SOLIDS) <i>(continued)</i>	P002
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met.		

- △ PP12 For UN Nos. 2213 and 3077, 5H1, 5L1 and 5M1 bags are allowed when transported in closed cargo transport units.

P003	PACKING INSTRUCTION	P003
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- △ 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 of the package shall be used.

P005	PACKING INSTRUCTION	P005
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- (5) Articles containing pre-production prototype lithium cells or batteries when these prototypes are transported for testing or production runs of not more than 100 lithium cells or batteries that are of a type that have not met the testing requirements of the *Manual of Tests and Criteria*, part III, subsection 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 transport. 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 transported unpackaged under conditions specified by the competent authority. Additional conditions that may be considered in the approval process include, but are not limited to:
    - (i) the article shall be strong enough to withstand the shocks and loadings normally encountered during transport, 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
    - (ii) 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 transport.

P200

## PACKING INSTRUCTION (continued)

P200

- (4) The filling of pressure receptacles shall be carried out by qualified staff using appropriate equipment and procedures.

The procedures should include checks of:

- (a) the conformity of receptacles and accessories with the provisions of this Code;
- (b) their compatibility with the product to be transported;
- (c) the absence of damage which might affect safety;
- (d) compliance with the degree or pressure of filling, as appropriate;
- (e) marks and identification.

These requirements are deemed to be met if the following standards are applied:

ISO 10691:2004	Gas cylinders – Refillable welded steel cylinders for liquefied petroleum gas (LPG) – Procedures for checking before, during and after filling.
ISO 11372:2011	Gas cylinders – Acetylene cylinders – Filling conditions and filling inspection
ISO 11755:2005	Gas cylinders – Cylinder bundles for compressed and liquefied gases (excluding acetylene) – Inspection at time of filling
ISO 13088:2011 + Amd 1:2020	Gas cylinders – Acetylene cylinder bundles – Filling conditions and filling inspection
ISO 24431:2016	Gas cylinders – Seamless, welded and composite cylinders for compressed and liquefied gases (excluding acetylene) – Inspection at time of filling

△

△

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 31 bar (absolute).

$$\text{working pressure (bar)} < \frac{31}{x_f} - 1$$

in which  $x_f$  = 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 31 bar (absolute), additionally taking the coefficient of nitrogen equivalency in accordance with ISO 10156:2017 into account when calculating the partial pressure.

$$\text{working pressure (bar)} < \frac{31}{x_f} (x_f + K_n \times x_n) - 1$$

in which  $x_f$  = fluorine concentration in % by volume/100;

$K_n$  = coefficient of equivalency of an inert gas relative to nitrogen (coefficient of nitrogen equivalency); and

$x_n$  = inert gas concentration in % by volume/100.

However, the working pressure for mixtures of fluorine and inert gases shall not exceed 200 bar. The minimum test pressure of pressure receptacles for mixtures of fluorine and inert gases equals 1.5 times the working pressure or 200 bar, with the greater value to be applied.

P200

## PACKING INSTRUCTION (continued)

P200

Table 1: COMPRESSED GASES

UN No.	Proper shipping name	Class	Subsidiary hazards	LC <sub>50</sub> , mL/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	MEGCs	Test period, years	Test pressure, bar <sup>a</sup>	Maximum working pressure, bar <sup>a</sup>	Special packing provisions
1010	BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED with more than 20% butadienes	2.1			X	X	X	X	X	10			v, z
3553	DISILANE	2.1			X	X	X	X		10	225	0.39	q

P203	PACKING INSTRUCTION	P203
This instruction applies to class 2 refrigerated liquefied gases.		
<b>Requirements for closed cryogenic receptacles:</b> (1) The general requirements of 4.1.6.1 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 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 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 transport of oxidizing gases (i.e. with a subsidiary hazard of 5.1), these materials shall not react with these gases in a dangerous manner. (8) Periodic inspection The periodic inspection and test frequencies of pressure relief valves in accordance with 6.2.1.6.3 shall not exceed five years.		
<b>Requirements for open cryogenic receptacles:</b> Only the following non-oxidizing refrigerated liquefied gases of class 2.2 may be transported 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.		
<b>Special packing provisions:</b> <b>PP89</b> For UN Nos. 3501, 3502, 3503, 3504 and 3505, notwithstanding 4.1.6.1.9.2, non-refillable cylinders used may have a water capacity in L not exceeding 1 000L 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 50L. <b>PP97</b> For fire-extinguishing agents assigned to UN 3500 the maximum test period for periodic inspection shall be 10 years. They may be transported in tubes of a maximum water capacity of 450 L conforming to the applicable requirements of chapter 6.2.		

P208		PACKING INSTRUCTION (continued)				P208
Table 1: ADSORBED GASES						
UN No.	Proper shipping name	Class or Division	Subsidiary hazard	LC <sub>50</sub> mL/m <sup>3</sup>	Special packing provisions	



P301	PACKING INSTRUCTION	P301
This instruction applies to UN 3165.		
△	<p>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:</p> <p>(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 L. 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 shipment 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 primary containment and package is 42 L.</p> <p>(2) Aluminium pressure receptacle            Primary containment of the fuel within this receptacle shall consist of a welded vapourtight fuel compartment with an elastomeric bladder having a maximum internal volume of 46 L. The pressure receptacle shall have a minimum design gauge pressure of 2,680 kPa and a minimum burst pressure of 5,170 kPa. Each receptacle shall be leak-checked during manufacture and before shipment 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 primary containment and package is 42 L.</p>	

P303	PACKING INSTRUCTION	P303
This instruction applies to UN 3555.		
<p>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:</p> <p>Plastics drum non-removeable head (1H1) of maximum capacity 250 L.</p>		
<p><b>Additional requirement:</b>            The packagings shall be transported in an upright position.</p>		
<p><b>Special packing provision:</b>  <b>PP26</b> For UN 3555, packagings shall be lead free.</p>		

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.		
△	<p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>(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.            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 transport.</p> <p>(2) Metal packagings:            Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2);            Jerricans (3A1, 3A2, 3B1, 3B2).            Maximum gross mass: 150 kg</p> <p>(3) Composite packagings:            Plastics receptacle in a steel or aluminium drum (6HA1 or 6HB1)            Maximum gross mass: 150 kg</p> <p>(4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.</p>	



P405	PACKING INSTRUCTION	P405
This instruction applies to UN 1381.		
<p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>(1) For UN 1381, wet phosphorus:</p> <p>.1 Combination packagings</p> <p>Outer packagings:</p> <p>Boxes (4A, 4B, 4N, 4C1, 4C2, 4D or 4F); maximum net mass: 75 kg</p> <p>Inner packagings:</p> <p>(i) hermetically sealed metal cans, with a maximum net mass of 15 kg; or</p> <p>(ii) 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</p> <p>.2 Drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2); maximum net mass: 400 kg</p> <p>Jerricans (3A1 or 3B1); maximum net mass: 120 kg.</p> <p>These packagings shall be capable of passing the leakproofness test specified in 6.1.5.4 at the packing group II performance level.</p> <p>(2) For UN 1381, dry phosphorus:</p> <p>.1 When fused, drums (1A2, 1B2 or 1N2) with a maximum net mass of 400 kg; or</p> <p>.2 In projectiles or hard-cased articles when transported without class 1 components, as specified by the competent authority.</p>		
<p><b>Special packing provision:</b></p> <p><b>PP31</b> For UN 1381, packagings shall be hermetically sealed.</p>		

P501	PACKING INSTRUCTION	P501
This instruction applies to UN 2015.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met.		
Combination packagings	Inner packagings maximum capacity	Outer packagings maximum net mass
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
Fibreboard box (4G) or fibre drum (1G), with plastics or metal inner packagings each in a plastics bag	2 L	50 kg

P505	PACKING INSTRUCTION	P505
This instruction applies to UN 3375.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met.		
Combination packagings		Maximum capacity/ maximum net mass
Inner packagings	Outer packagings	
Glass 5 L	<b>Boxes</b>	
Plastics 5 L	aluminium (4B)	125 kg
Metal 5 L	natural wood, ordinary (4C1)	125 kg
	natural wood, sift-proof walls (4C2)	125 kg
	plywood (4D)	125 kg
	fibreboard (4G)	125 kg
	plastics, solid (4H2)	125 kg
	<b>Drums</b>	
	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
	<b>Jerricans</b>	
	aluminium, removable head (3B2)	125 kg
	plastics, removable head (3H2)	125 kg
<b>Single packagings</b>		

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 are authorized provided the general provisions of 4.1.1 and 4.1.3 and special provisions of 4.1.7 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 2.4.2.3.2.3 and 2.5.3.2.4. The quantities specified for each packing method are the maximum quantities authorized per package. The following packagings are authorized:									
(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) and 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 <sup>1</sup>	OP3	OP4 <sup>1</sup>	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 <sup>2</sup>	
Maximum contents in litres for liquids <sup>3</sup>	0.5	–	5	–	30	60	60	225 <sup>4</sup>	

P600	PACKING INSTRUCTION	P600
This instruction applies to UN Nos. 1700, 2016 and 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 transport.		
Maximum net mass: 75 kg		

P603	PACKING INSTRUCTION	P603
This instruction applies to UN 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).		
<b>Additional requirements:</b>		
1 Primary inner receptacles shall be packed in secondary packagings in a way that, under normal conditions of transport, 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 2.7.2.4.5.2.		
3 The provisions of 6.4.4 shall be met.		
4 In the case of fissile-excepted material, limits specified in 2.7.2.3.5 shall be met.		

P620	PACKING INSTRUCTION	P620
This instruction applies to UN Nos. 2814 and 2900.		
<p>The following packagings are authorized, provided the special packing provisions of 4.1.8 are met: Packagings meeting the provisions of chapter 6.3 and approved accordingly consisting of:</p> <p>.1 Inner packagings comprising:</p> <ul style="list-style-type: none"> <li>(i) leakproof primary receptacle(s);</li> <li>(ii) a leakproof secondary packaging;</li> <li>(iii) 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;</li> </ul> <p>.2 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).</p> <p>The smallest external dimension shall be not less than 100 mm.</p>		
<p><b>Additional provisions:</b></p> <p>△ 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.</p> <p>2 Other than for exceptional consignments, such as whole organs which require special packaging, the following additional provisions shall apply:</p> <ul style="list-style-type: none"> <li>(a) <i>Substances consigned at ambient temperatures or at a higher temperature.</i> 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 a manufactured locking closure;</li> <li>△ (b) <i>Substances consigned refrigerated or frozen.</i> 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;</li> <li>△ (c) <i>Substances consigned in liquid nitrogen.</i> 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.</li> </ul>		



P650	PACKING INSTRUCTION	P650
This instruction applies to UN 3373.		

- (5) At least one surface of the outer packaging shall have a minimum dimension of 100 mm × 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:** Capability 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 either be 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 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; 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:** Capability 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 either be 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 transport then a packaging suitable for liquids, including absorbent materials, shall be used.

P650	PACKING INSTRUCTION (continued)	P650
(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.	

P800	PACKING INSTRUCTION	P800
This instruction applies to UN Nos. 2803 and 2809.		

- Special packing provision:**
- △ **PP41** For UN 2803, when it is necessary to transport 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.

P803	PACKING INSTRUCTION	P803
This instruction applies to UN 2028.		
△	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). 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 transport. Maximum net mass: 75 kg.	

P901	PACKING INSTRUCTION	P901
This instruction applies to UN 3316.		
<p>The following combination packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);</p> <p>Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p> <p>Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2).</p> <p>Packagings shall conform to the performance level consistent with the packing group assigned to the kit as a whole (see 3.3.1, special provision 251). Where the kit contains only dangerous goods to which no packing group is assigned, packagings shall meet Packing Group II performance level.</p> <p>Maximum quantity of dangerous goods per outer packaging: 10 kg excluding the mass of any carbon dioxide, solid (dry ice) used as a refrigerant.</p> <p>■ If dry ice is used as a coolant, the requirements of 5.5.3 shall apply.</p>		
<p><b>Additional requirement:</b></p> <p>Dangerous goods in kits shall be packed in inner packagings which shall be protected from other materials in the kit.</p>		

P902	PACKING INSTRUCTION	P902
△	This instruction applies to UN Nos. 3268 and 3559.	
△	<p>(1) Packaged articles:</p> <p>The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</p> <p>Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p> <p>Jerricans (3A2, 3B2, 3H2).</p> <p>Packagings shall conform to the packing group III performance level.</p> <p>The packagings shall be designed and constructed so as to prevent movement of the articles and inadvertent operation during normal conditions of transport.</p>	
△	(2) Unpackaged articles:	
△	Except for UN 3559, the articles may also be transported unpackaged in dedicated handling devices, vehicles or containers when moved to, from, or between where they are manufactured and an assembly plant including intermediate handling locations.	
<b>Additional requirement:</b>		
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.	
△	<p>For the purpose of this packing instruction, "equipment" means apparatus for which the 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:</p> <p>(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).</p> <p>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.</p> <p>(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.</p> <p>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.</p> <p>(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.</p> <p>(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 transport. Packagings need not meet the requirements of 4.1.1.3.            Large equipment can be offered for transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained.            When intentionally active, 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 transported in strong outer packagings.</p> <p>(5) For packaging 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 transport and need not meet the requirements of 4.1.1.3.</p> <p>The equipment shall be secured against movement within the outer packaging.            When intentionally active, 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 transported in strong outer packagings.</p> <p><b>Note:</b> The packagings authorized in (2), (4) and (5) may exceed a net mass of 400 kg (see 4.1.3.3).</p>	
	<b>Additional requirement:</b>	
△	Cells or batteries shall be protected against short circuit.	

P904	PACKING INSTRUCTION	P904
	This instruction applies to UN 3245.	
	<b>Additional requirement:</b>	
⊗	<p>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.</p>	



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 provisions of part 6.		
<b>Note:</b> 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 transported unpackaged.		
<b>Additional provisions:</b>		
<ol style="list-style-type: none"> <li>1 All dangerous substances and articles contained as equipment within the appliances shall be secured to prevent inadvertent movement and in addition:               <ol style="list-style-type: none"> <li>(a) signal devices of class 1 shall be packed in plastics or fibreboard inner packagings;</li> <li>(b) gases (class 2.2) shall be contained in cylinders as specified by the competent authority, which may be connected to the appliance;</li> <li>(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</li> <li>(d) small quantities of other dangerous substances (for example in classes 3, 4.1 and 5.2) shall be packed in strong inner packagings.</li> </ol> </li> <li>2 Preparation for transport and packaging shall include provisions to prevent any accidental inflation of the appliance.</li> </ol>		

P907	PACKING INSTRUCTION	P907
This instruction applies to articles, such as machinery, apparatus or devices of UN No. 3363.		
<p>If the article is constructed and designed so that the receptacles containing the dangerous goods are afforded adequate protection, an outer packaging is not required. Dangerous goods in an article 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.</p> <p>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 class 2.2 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.</p> <p>In addition, the manner in which receptacles are contained within the article shall be such that, under normal conditions of transport, damage to receptacles containing the dangerous goods is unlikely; and in the event of damage to the receptacles containing solid or liquid dangerous goods, no leakage of the dangerous goods from the article 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 article during normal conditions of transport. 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.</p> <p><b>Note:</b> The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).</p>		

P908	PACKING INSTRUCTION	P908
△	<p>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.</p> <p>The following packagings are authorized provided the general provisions for 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)</p> <p>Packagings shall conform to the packing group II performance level.</p> <p>■ Packagings shall also meet the following requirements:</p> <ul style="list-style-type: none"> <li>(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 of an outer packaging. The inner packaging or outer packaging shall be leakproof to prevent the potential release of electrolyte.</li> <li>(b) Each inner packaging shall be surrounded by sufficient non-combustible and electrically non-conductive thermal insulation material to protect against a dangerous evolution of heat.</li> <li>(c) Sealed packagings shall be fitted with a venting device when appropriate.</li> <li>(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 transport. Cushioning material that is non-combustible and electrically non-conductive may also be used to meet this requirement.</li> <li>△ (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.</li> </ul> <p>For leaking cells or batteries, sufficient inert absorbent material shall be added to the inner or outer packaging to absorb any release of electrolyte.</p> <p>A cell or battery with a net mass of more than 30 kg shall be limited to one cell or battery per outer packaging.</p> <p><b>Additional requirement:</b>            Cells or batteries shall be protected against short circuit.</p>	

P909	PACKING INSTRUCTION	P909
△	<p>This instruction applies to UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552 transported for disposal or recycling, either packed together with or packed without non-lithium batteries.</p> <ul style="list-style-type: none"> <li>(1) Cells and batteries shall be packed in accordance with the following:           <ul style="list-style-type: none"> <li>(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); and                Jerricans (3A2, 3B2, 3H2).</li> <li>(b) Packagings shall conform to the packing group II performance level.</li> <li>(c) Metal packagings shall be fitted with an electrically non-conductive lining material (e.g. plastics) of adequate strength for the intended use.</li> </ul> </li> <li>△ (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:           <ul style="list-style-type: none"> <li>(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.</li> <li>(b) Metal packagings shall be fitted with an electrically non-conductive lining material (e.g. plastics) of adequate strength for the intended use.</li> </ul> </li> <li>(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 transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained.</li> <li>(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 packagings capacity and its intended use, may be used. Packagings need not meet the requirements of 4.1.1.3.</li> </ul> <p><b>Note:</b> The packagings authorized in (3) and (4) may exceed a net mass of 400 kg (see 4.1.3.3).</p>	

P910	PACKING INSTRUCTION	P910
△	<p>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 transported for testing.</p> <p>The following packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>(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:</p> <p>(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;</p> <p>(b) Each cell or battery shall be individually packed in an inner packaging and placed inside an outer packaging;</p> <p>(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;</p> <p>(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 transport. Cushioning material that is non-combustible and electrically non-conductive may be used to meet this requirement;</p>	
△	<p>(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;</p> <p>(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.</p> <p>(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:</p> <p>(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;</p> <p>(b) The equipment shall be constructed or packaged in such a manner as to prevent accidental operation during transport;</p> <p>(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 transport. When cushioning material is used to meet this requirement it shall be non-combustible and electrically non-conductive; and</p>	
△	<p>(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.</p> <p>(3) The equipment or the batteries may be transported unpackaged under conditions specified by the competent authority. Additional conditions that may be considered in the approval process include, but are not limited to:</p> <p>(a) The equipment or the battery shall be strong enough to withstand the shocks and loadings normally encountered during transport, 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</p> <p>(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 transport.</p> <p><b>Note:</b> The packagings authorized may exceed a net mass of 400 kg (see 4.1.3.3).</p> <p><b>Additional requirements:</b></p>	
△	<p>The cells and batteries shall be protected against short circuit. Protection against short circuits includes, but is not limited to,</p> <p>(a) individual protection of the battery terminals,</p> <p>(b) inner packaging to prevent contact between cells and batteries,</p> <p>(c) batteries with recessed terminals designed to protect against short circuits, or</p> <p>(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.</p>	



P911	PACKING INSTRUCTION	P911
△	<p>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 transport.</p> <p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>For cells and batteries and equipment containing cells and batteries:</p> <p>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</p> <p>Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p> <p>Jerricans (3A2, 3B2, 3H2).</p> <p>The packagings shall conform to the packing group I performance level.</p> <p>(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:</p> <p>(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;</p> <p>(b) No flame shall occur outside the package;</p> <p>(c) No projectiles shall exit the package;</p> <p>(d) The structural integrity of the package shall be maintained;</p> <p>(e) The packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging, etc.), as appropriate.</p> <p>(2) The additional packaging performance requirements shall be verified by a test as specified by the competent authority.*</p> <p>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.</p> <p>(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.</p> <p><b>Additional requirement:</b></p> <p>Cells or batteries shall be protected against short circuit.</p>	

△	<p>* The following criteria, as relevant, may be considered to assess the performance of the packaging:</p> <p>(a) The assessment shall be done under a quality management system (as described, e.g. in section 2.9.4.5) allowing for the traceability of tests results, reference data and characterization models used;</p> <p>(b) The list of hazards expected in case of thermal runaway for the cell or battery type, in the condition it is transported (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;</p> <p>(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 [kg·m<sup>-3</sup>], specific heat capacity [J·kg<sup>-1</sup>·K<sup>-1</sup>], heating value [kJ·kg<sup>-1</sup>], thermal conductivity [W·m<sup>-1</sup>·K<sup>-1</sup>], melting temperature and flammability temperature [K], heat transfer coefficient of the outer packaging [W·m<sup>-2</sup>·K<sup>-1</sup>], ...);</p> <p>(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 transport;</p> <p>(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;</p> <p>(f) The surrounding conditions in which the packaging may be used and transported 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;</p> <p>(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 transport condition, the maximum heat and flame emissions for the possible propagation of the reaction;</p> <p>(h) These scenarios shall be assessed over a period long enough to allow all the possible consequences to occur (e.g. 24 hours);</p> <p>(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>
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P912	PACKING INSTRUCTION	P912
This instruction applies to UN Nos. 3556, 3557 and 3558.		
<p>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 transport. 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 transport which would change the orientation or cause the battery in the vehicle to be damaged.</p> <p>Vehicles transported in a packaging may have some parts of the vehicle, other than the battery, detached from its frame to fit into the packaging.</p> <p>Note: The packagings may exceed a net mass of 400 kg (see 4.1.3.3).</p> <p>Vehicles with an individual net mass of 30 kg or more:</p> <ul style="list-style-type: none"> <li>(a) may be loaded into crates or secured to pallets;</li> <li>(b) may be transported unpackaged providing that the vehicle is capable of remaining upright during transport without additional support and the vehicle provides adequate protection to the battery so that no damage to the battery can occur; or</li> <li>(c) where the vehicles have the potential to topple over during transport (e.g. motor cycles), may be transported unpackaged in a cargo transport unit fitted out with the means to prevent toppling in transport, such as by the use of bracing, frames or racking.</li> </ul>		

IBC03	PACKING INSTRUCTION	IBC03
<p>The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met:</p> <p>Metal (31A, 31B and 31N);</p> <p>Rigid plastics (31H1 and 31H2);</p> <p>Composite (31HZ1 and 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2).</p> <p><b>Special packing provisions:</b></p> <p><b>B8</b> 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.</p> <p><b>B11</b> Notwithstanding the provisions of the second paragraph of 4.1.1.10, UN 2672 ammonia solution in concentrations not exceeding 25% may be transported in IBCs.</p> <p><b>B19</b> For UN Nos. 3532 and 3534, 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.</p>		

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 2.4.2.3.2.3 or 2.5.3.2.4 but listed below may also be transported packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable. 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)	Control temperature	Emergency temperature	
Δ	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52%, stable dispersion, in water	31HA1	1,000	+10°C	+15°C	
		31A	1,250	+10°C	+15°C	

LP03	PACKING INSTRUCTION	LP03
This instruction applies to UN Nos. 3537, 3538, 3540, 3541, 3546, 3547 and 3548.		
<p>(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:</p> <ul style="list-style-type: none"> <li>steel (50A);</li> <li>aluminium (50B);</li> <li>metal other than steel or aluminium (50N);</li> <li>rigid plastics (50H);</li> <li>natural wood (50C);</li> <li>plywood (50D);</li> <li>reconstituted wood (50F);</li> <li>rigid fibreboard (50G).</li> </ul> <p>(2) Additionally, the following conditions shall be met:</p> <ul style="list-style-type: none"> <li>(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 transport, they cannot break, be punctured or leak their contents into the article itself or the outer packaging;</li> <li>(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;</li> <li>(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;</li> <li>(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 P200 or P208; and</li> <li>(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 transport.</li> </ul> <p>(3) Articles shall be packed to prevent movement and inadvertent operation during normal conditions of transport.</p> <p>■ (4) Articles containing pre-production prototype lithium cells or batteries when these prototypes are transported for testing or production runs of not more than 100 lithium cells or batteries that are of a type that have not met the testing requirements of the Manual of Tests and Criteria, part III, subsection 38.3 shall in addition meet the following:</p> <ul style="list-style-type: none"> <li>(a) Packagings shall conform to the requirements in paragraph (1) of this packing instruction.</li> <li>(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 transport. When cushioning material is used to meet this requirement it shall be non-combustible and electrically non-conductive.</li> <li>(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.</li> </ul>		

LP902	PACKING INSTRUCTION	LP902
This instruction applies to UN 3268.		
<p>△ (1) Packaged articles: The following large 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:</p> <ul style="list-style-type: none"> <li>steel (50A);</li> <li>aluminium (50B);</li> <li>metal other than steel or aluminium (50N);</li> <li>rigid plastics (50H);</li> <li>natural wood (50C);</li> <li>plywood (50D);</li> <li>reconstituted wood (50F);</li> <li>rigid fibreboard (50G).</li> </ul> <p>The packagings shall be designed and constructed to prevent movement of the articles and inadvertent operation during normal conditions of transport.</p> <p>△ (2) Unpackaged articles: The articles may also be transported unpackaged in dedicated handling devices, vehicles, containers or wagons when moved to, from, or between where they are manufactured and an assembly plant including intermediate handling locations.</p> <p><b>Additional provision:</b> Any pressure receptacle shall be in accordance with the requirements of the competent authority for the substance(s) contained in the pressure receptacle(s).</p>		



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.	
△	<p>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:</p> <p>Rigid large packagings conforming to the packing group II performance level, made of:</p> <ul style="list-style-type: none"> <li>steel (50A);</li> <li>aluminium (50B);</li> <li>metal other than steel or aluminium (50N);</li> <li>rigid plastics (50H);</li> <li>natural wood (50C);</li> <li>plywood (50D);</li> <li>reconstituted wood (50F);</li> <li>rigid fibreboard (50G).</li> </ul> <p>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 transport by:</p> <ul style="list-style-type: none"> <li>(a) its movement or placement within the large packaging;</li> <li>(b) contact with other cells, batteries or equipment within the large packaging; and</li> <li>(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.</li> </ul> <p>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.</p> <p><b>Additional requirement:</b> Batteries shall be protected against short circuit.</p>	

LP904	PACKING INSTRUCTION	LP904
△	This instruction applies to single damaged or defective batteries and to single items of equipment containing damaged or defective cells or batteries of UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552.	
	<p>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 or batteries, provided the general provisions of 4.1.1 and 4.1.3 are met.</p> <p>For batteries and equipment containing cells and batteries:</p> <p>Rigid large packagings conforming to the packing group II performance level, made of:</p> <ul style="list-style-type: none"> <li>steel (50A)</li> <li>aluminium (50B)</li> <li>metal other than steel or aluminium (50N)</li> <li>rigid plastics (50H)</li> <li>plywood (50D)</li> </ul> <p>■ Large packagings shall also meet the following requirements:</p> <ul style="list-style-type: none"> <li>(a) The damaged or defective battery or equipment containing such cells or batteries shall be individually packed in an inner packaging and placed inside of an outer packaging. The inner packaging or outer packaging shall be leakproof to prevent the potential release of electrolyte.</li> <li>(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.</li> <li>(c) Sealed packagings shall be fitted with a venting device when appropriate.</li> <li>(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 transport. Cushioning material that is non-combustible and electrically non-conductive may also be used to meet this requirement.</li> <li>(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.</li> </ul> <p>For leaking batteries and cells, sufficient inert absorbent material shall be added to the inner or outer packaging to absorb any release of electrolyte.</p> <p><b>Additional requirement:</b> Batteries and cells shall be protected against short circuit.</p>	

LP905	PACKING INSTRUCTION	LP905
△	<p>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 transported for testing.</p>	
	<p>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:</p>	
(1)	<p>For a single battery:</p> <p>Rigid large packagings conforming to the packing group II performance level, made of:</p> <ul style="list-style-type: none"> <li>steel (50A);</li> <li>aluminium (50B);</li> <li>metal other than steel or aluminium (50N);</li> <li>rigid plastics (50H);</li> <li>natural wood (50C);</li> <li>plywood (50D);</li> <li>reconstituted wood (50F);</li> <li>rigid fibreboard (50G).</li> </ul> <p>Large packagings shall also meet the following requirements:</p> <ul style="list-style-type: none"> <li>(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;</li> <li>(b) The battery shall be packed in an inner packaging and placed inside the outer packaging;</li> <li>(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;</li> <li>(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 transport. When cushioning material is used to meet this requirement it shall be non-combustible and electrically non-conductive; and</li> </ul>	
△	<p>(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.</p>	
(2)	<p>For a single item of equipment containing cells or batteries:</p> <p>Rigid large packagings conforming to the packing group II performance level, made of:</p> <ul style="list-style-type: none"> <li>steel (50A);</li> <li>aluminium (50B);</li> <li>metal other than steel or aluminium (50N);</li> <li>rigid plastics (50H);</li> <li>natural wood (50C);</li> <li>plywood (50D);</li> <li>reconstituted wood (50F);</li> <li>rigid fibreboard (50G).</li> </ul> <p>Large packagings shall also meet the following requirements:</p> <ul style="list-style-type: none"> <li>(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;</li> <li>(b) The equipment shall be constructed or packed in such a manner as to prevent accidental operation during transport;</li> <li>(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 transport. When cushioning material is used to meet this requirement, it shall be non-combustible and electrically non-conductive; and</li> <li>(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.</li> </ul>	
△	<p><b>Additional requirement:</b> Cells and batteries shall be protected against short circuit.</p>	

LP906	PACKING INSTRUCTION	LP906
△	<p>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 transport.</p>	
	<p>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:</p> <ul style="list-style-type: none"> <li>steel (50A);</li> <li>aluminium (50B);</li> <li>metal other than steel or aluminium (50N);</li> <li>rigid plastics (50H);</li> <li>plywood (50D);</li> <li>rigid fibreboard (50G).</li> </ul> <p>(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:</p> <ul style="list-style-type: none"> <li>(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;</li> <li>(b) No flame shall occur outside the package;</li> <li>(c) No projectiles shall exit the package;</li> <li>(d) The structural integrity of the package shall be maintained; and</li> <li>(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.</li> </ul> <p>(2) The additional large packaging performance requirements shall be verified by a test as specified by the competent authority. 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 <i>Manual of Tests and Criteria</i>, 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.</p> <p>(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.</p>	
	<p>(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.</p>	
	<p><b>Additional requirement:</b> Batteries shall be protected against short circuit.</p>	
△	<p>* The following criteria, as relevant, may be considered to assess the performance of the large packaging:</p> <ul style="list-style-type: none"> <li>(a) The assessment shall be done under a quality management system (as described, e.g. in section 2.9.4.5) allowing for the traceability of tests results, reference data and characterization models used;</li> <li>(b) The list of hazards expected in case of thermal runaway for the battery type, in the condition it is transported (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 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;</li> <li>(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 [kg·m<sup>-3</sup>], specific heat capacity [J·kg<sup>-1</sup>·K<sup>-1</sup>], heating value [kJ·kg<sup>-1</sup>], thermal conductivity [W·m<sup>-1</sup>·K<sup>-1</sup>], melting temperature and flammability temperature [K], heat transfer coefficient of the outer packaging [W·m<sup>-2</sup>·K<sup>-1</sup>], ...);</li> <li>(d) The test and any supporting calculations shall assess the result of a thermal run-away of the battery inside the large packaging in the normal conditions of transport;</li> <li>(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;</li> <li>(f) The surrounding conditions in which the large packaging may be used and transported 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;</li> <li>(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 transport condition, the maximum heat and flame emissions for the possible propagation of the reaction;</li> <li>(h) These scenarios shall be assessed over a period long enough to allow all the possible consequences to occur (e.g. 24 hours);</li> <li>(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.</li> </ul>	



## 4.1.6 Special packing provisions for goods of class 2

### 4.1.6.1 General provisions

4.1.6.1.1 This section provides general requirements applicable to the use of pressure receptacles for the transport of class 2 gases and other dangerous goods in pressure receptacles (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 transport, including by vibration, or by changes in temperature, humidity or pressure (resulting from change in altitude, for example).

△ 4.1.6.1.2 Parts of pressure 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). The provisions of ISO 11114-1:2020 and ISO 11114-2:2021 shall be met as applicable.

4.1.6.1.8 Valves 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:

- .1 Valves are placed inside the neck of the pressure receptacle and protected by a threaded plug or cap;
  - △ .2 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;
  - .3 Valves are protected by shrouds or permanent protective attachments;
  - .4 Pressure receptacles are transported in frames (e.g. bundles); or
  - .5 Pressure receptacles are transported in an outer packaging. The packaging as prepared for transport shall be capable of meeting the drop test specified in 6.1.5.3 at the packing group I performance level.
- △ For pressure receptacles with valves as described in .2, the requirements of ISO 11117:1998, ISO 11117:2008 + Cor 1:2009 or ISO 11117:2019 shall be met. Requirements for shrouds and permanent protective attachments used as valve protection under .3, are given in the relevant pressure receptacle shell design standards, see 6.2.2.1. Valves with inherent protection used for refillable pressure receptacles shall meet the requirements of clause 4.6.2 of ISO 10297:2006 or clause 5.5.2 of ISO 10297:2014 or clause 5.5.2 of ISO

### Chapter 4.2. Use of portable tanks and multiple-element gas containers (MEGCs)

- 4.2.3.6 Filling**
- 4.2.3.6.1** Prior to filling, the shipper shall ensure that the portable tank is approved for the refrigerated liquefied gas to be transported and that the portable tank is not loaded with refrigerated liquefied gases which, in contact with the materials of the shell, gaskets and service equipment, 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 quantity of gas filled into the shell, the necessary holding time for the intended journey, including any delays which might be encountered, shall be taken into consideration. The initial quantity of gas filled into 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 transport 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 quantity of gas filled into the shell may be allowed, subject to approval by the competent authority, when the intended duration of transport is considerably shorter than the holding time.
- 4.2.3.6.5** Portable tanks shall not be filled or discharged while they remain on board.
- 4.2.3.7 Actual holding time**
- 4.2.3.7.1** The actual holding time shall be calculated for each journey in accordance with a procedure recognized by the competent authority, on the basis of the following:
- .1 the reference holding time for the refrigerated liquefied gas to be transported (see 6.7.4.2.8.1) (as indicated on the plate referred to in 6.7.4.15.1);
  - .2 the actual filling density;
  - .3 the actual filling pressure;
  - .4 the lowest set pressure of the pressure-limiting device(s).
- 4.2.3.7.2** The actual 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 5.4.1.5.19).
- △ **4.2.5.2.3** Non-refrigerated liquefied gases are assigned to portable tank instruction T50. T50 provides the maximum allowable working pressures, bottom opening provisions, pressure-relief provisions and filling ratio provisions for non-refrigerated liquefied gases permitted for transport in portable tanks.

T23	PORTABLE TANK INSTRUCTION	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 4.2.1 and the provisions of 6.7.2 shall be met. The 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 2.4.2.3.2.3 or 2.5.3.2.4 but listed below may also be transported packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.	

#### 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 provisions in chapter 6.7. Portable tank special provisions are identified by an alpha-numeric designation beginning with the letters "TP" (tank provision) and are assigned to specific substances in column 14 of the Dangerous Goods List in 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.
- TP2 The degree of filling prescribed in 4.2.1.9.3 shall not be exceeded.
- TP3 The maximum degree of filling (in %) for solids transported above their melting points and for elevated temperature liquids shall be determined in accordance with 4.2.1.9.5.
- TP4 The degree of filling shall not exceed 90% or, alternatively, any other value approved by the competent authority (see 4.2.1.16.2).
- △ TP5 The restrictions on filling prescribed in 4.2.3.6 shall be met.

- TP42 Portable tanks are not authorized for the transport of caesium or rubidium dispersions.

## Part 5. Consignment procedures

### Chapter 5.2. Marking and labelling of packages including IBCs

#### △ 5.2.1.10 Lithium or sodium ion battery mark

- △ 5.2.1.10.1 Packages containing lithium or sodium ion cells or batteries prepared in accordance with special provision 188 shall be marked as shown in figure below.

- △ 5.2.1.10.2 The mark shall indicate the UN number, preceded by the letters "UN", i.e. 'UN 3090' for lithium metal cells or batteries, '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 cells or batteries assigned to different UN numbers, all applicable UN numbers shall be indicated on one or more marks.



△ Lithium or sodium ion battery mark

\* 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 × 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 × 70 mm high. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

**Note:** The mark shown in the figure "Lithium battery mark" in 5.2.1.10.2 of the IMDG Code Amendment 40-20, showing the telephone number for additional information, may continue to be applied until 31 December 2026.



**5.2.2.1.13 Labels for articles containing dangerous goods transported as UN Nos. 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547 and 3548**

- △ .1 Packages containing articles or articles transported unpackaged shall bear labels according to 5.2.2.1.2 reflecting the hazards established according to 2.0.6. If the article contains one or more lithium or sodium ion batteries with, for lithium metal batteries, an aggregate lithium content of 2 g or less, and for lithium ion or sodium ion batteries, a Watt-hour rating of 100 Wh or less, the lithium or sodium ion battery mark (5.2.1.10.2) shall be affixed to the package or unpackaged article. If the article contains one or more lithium or sodium ion batteries with, for lithium metal batteries, an aggregate lithium content of more than 2 g and for lithium ion or sodium ion batteries, a Watt-hour rating of more than 100 Wh, the battery label (5.2.2.2.2 No. 9A) shall be affixed to the package or unpackaged article.
- .2 When it is required to ensure articles containing liquid dangerous goods remain in their intended orientation, orientation marks meeting 5.2.1.7.1 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.

## Chapter 5.4. Documentation

### ■ 5.4.1.5.18 Transport of UN 1361

For transport of UN 1361, the transport document shall contain the following additional information (see special provision 978 of chapter 3.3):

- .1 Date of production ...
- .2 Date of packing into packagings ...
- .3 Temperature of the material on the day of packing into the packagings ... °C".

## 5.4.3 Documentation required aboard the ship

- △ 5.4.3.1 Each ship carrying dangerous goods and marine pollutants shall have a special list, manifest<sup>6</sup> or stowage plan setting out, in accordance with regulation VII/4.2 of SOLAS, as amended, and with regulation 5.2 of Annex III of MARPOL, the dangerous goods (except dangerous goods in excepted packages of class 7) and marine pollutants and the location thereof. This special list or manifest shall be based on the documentation and certification required in this Code. It shall contain in addition to the information in 5.4.1.4, 5.4.1.5 and, for UN 3359, in 5.5.2.4.1.1, the stowage location and the total quantity of dangerous goods and marine pollutants. A detailed stowage plan, which identifies by primary hazard class(es) and subsidiary hazard(s) and sets out the location of all dangerous goods and marine pollutants, may be used in place of such special list or manifest.

## 5.4.4 Other required information and documentation

5.4.4.1 In certain circumstances, special certificates or other documents are required such as:

- .1 a weathering certificate; as required in the individual entries of the Dangerous Goods List;
- △ .2 a certificate exempting a substance, material or article from the provisions of the IMDG Code;
- .3 for new self-reactive substances and organic peroxides or new formulation of currently assigned self-reactive substances and organic peroxides, a statement by the competent authority of the country of origin of the approved classification and conditions of transport.

- 5.4.4.2 A certificate exempting a substance, material or article from the provisions of the IMDG Code and referred to in a special provision assigned to an individual entry in the Dangerous Goods List shall be submitted together with the cargo information required by SOLAS regulation VI/2.

## Chapter 5.5. Special provisions

5.5.2.3.2 The fumigation warning mark shall be as shown in the figure below.



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.

The method of marking shall be such that this information will still be identifiable on cargo transport units surviving at least three months' immersion in the sea. In considering suitable marking methods, account shall be taken of the ease with which the surface of the cargo transport unit can be marked.

- **Note:** The fumigation warning mark in 5.5.2.3.2 of the IMDG Code Amendment 41-22 may continue to be applied until 31 December 2026.

### 5.5.3.3 Packages containing a coolant or conditioner

- △ 5.5.3.3.1 Packaged dangerous goods requiring cooling or conditioning assigned to packing instructions P203, P620, P650 or P800 of 4.1.4.1 shall meet the appropriate requirements of that packing instruction.

- △ 5.5.4 **Devices containing dangerous goods, which are in use or intended for use during transport**
- 5.5.4.1 Devices in use or intended for use during transport containing dangerous goods, such as data loggers, sensors and cargo tracking devices, attached to or placed in packages, overpacks, bulk containers, freight containers or other types of cargo transport units, are not subject to the provisions of this Code other than the requirements set out in 5.5.4.1.1 to 5.5.4.5, as follows:
- .1 the device shall be in use or intended for use during transport;
  - .2 the contained dangerous goods (e.g. lithium batteries, fuel cell cartridges) shall meet the applicable construction and test requirements specified in this Code; and
  - .3 the device shall be capable of withstanding the shocks and loadings normally encountered during transport and shall be safe for use in the dangerous environments to which it may be exposed.
- 5.5.4.2 When such device containing dangerous goods is transported as a consignment, the relevant entry of the Dangerous Goods List in chapter 3.2 shall be used and all applicable provisions of this Code shall apply.
- 5.5.4.3 Data loggers, sensors and cargo tracking devices, attached to packages and overpacks in a closed cargo transport unit are subject to 7.3.5 when dangerous goods are transported in that cargo transport unit.
- 5.5.4.4 Data loggers, sensors and cargo tracking devices, attached directly to the interior or exterior of cargo transport units shall comply with the following criteria, as found in IEC 60079-0:2017 and IEC 60529:2013:
- .1 Temperature class T4: the device maximum surface temperature attained in service under the most adverse conditions is  $\leq 135^{\circ}\text{C}$ ;
  - .2 Equipment group IIB: the device is intended for use in places with an explosive gas atmosphere other than mines susceptible to firedamp and in explosive gas atmospheres other than those containing hydrogen; and
  - .3 Degree of protection IP65: the device enclosure protects internal equipment against ingress of dust and protects against harmful effects due to water jets against the enclosure from any direction.
- Note:** For devices in a reefer controller box, the requirement in 5.5.4.4.3 is complied with when the casing of the controller box conforms to 5.5.4.4.3.
- 5.5.4.5 Devices subject to 5.5.4.4 shall comply with the requirements from 1 January 2028, with the exception for fixed devices on or in reefer containers, which shall comply with these requirements as soon as possible, but not later than 1 January 2032.

## Part 6. Construction and testing of packagings, intermediate bulk containers IBCs), large packagings, portable tanks, multiple-element gas containers (MEGCs) and road tank vehicles

### Chapter 6.1. Provisions for the construction and testing of packagings

- △ 6.1.3.1 Each packaging intended for use according to this Code shall bear marks on a non-removable component which are durable, legible and placed in such 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 L 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 L capacity or less or of 5 kg maximum net mass when they shall be of an appropriate size.
- **Note:** The provisions of 6.1.3.1 of the IMDG Code Amendment 41-22 may continue to be applied until 31 December 2026. Packagings manufactured before 1 January 2027 according to the provisions applicable at the date of manufacture may continue to be used.
- △ 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.



- △ 6.1.4.2.3 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.
- △ 6.1.4.3.3 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.
- △ 6.1.4.12 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/m<sup>2</sup> – see ISO 535:2014. It shall have proper

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#### Chapter 6.1 – Provisions for the construction and testing of packagings

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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.

### *Chapter 6.2. Provisions for the construction and testing of pressure receptacles, aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquified flammable gas*

- 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:
  - .16 verification of the conformance with the design standard or recognized technical code.
  - △ For all completed closed cryogenic receptacles:
    - .17 testing for leakproofness.
  - **Note:** Closed cryogenic receptacles which were constructed in accordance with the initial inspection and test requirements of 6.2.1.5.2 applicable in the IMDG Code Amendment 40-20 but which do not however conform to the requirements of 6.2.1.5.2 relating to the initial inspection and test applicable in the IMDG Code Amendment 41-22, may continue to be used.

### 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 authorized by the competent authority, in accordance with the following:

- .1 Check of the external conditions of the pressure receptacle and verification of the equipment and the external marks;
- .2 Check of the internal conditions of the pressure receptacle (e.g. internal inspection, verification of minimum wall thickness);
- .3 Checking of the threads either:
  - .1 If there is evidence of corrosion; or
  - .2 If the closures or other service equipment are removed;
- .4 A hydraulic pressure test of the pressure receptacle shell and, if necessary, verification of the characteristics of the material by suitable tests;

**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 6.2.1.6.1.2 and hydraulic pressure test of 6.2.1.6.1.4 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 6.2.1.6.1.2 and the hydraulic pressure test of 6.2.1.6.1.4 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. For a transitional period until 31 December 2026, the standard ISO 18119:2018 may be used for this same purpose. For a transitional period until 31 December 2024, the standard ISO 10461:2005 + Amd 1:2006 may be used for seamless aluminium alloy cylinder shells and ISO 6406:2005 may be used for seamless steel cylinder shells for this same purpose.

### 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:

Reference	Title	Applicable for manufacture
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 <b>Note:</b> Small quantities are a batch of cylinders not exceeding 200.	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 11119-2:2002	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 11119-2:2012 + 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 11119-3:2002	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 <b>Note:</b> This standard shall not be used for linerless cylinders manufactured from two parts joined together.	Until 31 December 2020
△	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 <b>Note:</b> This standard shall not be used for linerless cylinders manufactured from two parts joined together.	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

6.2.2.1.2 The following standards 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:

Reference	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 <b>Note:</b> The note concerning the <i>F</i> factor in section 7.1 of this standard shall not be applied for UN tubes.	Until 31 December 2022
ISO 11120:2015	Gas cylinders – Refillable seamless steel tubes of water capacity between 150 l and 3 000 l – 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 <b>Note:</b> This standard shall not be used for linerless tubes manufactured from two parts joined together.	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



### 6.2.2.2 Materials

In addition to the material requirements specified in the design and construction standards, and any restrictions specified in the applicable packing instruction for the gas(es) to be transported (e.g. packing instruction P200 or P205), the following standards apply to material compatibility:

Reference	Title
△ ISO 11114-1:2020	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:

Reference	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 2008
ISO 10297:2006	Gas cylinders – Refillable gas 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 <b>Note:</b> This standard shall not be used for flammable gases.	Until 31 December 2026

Reference	Title	Applicable for manufacture
ISO 17879:2017	Gas cylinders – Self-closing cylinder valves – Specification and type testing <b>Note:</b> 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

#### 6.2.2.4 Periodic inspection and test

The following standards apply to periodic inspection and testing of UN pressure receptacles:

Reference	Title	Applicable
ISO 6406:2005	Seamless steel gas cylinders – Periodic inspection and testing	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 <b>Note:</b> 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.	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

#### 6.2.2.7.3 The following operational marks shall be applied:

- △ (ii) the identity of the porous material (e.g.: name or trademark); and
- (iii) the total mass of the filled acetylene cylinder in kilograms followed by the letters "KG".
- **Note:** Acetylene cylinders constructed in accordance with the IMDG Code Amendment 40-20 which are not marked in accordance with 6.2.2.7.3 (k) or (l) applicable in the the IMDG Code Amendment 41-22, may continue to be used until the next periodic inspection and test two years after the coming into force of the IMDG Code Amendment 42-24 where they have to be marked according to the IMDG Code Amendment 42-24 or be taken out of operation.

#### 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 traffic.<sup>a</sup> 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 transport of gases with a risk of hydrogen embrittlement, the letter "H" showing compatibility of the steel (see ISO 11114-1:2020).

#### 6.2.2.9.2 The following marks shall be applied:

- △ (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).

#### 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):

- .1 manufacturer's identification mark;
- .2 design standard or design standard designation;
- .3 date of manufacture (year and month or year and week); and
- .4 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.

- **Note:** Closures of refillable pressure receptacles manufactured before 1 January 2027 in accordance with the requirements applicable in the IMDG Code Amendment 40-20 which are not marked in accordance with the requirements of 6.2.2.11 applicable in the IMDG Code Amendment 41-22 may continue to be used.

### Chapter 6.5. Provisions for the construction and testing of intermediate bulk containers (IBCs)

- △ 6.5.5.4.16 For fibreboard outer packagings, strong and good-quality solid or double-faced corrugated fibreboard (single or multiwall) shall be used appropriate to the capacity of the packaging 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/m<sup>2</sup> – 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 by water-resistant adhesive to the facings.

### Chapter 6.6. Provisions for the construction and testing of large packagings

#### 6.6.4.4 Specific provisions for 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 the 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/m<sup>2</sup> – 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.

### Chapter 6.7. Provisions for the design, construction, inspection and testing of portable tanks and multiple-element gas containers (MEGCs)

#### 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:



- (i) holding times – for each refrigerated liquefied gas permitted to be transported in the portable tank:
- (i) name, in full, of the refrigerated liquefied gas;
  - (ii) reference holding time (in days or hours);\*
  - (iii) initial pressure (in bar gauge or kPa gauge);\*
  - △ (iv) maximum allowable mass of gas filled (in kg);\*

Figure 6.7.4.15.1 – Example of a plate for marking

Owner's registration number			
<b>MANUFACTURING INFORMATION</b>			
Country of manufacture			
<b>HOLDING TIMES</b>			
△ Refrigerated liquefied gas(es) permitted	Reference holding time	Initial pressure	Maximum allowable mass of gas filled
	days or hours	bar or kPa	kg

#### 6.7.5.2.4 Elements of MEGCs, fittings and pipework shall be:

- △ .1 compatible with the substances intended to be transported (for gases, see ISO 11114-1:2020 and ISO 11114-2:2021); or
- .2 properly passivated or neutralized by chemical reaction.

## PART 7. Provisions concerning transport operations

### Chapter 7.1. General stowage provisions

#### 7.1.5 Stowage codes

The stowage codes given in column 16a of the Dangerous Goods List are as specified below:

Stowage code	Description
■ SW31	Stow away from potential sources of ignition, as determined in 7.4.2.3.2 or 7.5.2.8 or 7.6.2.2.2, as applicable.

## Chapter 7.2. General segregation provisions

### 7.2.6 Special segregation provisions and exemptions

- △ 7.2.6.1 Notwithstanding 7.2.3.3 and 7.2.3.4, substances of the same class may be stowed together without regard to segregation required by secondary hazards (subsidiary hazard label(s)), provided that the substances do not react dangerously with each other and do not cause:
- .1 combustion and/or evolution of considerable heat;
  - .2 evolution of flammable, toxic or asphyxiant gases;
  - .3 the formation of corrosive substances; or
  - .4 the formation of unstable substances.

## Chapter 7.3. Consigning operations concerning the packing and use of cargo transport units (CTUs) and related provisions

- △ 7.3.3.14 Cargo transport units shall be packed so that the cargo is uniformly distributed.\*
- 7.3.3.15 If goods of class 1 are packed, the cargo transport unit shall comply with the definition in 7.1.2 for closed cargo transport unit for class 1.
- 7.3.3.16 If goods of class 7 are packed, the transport index and, if applicable, the criticality safety index, shall be limited according to 7.1.4.5.3.
- 7.3.3.17 Those responsible for the packing of dangerous goods into a cargo transport unit shall provide a "container/vehicle packing certificate" (see 5.4.2). This document is not required for tanks.
- 7.3.3.18 Flexible bulk containers are not allowed to be transported in cargo transport units (see 4.3.4).
- ### 7.3.4 Segregation provisions within cargo transport units
- 7.3.4.1 Dangerous goods which have to be segregated from each other according to the provisions in chapter 7.2 shall not be transported in the same cargo transport unit with the exception of dangerous goods which shall be segregated "away from" each other which may be transported in the same cargo transport unit with the approval of the competent authority. In such cases an equivalent standard of safety shall be maintained.

■ \* Refer to the CTU Code.

## Chapter 7.6 Stowage and segregation on general cargo ships

- △ 7.6.2.7.2 Stowage provisions for CARBON, animal or vegetable origin (UN 1361), FISH MEAL, UNSTABILIZED (UN 1374), FISH MEAL, STABILIZED (UN 2216, class 9) and KRILL MEAL (UN 3497)
- 7.6.2.7.2.1 For loose packages:
- .1 Temperature readings shall be taken 3 times a day during the voyage and recorded.
  - .2 If the temperature of the cargo exceeds 55°C and continues to increase, ventilation to the hold shall be restricted. If self-heating continues, then carbon dioxide or inert gas shall be introduced. The ship shall be equipped with facilities for introducing carbon dioxide or inert gas into the holds.
  - .3 The cargo shall be stowed protected from sources of heat.
- △ .4 For UN 1361, 1374 and 3497, where loose bags are being carried, double strip stowage is recommended, provided there is good surface and through ventilation. The diagram in 7.6.2.7.2.3 shows how this can be achieved. For UN 2216, where loose bags are being carried, no special ventilation is required for block stowage of bagged cargo.

- △ 7.6.2.8.4 UN 1942 AMMONIUM NITRATE and UN 2067 AMMONIUM NITRATE BASED FERTILIZER may be stowed under deck in a clean cargo space capable of being opened up in an emergency. The possible need to open hatches in case of fire to provide maximum ventilation and to apply water in an emergency and the consequent risk to the stability of the ship through flooding of cargo space shall be considered before loading. The requirement for opening the cargo space hatches applies to the weather deck and tween deck hatches (if any).