

APPENDIX A

CONSOLIDATION OF AMENDMENTS TO THE TECHNICAL INSTRUCTIONS AGREED AT DGP-WG/14 AND DGP-WG/15

Part 1

GENERAL

Chapter 1

SCOPE AND APPLICABILITY

Parts of this Chapter are affected by State Variations AE 3, AE 8, BE 2, BE 4, BE 5, BR 4, CA 6, CH 3, DE 1, DE 4, DK 2, FR 2, GB 2, HR 2, HR 3, HR 4, HR 5, IN 1, IR 1, IT 1, IT 5, KH 1, NL 6, RO 1, RO 2, RO 3, US 1, VC 1, VC 2, VC 3, VU 2; see Table A-1

UN Model Regulations, Chapter 1.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/11 (see paragraph 3.2.1.1 of this report)

Note.— Recommendations on Tests and Criteria, which are incorporated by reference into certain provisions of these Instructions, are published as a separate Manual (United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria) (ST/SG/AC.10/11/Rev.5, [Rev.6 Amend.1](#) and [Amend.2](#)), the contents of which are:

Part I. Classification procedures, test methods and criteria relating to explosives of Class 1;

Part II. Classification procedures, test methods and criteria relating to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2; and

Part III. Classification procedures, test methods and criteria relating to substances or articles of Class 2, Class 3, Class 4, Division 5.1, Class 8 and Class 9.

Appendices. Information common to a number of different types of tests and national contacts for test details.

1.1 GENERAL APPLICABILITY

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1.1.5 General exceptions

1.1.5.1 Except for 7;4.2, these Instructions do not apply to dangerous goods carried by an aircraft where the dangerous goods are:

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UN Model Regulations, Chapter 1.1.1.2, Note 3, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/11 (see paragraph 3.2.1.1 of this report)

- f) required for the propulsion of the means of transport or the operation of its specialized equipment during transport (e.g. refrigeration units) or that are required in accordance with the operating regulations (e.g. fire extinguishers) (see 2.2).

[Note.— This exception is only applicable to the means of transport performing the transport operation.](#)

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UN Model Regulations, Chapter 1.1.1.7, Note 3, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/11 (see paragraph 3.2.1.1 of this report)

1.3 APPLICATION OF STANDARDS

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

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Chapter 3

GENERAL INFORMATION

Parts of this Chapter are affected by State Variation BE 1; see Table A-1

3.1 DEFINITIONS

3.1.1 The following is a list of definitions of commonly used terms in these Instructions. Definitions of terms which have their usual dictionary meanings or are used in the common technical sense are not included. Definitions of additional terms used solely in conjunction with radioactive material are contained in 2;7.1.3.

UN Model Regulations, Chapter 1.2, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/11 (see paragraph 3.2.1.1 of this report)

Aerosols or aerosol dispensers. An article consisting of a non-refillable receptacle meeting the requirements of 6;3.2.7, made of metal, glass or plastic and containing a gas, compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.

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

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GHS. ~~The fourth~~ sixth revised edition of the *Globally Harmonized System of Classification and Labelling of Chemicals*, published by the United Nations as document ST/SG/AC.10/30/Rev. 4.6.

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Large salvage packaging. (Not permitted for air transport.) A special packaging which:

- a) is designed for mechanical handling; and
- b) exceeds 400 kg net mass or 450 litres capacity but has a volume of not more than 3 m³;

into which damaged, defective or leaking or non-conforming dangerous goods packages, or dangerous goods that have spilled or leaked are placed for purposes of transport for recovery or disposal.

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Liquids. Dangerous goods which at 50°C have a vapour pressure of not more than 300 kPa (3 bar), which are not completely gaseous at 20°C and at a pressure of 101.3 kPa, and which have a melting point or initial melting point of 20°C or less at a pressure of 101.3 kPa. A viscous substance for which a specific melting point cannot be determined must be subjected to the ASTM D 4359-90 test; or to the test for determining fluidity (penetrometer test) prescribed in section 2.3.4 of Annex A of the *European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)* (United Nations publication: ECE/TRANS/202225 (Sales No. E.14.VIII.1).

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Manual of Tests and Criteria. The ~~fourth~~ sixth revised edition of the United Nations publication entitled Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.6/Amend.1 and Amend.2).

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DGP-WG/15-WP/11 (see paragraph 3.2.1.1.1 of this report):

Multiple-element gas containers (MEGCs). (~~See UN Recommendations, Chapter 1.2.~~ Not permitted for air transport.) A multimodal assembly of cylinders, tubes or bundles of cylinders which are interconnected by a manifold and which are assembled within a framework. The MEGC includes service equipment and structural equipment necessary for the transport of gases.

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Pressure drums. (~~See UN Recommendations, Chapter 1.2.~~ Not permitted for air transport.) A welded transportable pressure receptacle of a water capacity exceeding 150 litres and of not more than 1 000 litres, (e.g. cylindrical receptacles equipped with rolling hoops, spheres on skids).

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Remanufactured large packaging. (~~See UN Recommendations, Chapter 1.2.~~ Not permitted for air transport.) A metal or rigid plastics large packaging that:

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

Remanufactured large packagings are subject to the same requirements of the UN Model Regulations that apply to new large packagings of the same type (see also design type definition in 6.6.5.1.2 of the UN Model Regulations).

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Reused large packaging. (~~See UN Recommendations, Chapter 1.2.~~ Not permitted for air transport.) A large packaging to be refilled which has been examined and found free of defects affecting the ability to withstand the performance tests: the term includes those which are refilled with the same or similar compatible contents and are transported within distribution chains controlled by the consignor of the product.

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Salvage pressure receptacle. (~~See UN Recommendations, Chapter 1.2.~~ Not permitted for air transport.) A pressure receptacle with a water capacity not exceeding 3 000 litres into which are placed damaged, defective, leaking or non-conforming pressure receptacle(s) for the purpose of transport e.g. for recovery or disposal.

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UN Model Regulations, Chapter 1.2, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/11 (see paragraph 3.2.1.1 of this report)

Self-accelerating polymerization temperature (SAPT). The lowest temperature at which polymerization may occur with a substance in the packaging as offered for transport. The SAPT must be determined in accordance with the test procedures established for the self-accelerating decomposition temperature for self-reactive substances in accordance with Part II, Section 28 of the *Manual of Tests and Criteria*.

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

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DGP-WG/15-WP/11 (see paragraph 3.2.1.1.1 of this report):

Tube. (Not permitted for air transport.) A transportable pressure receptacle of seamless or composite construction having a water capacity exceeding 150 litres but not more than 3 000 litres.

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DGP-WG/15-WP/28 (see paragraph 3.2.1.3 of this report):

Chapter 4

TRAINING

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4.1 ESTABLISHMENT OF **DANGEROUS GOODS** TRAINING PROGRAMMES

4.1.1 Establishment and maintenance

4.1.1.1 Initial and recurrent dangerous goods training programmes must be established and maintained by or on behalf of:

- a) shippers of dangerous goods, including packers and persons or organizations undertaking the responsibilities of the shipper;
- b) operators;
- c) ground handling agencies which perform, on behalf of the operator, the act of accepting, handling, loading, unloading, transferring or other processing of cargo or mail;
- d) ground handling agencies located at an airport which perform, on behalf of the operator, the act of processing passengers;
- e) agencies, not located at an airport, which perform, on behalf of the operator, the act of checking in passengers;
- f) freight forwarders;
- g) agencies engaged in the security screening of passengers and crew and their baggage and/or cargo or mail; and
- h) designated postal operators.

4.1.2 Review and approval

4.1.2.1 Dangerous goods training programmes required by 4.1.1.1 b) must be subjected to review and approval by the appropriate authority of the State of the Operator.

4.1.2.2 Dangerous goods training programmes required by 4.1.1.1 h) must be subjected to review and approval by the civil aviation authority of the State where the mail was accepted by the designated postal operator.

4.1.2.3 Dangerous goods training programmes required by other than 4.1.1.1 b) and h) should be subjected to review and approval as determined by the appropriate national authority.

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Part 2

CLASSIFICATION OF DANGEROUS GOODS

INTRODUCTORY CHAPTER

Parts of this Chapter are affected by State Variations DE 5, NL 4; see Table A-1

1. RESPONSIBILITIES

UN Model Regulations, Chapter 2.0.0, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraph 3.2.2.1.1 a) and b) of this report)

1.1 Classification must be made by the appropriate national authority when so required or may otherwise be made by the shipper.

1.2 A shipper who has identified, on the basis of test data, that a substance listed by name in column 1 of the Dangerous Goods List in Part 3, Chapter 2, Table 3-1 meets classification criteria for a hazard class or division that is not identified in the list, may, with the approval of the appropriate national authority, consign the substance:

a) under the most appropriate generic or not otherwise specified (n.o.s.) entry reflecting all hazards; or

b) under the same UN number and name but with additional hazard communication information as appropriate to reflect the additional subsidiary risk(s) (documentation, label) provided that the primary hazard class remains unchanged and that any other transport conditions (e.g. limited quantity, packaging provisions) that would normally apply to substances possessing such a combination of hazards are the same as those applicable to the substance listed.

A copy of the document of approval must accompany the consignment.

Note.— When an appropriate national authority grants such approvals, it should inform the United Nations Subcommittee of Experts on the Transport of Dangerous Goods accordingly and submit a relevant proposal of amendment to the Dangerous Goods List. Should the proposed amendment be rejected, the appropriate national authority should withdraw its approval.

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UN Model Regulations, Chapter 2.0.2.2 ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraph 3.2.2.1 of this report)

3. UN NUMBERS AND PROPER SHIPPING NAMES

3.1 Dangerous goods are assigned to UN numbers and proper shipping names according to their hazard classification and their composition.

3.2 Dangerous goods commonly carried are listed in Table 3-1. Where an article or substance is specifically listed by name, it must be identified in transport by the proper shipping name in Table 3-1. Such substances may contain technical impurities (for example, those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance listed by name containing technical impurities or additives for stability or other purposes affecting its classification must be considered a mixture or solution (see 3.5). For dangerous goods not specifically listed by name, “generic” or “not otherwise specified (n.o.s.)” entries are provided (see 3.8) to identify the article or substance in transport. The substances listed by name in column 1 of Table 3-1 must be transported according to their classification in the list or under the conditions specified in 1.2. Each entry in Table 3-1 is characterized by a UN number. Table 3-1 also contains relevant information for each entry, such as hazard class, subsidiary risk(s) (if any), packing group (where assigned), packing requirements, passenger and cargo aircraft requirements, etc. Entries in Table 3-1 are of the following four types:

Chapter 1**CLASS 1 — EXPLOSIVES**

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1.3 DIVISIONS

UN Model Regulations, Chapter 2.1.1.4 (f) ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraph 3.2.2.1 of this report)

1.3.1 Class 1 is divided into six divisions:

- a) Division 1.1 — Substances and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire load virtually instantaneously).

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- f) Division 1.6 — Extremely insensitive articles which do not have a mass explosion hazard.

This division comprises articles which predominantly contain ~~only~~ extremely insensitive substances and which demonstrate a negligible probability of accidental initiation or propagation.

Note.— The risk from articles of Division 1.6 is limited to the explosion of a single article.

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1.4 COMPATIBILITY GROUPS

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UN Model Regulations, Chapter 2.1.2.1.1 ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraph 3.2.2.1 of this report)

Table 2-2. Classification codes

<i>Description of substance or article to be classified</i>	<i>Compatibility group</i>	<i>Classification code</i>
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Articles <u>predominantly</u> containing only extremely insensitive substances	N	1.6N
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UN Model Regulations, Chapter 2.1.3.7, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraph 3.2.2.1 of this report)

1.5.3 Classification documentation

1.5.3.1 An appropriate national authority assigning an article or substance into Class 1 should confirm with the applicant that classification in writing.

1.5.3.2 An appropriate national authority classification document may be in any form and may consist of more than one page, provided pages are numbered consecutively. The document should have a unique reference.

1.5.3.3 The information provided must be easy to identify, legible and durable.

1.5.3.4 Examples of the information that may be provided in the classification documents are as follows:

- a) the name of the appropriate national authority and the provisions in national legislation under which it is granted its authority;
- b) the modal or national regulations for which the classification document is applicable;
- c) confirmation that the classification has been approved, made or agreed in accordance with the UN Model Regulations or these Instructions;
- d) the name and address of the person in law to which the classification has been assigned and any company registration which uniquely identifies a company or other body corporate under national legislation;
- e) the name under which the explosives will be placed onto the market or otherwise supplied for transport;
- f) the proper shipping name, UN number, class, hazard division and corresponding compatibility group of the explosives;
- g) where appropriate, the maximum net explosive mass of the package or article;
- h) the name, signature, stamp, seal or other identification of the person authorized by the appropriate national authority to issue the classification document is clearly visible;
- i) where safety in transport or the hazard division is assessed as being dependent upon the packaging, the packaging mark or a description of the permitted:
 - i) inner packagings;
 - ii) intermediate packagings; and
 - iii) outer packagings;
- j) the classification document states the part number, stock number or other identifying reference under which the explosives will be placed onto the market or otherwise supplied for transport;
- k) the name and address of the person in law who manufactured the explosives and any company registration which uniquely identifies a company or other body corporate under national legislation;
- l) any additional information regarding the applicable packing instruction and special packing provisions where appropriate;
- m) the basis for assigning the classification, i.e. whether on the basis of test results, default for fireworks, analogy with classified explosive, by definition from the Dangerous Goods List etc.;
- n) any special conditions or limitations that the appropriate national authority has identified as relevant to the safety for transport of the explosives, the communication of the hazard and international transport;
- o) the expiry date of the classification document is given where the appropriate national authority considers one to be appropriate.

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Chapter 2

CLASS 2 — GASES

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UN Model Regulations, Chapter 2.2.4 ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraphs 3.2.2.1 d) and e) of this report)

2.6 Gases forbidden for transport

2.6.1 Chemically unstable gases of Class 2 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.

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Chapter 3

CLASS 3 — FLAMMABLE LIQUIDS

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3.2 ASSIGNMENT OF PACKING GROUPS

3.2.1 Table 2-4 should be used for the determination of the packing group of a liquid that presents a risk due to flammability. For liquids whose only hazard is flammability, the packing group for the material is the packing group shown in Table 2-4. For a liquid possessing an additional hazard(s), the packing group, determined by using Table 2-4, and the packing group based on the severity of the additional hazard(s), must be considered. In such cases, the table of precedence of hazard characteristics appearing in Table 2-1 should be used to determine the correct classification of the liquid.

3.2.2 Viscous flammable liquids such as paints, enamels, lacquers, varnishes, adhesives and polishes having a flash point of less than 23°C may be assigned to Packing Group III in conformity with the procedures prescribed in Part III, subsection 32.3 of the UN *Manual of Tests and Criteria* provided that:

UN Model Regulations, Chapter 2.3.2.2 (a), ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraph 3.2.2.1.1 f) of this report)

- a) the viscosity¹ ~~expressed as the flowtime in seconds~~ and flash point are in accordance with Table 2-5;
- b) less than 3 per cent of the clear solvent layer separates in the solvent separation test;
- c) the mixture or any separated solvent does not meet the criteria for Division 6.1 or Class 8;
- d) the net quantity per package does not exceed 30 L for passenger aircraft or 100 L for cargo aircraft.

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¹ Viscosity determination: Where the substance concerned is non-Newtonian, or where a flow cup method of viscosity determination is otherwise unsuitable, a variable shear-rate viscometer must be used to determine the dynamic viscosity coefficient of the substance, at 23°C, at a number of shear rates. The values obtained are plotted against shear rate and then extrapolated to zero shear rate. The dynamic viscosity thus obtained, divided by the density, gives the apparent kinematic viscosity at near-zero shear rate.

UN Model Regulations, Chapter 2.3.2.2, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraph 3.2.2.1 of this report)

Table 2-5. Viscosity and flashpoints

<i>Kinematic viscosity (extrapolated) v (at near-zero shear rate) mm²/s at 23°C</i>	<i>Flow time t in seconds</i>	<i>Jet diameter in mm</i>	<i>Flash point in °C (closed-cup)</i>
<u>20 < v ≤ 80</u>	20 < t ≤ 60	4	above 17
<u>80 < v ≤ 135</u>	60 < t ≤ 100	4	above 10
<u>135 < v ≤ 220</u>	20 < t ≤ 32	6	above 5
<u>220 < v ≤ 300</u>	32 < t ≤ 44	6	above -1
<u>300 < v ≤ 700</u>	44 < t ≤ 100	6	above -5
<u>700 < v</u>	100 < t	6	-5 and below

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UN Model Regulations, Chapter 2.3.5, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraphs 3.2.2.1 d) and e) of this report)

3.5 Substances forbidden for transport

3.5.1 Chemically unstable substances of Class 3 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.

Chapter 4

CLASS 4 — FLAMMABLE SOLIDS; SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

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UN Model Regulations, Chapter 2.4, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraph 3.2.2.1 of this report)

4.1 DEFINITIONS AND GENERAL PROVISIONS

4.1.1 Class 4 is divided into three divisions as follows:

a) Division 4.1 — Flammable solids.

Solids which, under conditions encountered in transport, are readily combustible or may cause or contribute to fire through friction; self-reactive substances and polymerizing substances which are liable to undergo a strongly exothermic reaction; desensitized explosives which may explode if not diluted sufficiently.

- b) Division 4.2 — Substances liable to spontaneous combustion.

Substances which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up in contact with air, and being then liable to catch fire.

- c) Division 4.3 — Substances which, in contact with water, emit flammable gases.

Substances which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

4.1.2 As referenced in this Chapter, test methods and criteria, with advice on application of the tests, are given in the current edition of the UN *Manual of Tests and Criteria*, for the classification of the following types of substances of Class 4:

- a) Flammable solids (Division 4.1);
 b) Self-reactive substances (Division 4.1);
~~c) Polymerizing substances (Division 4.1);~~
 ed) Pyrophoric solids (Division 4.2);
 ee) Pyrophoric liquids (Division 4.2);
 ef) Self-heating substances (Division 4.2); and
 fg) Substances which, in contact with water, emit flammable gases (Division 4.3).

Test methods and criteria for self-reactive substances and polymerizing substances are given in Part II of the UN *Manual of Tests and Criteria*, and test methods and criteria for the other types of substances of Class 4 are given in Part III, section 33 of the UN *Manual of Tests and Criteria*.

4.2 FLAMMABLE SOLIDS, SELF-REACTIVE SUBSTANCES-AND, DESENSITIZED EXPLOSIVES AND POLYMERIZING SUBSTANCES

4.2.1 General

Division 4.1 includes the following types of substances:

- a) flammable solids (see 4.2.2);
 b) self-reactive substances (see 4.2.3); ~~and~~
 c) solid desensitized explosives (see 4.2.4); and
~~d) polymerizing substances (see 4.2.5).~~

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4.2.5 Division 4.1 — Polymerizing substances and mixtures (stabilized)

4.2.5.1 Definitions and properties

4.2.5.1.1 Polymerizing substances are substances which, without stabilization, are liable to undergo a strongly exothermic reaction resulting in the formation of larger molecules or resulting in the formation of polymers under conditions normally encountered in transport. Such substances are considered to be polymerizing substances of Division 4.1 when:

- a) their self-accelerating polymerization temperature (SAPT) is 75°C or less under the conditions (with or without chemical stabilization as offered for transport) and in the packaging in which the substance or mixture is to be transported;
b) they exhibit a heat of reaction of more than 300 J/g; and

c) they do not meet any other criteria for inclusion in Classes 1 to 8.

4.2.5.1.2 A mixture meeting the criteria of a polymerizing substance must be classified as a polymerizing substance of Division 4.1.

4.2.5.1.3 Polymerizing substances are subject to temperature control in transport if their self-accelerating polymerization temperature (SAPT) is 50 °C or less in the packaging in which the substance is to be transported.

4.2.5.1.4 Polymerizing substances that also meet the criteria of 2.9.3 of the UN Model Regulations as environmentally hazardous substances must be consigned under the appropriate polymerizing substance entry.

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4.4 SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES (DIVISION 4.3)

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4.4.3 Assignment of packing groups

4.4.3.1 Packing Group I must be assigned to any substance which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 L/kg of substance over any one minute.

4.4.3.2 Packing Group II must be assigned to any substance which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 L/kg of substance per hour, and which does not meet the criteria for Packing Group I.

4.4.3.3 Packing Group III must be assigned to any substance which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is ~~equal to or~~ greater than 1 L/kg of substance per hour, and which does not meet the criteria for Packing Groups I or II.

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Chapter 6

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

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6.2 DIVISION 6.1 — TOXIC SUBSTANCES

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UN Model Regulations, Chapter 2.1.3.7, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraphs 3.2.2.1 d) and e) of this report)

6.2.5 Substances forbidden for transport

6.2.5.1 Chemically unstable substances of Division 6.1 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.

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Chapter 7

CLASS 7 — RADIOACTIVE MATERIAL

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7.2.4 Classification of packages

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7.2.4.1.1.3 Radioactive material which is enclosed in or is included as a component part of an instrument or other manufactured article may be classified under UN 2911 — **Radioactive material, excepted package — instruments or articles** provided that:

- a) the radiation level at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h; and
- b) each instrument or article bears the marking "RADIOACTIVE" on its external surface except for the following:
 - i) radioluminescent time-pieces or devices;
 - ii) consumer products that either have received regulatory approval in accordance with 1;6.1.4 c) or do not individually exceed the activity limit for an exempt consignment in Table 2-12 (column 5), provided such products are transported in a package that bears the marking "RADIOACTIVE" on an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; and
 - iii) other instruments or articles too small to bear the marking "RADIOACTIVE", provided that they are transported in a package that bears the marking "RADIOACTIVE" on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package;
- c) the active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material must not be considered to be an instrument or manufactured article); and
- d) the limits specified in columns 2 and 3 of Table 2-14 are met for each individual item and each package, respectively.

7.2.4.1.1.4 Radioactive material in forms other than as specified in 7.2.4.1.1.3 and with an activity not exceeding the limits specified in column 4 of Table 2-14 may be classified under UN 2910 — **Radioactive material, excepted package — limited quantity of material**, provided that:

- a) the package retains its radioactive contents under routine conditions of transport; and
- b) the package bears the marking “RADIOACTIVE” on either:
 - i) an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; or
 - ii) the outside of the package, where it is impractical to mark an internal surface.

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Chapter 8

CLASS 8 — CORROSIVE SUBSTANCES

UN Model Regulations, Chapter 2.1.3.7, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/12 (see paragraphs 3.2.2.1 d) and e) of this report)

8.3 Substances forbidden for transport

Chemically unstable substances of Class 8 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.

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Part 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

Chapter 1

GENERAL

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1.2 PROPER SHIPPING NAME

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1.2.2 Proper shipping names may be used in the singular or plural as appropriate. In addition, when qualifying words are used as part of the proper shipping name, their sequence on documentation or package markings ~~marks~~ is optional. For instance, “**Dimethylamine solution**” may alternatively be shown as “**Solution of Dimethylamine**”. However, the entry in column 1 reflects the preferred sequence. Alternative spelling reflecting common usage around the world is acceptable for words such as “**caesium**” for “**cesium**”, “**sulfur**” for “**sulphur**”, “**aluminum**” for “**aluminium**”, etc. However, the spelling appearing in Table 3-1 is preferred.

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Table 3-1. Dangerous Goods List

See Attachments A and B for proposed changes to Table 3-1 (Attachment A = Numerical order according to Column 2, UN No. Attachment B = Alphabetical order according to Column 1, Name)

Chapter 3

SPECIAL PROVISIONS

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UN Model Regulations, paragraph 3.3.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 c) of this report)

Table 3-2 lists the special provisions referred to in column 7 of Table 3-1 and the information contained in them is additional to that shown for the relevant entry. Where the wording of the special provision is equivalent to that in the UN Model Regulations, the UN special provision number is shown in parentheses. Where a special provision includes a requirement for package marking, the provisions of Part 5:2.2 must be met. If the required mark is in the form of specific wording indicated in quotation marks, the size of the mark must be at least 12 mm, unless otherwise indicated in the special provision or elsewhere in these Instructions.

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Table 3-2. Special provisions

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UN Model Regulations, SP 225, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

- A19 (225) Fire extinguishers under this entry may include installed actuating cartridges (cartridges, power device of Division 1.4C or 1.4S), without changing the classification of Division 2.2 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 grams per extinguishing unit.

Fire extinguishers must be manufactured, tested, approved and labelled according to the provisions applied in the State of Manufacture.

Note.— Provisions applied in the State of Manufacture means the provisions applicable in the State of Manufacture or those applicable in the State of use.

Fire extinguishers under this entry include:

- a) portable fire extinguishers for manual handling and operation;
- b) fire extinguishers for installation in aircraft;
- c) fire extinguishers mounted on wheels for manual handling;
- d) fire extinguishing equipment or machinery mounted on wheels or wheeled platforms or units transported similar to (small) trailers; and
- e) fire extinguishers composed of a non-rollable pressure drum and equipment, and handled, for example, by fork lift or crane when loaded or unloaded.

Cylinders which contain gases for use in the above-mentioned extinguishers or for use in stationary fire-fighting installations must meet the requirements in Part 6:5 and all requirements applicable to the relevant dangerous goods when these cylinders are transported separately.

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UN Model Regulations, SP 240, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 d) of this report)

A21 This entry only applies to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries and equipment powered by wet batteries or sodium batteries which are transported with these 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 electrically-powered cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, battery-assisted bicycles (pedal cycles with an electric motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheelchairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. This includes vehicles transported in a packaging. In this case some parts of the vehicle 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 must be consigned under 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.

~~Vehicles or equipment that also contain an internal combustion engine must be consigned under the entries UN 3166 **Engine, internal combustion, flammable gas powered** or UN 3166 **Engine, internal combustion, flammable liquid powered** or UN 3166 **Vehicle, flammable gas powered** or UN 3166 **Vehicle, flammable liquid powered**, as appropriate. 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, must be consigned under the entries UN 3166 **Vehicle, flammable gas powered** or UN 3166 **Vehicle, flammable liquid powered**, as appropriate.~~

~~Vehicles or equipment powered by a fuel cell engine must be consigned under the entries UN 3166 **Vehicle, fuel cell, flammable gas powered** or UN 3166 **Vehicle, fuel cell, flammable liquid powered**, or UN 3166 **Engine, fuel cell, flammable gas powered** or UN 3166 **Engine, fuel cell, flammable liquid powered**, as appropriate.~~

Vehicles may contain other dangerous goods than batteries (e.g. fire extinguishers, compressed gas accumulators or safety devices) required for their functioning or safe operation without being subject to any additional requirements for these other dangerous goods, unless otherwise specified in these Instructions.

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UN Model Regulations, SP 207, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

A38 (207) ~~Polymeric beads and m~~Moulding compounds may be made from polystyrene, poly(methyl methacrylate) or other polymeric material.

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UN Model Regulations, SP 236, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 e) of this report)

- A66 (236) Polyester resin kits consist of two components: a base material (either Class 3 or Division 4.1, Packing Group II or III) and an activator (Division 5.2 organic peroxide). The organic peroxide must be type D, E or F, not requiring temperature control. The packing group must be Packing Group II or III ~~is assigned~~, according to the criteria for either Class 3 or Division 4.1, as appropriate, applied to the base material.

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DGP-WG/14 Report (see paragraph 3.2.7.2 of DGP-WG/14-WP/32):

- A70 Internal combustion or fuel cell engines being shipped either separately or incorporated into a vehicle, machine or other apparatus, without batteries or other dangerous goods, are not subject to these Instructions when carried as cargo provided that:

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Multiple engines may be shipped in a unit load device or other type of pallet provided that the shipper has made prior arrangements with the operator(s) for each shipment.

When this special provision is used, the words "not restricted" and the special provision number A70 must be provided on the air waybill when an air waybill is issued.

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UN Model Regulations, SP 310, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 f) of this report)

- [A88 Pre-production Prototypes of lithium batteries or cells when these prototypes are transported for testing or low production runs (i.e., annual production runs consisting of not more than 100 lithium batteries ~~or~~ and cells) lithium batteries or cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN *Manual of Tests and Criteria* may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the following requirements in Packing Instruction 910 of the Supplement are met:

- ~~a) except as provided in paragraph c), cells or batteries must be transported in an outer packaging that is a metal, plastic or plywood drum or a metal, plastic or wooden box and that meets the criteria for Packing Group I packagings;~~
- ~~b) except as provided in paragraph c), each cell or battery must be individually packed in an inner packaging inside an outer packaging and surrounded by cushioning material that is non-combustible, and non-conductive. Cells or batteries must be protected against short circuiting;~~
- ~~c) lithium batteries with a mass of 12 kg or greater and having a strong, impact resistant outer casing, or assemblies of such batteries, may be packed in strong outer packagings or protective enclosures not subject to the requirements of Part 6 of these Instructions. The batteries or battery assemblies must be protected against short circuiting; and~~

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- ~~d) a copy of the document of approval showing the quantity limitations must accompany the consignment.~~ Transport in accordance with this special provision must be noted on the dangerous goods transport document.

Irrespective of the limit specified in column 13 of Table 3-1, the battery or battery assembly as prepared for transport may have a mass exceeding 35 kg G.]

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UN Model Regulations, SP 244, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 g) of this report)

- A102 (244) This listing includes aluminium dross, aluminium skimmings, spent cathodes, spent potliner and aluminium salt slags.

UN Model Regulations, SP 204, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 h) of this report)

- A132 (204) Articles containing smoke-producing substance(s) corrosive according to the criteria for Class 8 must be labelled with a "Corrosive" subsidiary risk label. Articles containing smoke-producing substance(s) toxic by inhalation according to the criteria for Division 6.1 must be labelled with a "TOXIC" subsidiary risk label (Figure 5-17), except that those manufactured before 31 December 2016 may be offered for transport until 31 December 2018 without a "TOXIC" subsidiary label.

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UN Model Regulations, SP 312, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 i) of this report)

- A134 (312) ~~Vehicles or machinery powered by a fuel cell engine must be consigned under the entries UN 3166 **Vehicle, fuel cell, flammable gas powered** or UN 3166 **Vehicle, fuel cell, flammable liquid powered**, or UN 3166 **Engine, fuel cell, flammable gas powered** or UN 3166 **Engine, 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.~~

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DGP-WG/14 Report (see paragraph 3.2.7.2 of DGP-WG/14-WP/32):

- A151 When dry ice is used as a refrigerant for other than dangerous goods loaded in a unit load device ~~or other type of pallet~~, the quantity limits per package shown in columns 11 and 13 of Table 3-1 for dry ice do not apply. In such case, the unit load device ~~or other type of pallet~~ must be identified to the operator and must allow the venting of the carbon dioxide gas to prevent a dangerous build-up of pressure.

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UN Model Regulations, SP 373, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

- A190 (373) Neutron radiation detectors containing non-pressurized boron trifluoride gas in excess of 1 g and radiation detection systems containing neutron radiation detectors as components may be transported on cargo aircraft in accordance with all applicable requirements of these Instructions irrespective of the indication of "forbidden" in columns 12 and 13 of Table 3-1 and with "Toxic gas" and "Corrosive" labels displayed on each package irrespective of no labels being indicated in column 5, provided the following conditions are met:
- a) each radiation detector must meet the following conditions:
 - i) the pressure in each neutron radiation detector must not exceed 105 kPa absolute at 20°C;
 - ii) the amount of gas must not exceed 13 grams per detector;
 - iii) each detector must be manufactured under a registered quality assurance programme;
Note.— The application of ISO 9001:2008 may be considered acceptable for this purpose.
 - iv) each neutron radiation detector must be of welded metal construction with brazed metal to ceramic feed through assemblies. These detectors must have a minimum burst pressure of 1 800 kPa as demonstrated by design type qualification testing; and
 - v) each detector must be tested to a 1×10^{-10} cm³/s leaktightness standard before filling.
 - b) radiation detectors transported as individual components must be transported as follows:
 - i) they must be packed in a sealed intermediate plastic liner with sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents;
 - ii) they must be packed in strong outer packagings and the completed package must be capable of withstanding a 1.8 m drop test without leakage of gas contents from detectors; and
 - iii) the total amount of gas from all detectors per outer packaging must not exceed 52 grams.
 - c) completed neutron radiation detector systems containing detectors meeting the conditions of sub-paragraph a) must be transported as follows:
 - i) the detectors must be contained in a strong sealed outer casing;
 - ii) the casing must contain sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents; and
 - iii) the completed system must be packed in strong outer packagings capable of withstanding a 1.8 m drop test without leakage unless a system's outer casing affords equivalent protection.

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UN Model Regulations, SP 369, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

A194 (369) In accordance with Part 2, Introductory Chapter, paragraph 4, this radioactive material in an excepted package possessing toxic and corrosive properties is classified in ~~Class 8~~ Division 6.1 with a radioactive material and corrosive subsidiary risks.

Uranium hexafluoride may be classified under this entry only if the conditions of 2;7.2.4.1.1.2, 2;7.2.4.1.1.5, 2;7.2.4.5.2 and, for fissile-excepted material, of 2;7.2.3.6 are met.

In addition to the provisions applicable to the transport of ~~Class 8~~ Division 6.1 substances with a corrosive subsidiary risk, the provisions of 5;1.2.2.2, 5;1.6.3, 7;1.6 and 7;3.2.1 to 7;3.2.4 apply.

No Class 7 label is required to be displayed.

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UN Model Regulations, SP 378, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 j) of this report)

A202 (378) Radiation detectors containing this gas in non-refillable cylinders not meeting the requirements of Part 6.5 and Packing Instruction 200 may be offered for transport under this entry provided:

a) the working pressure in each cylinder does not exceed 50 bar;

b) the cylinder capacity does not exceed 12 L;

c) each cylinder has a minimum burst pressure of at least three times the working pressure when a relief device is fitted and at least four times the working pressure when no relief device is fitted;

d) each cylinder is manufactured from material which will not fragment upon rupture;

e) each detector is manufactured under a registered quality assurance programme;

Note.— ISO 9001:2008 may be used for this purpose.

f) detectors are transported in strong outer packagings. The complete package must be capable of withstanding a 1.2 m drop test without breakage of the detector or rupture of the outer packaging. Equipment that includes a detector must be packed in a strong outer packaging unless the detector is afforded equivalent protection by the equipment in which it is contained; and

g) transport in accordance with this special provision must be noted on the dangerous goods transport document.

Radiation detectors, including detectors in radiation detection systems, are not subject to any other requirements of these Instructions if the detectors meet the requirements in a) to f) above and the capacity of detector cylinders does not exceed 50 mL.

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UN Model Regulations, SP 380, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

A203 (380) If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it must be assigned to UN 3166 — Vehicle, flammable gas powered.

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UN Model Regulations, SP 382, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

A204 (382) Polymeric beads may be made from polystyrene, poly (methyl methacrylate) or other polymeric material. When it can be demonstrated that no flammable vapour, resulting in a flammable atmosphere, is evolved according to test U1 (Test method for substances liable to evolve flammable vapours) of Part III, sub-section 38.4.4 of the Manual of Tests and Criteria, polymeric beads, expandable need not be classified under this UN number. This test should only be performed when de-classification of a substance is considered.

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UN Model Regulations, SP 383, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

A205 (383) Table tennis balls manufactured from celluloid are not subject to these Instructions where the net mass of each table tennis ball does not exceed 3.0 g and the total net mass of table tennis balls does not exceed 500 g per package.

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UN Model Regulations, SP 384, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 k) of this report)

A206 (384) The hazard label must conform to the model shown in Figure 5-26. Figure 5-25 may continue to be used until 31 December 2018.

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UN Model Regulations, SP 385, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 d) of this report)

A207 (385) This entry applies to vehicles powered by flammable liquid or gas internal combustion engines or fuel cells.

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 batteries installed must be consigned under this entry. Vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the batteries installed, must be consigned under the entry UN 3171 — **Battery-powered vehicle** (see Special Provision A21).

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, trucks, locomotives, scooters, three- and four-wheeled vehicles or motorcycles, lawn tractors, self-propelled farming and construction equipment, boats and aircraft.

Dangerous goods such as batteries, air bags, 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, must be securely installed in the vehicle and are not otherwise subject to these Instructions. However, lithium batteries must meet the requirements of 2.9.3, except when otherwise specified by these Instructions.

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UN Model Regulations, SP 363, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 d) of this report)

[A208 (363) a) This entry applies to engines or machinery, powered by fuels classified as dangerous goods via internal combustion systems or fuel cells (e.g. combustion engines, generators, compressors, turbines, heating units), except those which are assigned under UN 3166 or UN 3363.

b) Engines or machinery which are empty of liquid or gaseous fuels and which do not contain other dangerous goods, are not subject to these Instructions.

[Note 1.— An engine or machinery is considered to be empty of liquid fuel when the liquid fuel tank has been drained and the engine or machinery cannot be operated due to a lack of fuel. Engine or machinery components such as fuel lines, fuel filters and injectors do not need to be cleaned, drained or purged to be considered empty of liquid fuels. In addition, the liquid fuel tank does not need to be cleaned or purged.]

[Note 2.— An engine or machinery is considered to be empty of gaseous fuels when the gaseous fuel tanks are empty of liquid (for liquefied gases), the positive pressure in the tanks does not exceed 2 bar and the fuel shut-off or isolation valve is closed and secured.]

c) Engines and machinery containing fuels meeting the classification criteria of Class 3, must be consigned under the entries UN 3528 — **Engine, internal combustion, flammable liquid powered** or UN 3528 — **Engine, fuel cell, flammable liquid powered** or UN 3528 — **Machinery, internal combustion, flammable liquid powered** or UN 3528 — **Machinery, fuel cell, flammable liquid powered**, as appropriate.

d) Engines and machinery containing fuels meeting the classification criteria of Division 2.1, must be consigned under the entries UN 3529 — **Engine, internal combustion, flammable gas powered** or UN 3529 — **Engine, fuel cell, flammable gas powered** or UN 3529 — **Machinery, internal combustion, flammable gas powered** or UN 3529 — **Machinery, fuel cell, flammable gas powered**, as appropriate.

Engines and machinery powered by both a flammable gas and a flammable liquid must be consigned under the appropriate UN 3529 entry.

e) Engines and machinery containing liquid fuels meeting the classification criteria for environmentally hazardous substances and not meeting the classification criteria of any other class or division, must be consigned under the entries UN 3530 — **Engine, internal combustion** or UN 3530 — **Machinery, internal combustion**, as appropriate.

f) Engines or machinery may contain other dangerous goods than fuels (e.g. batteries, fire extinguishers, compressed gas accumulators or safety devices) required for their functioning or safe operation without being subject to any additional requirements for these other dangerous goods, unless otherwise specified in these Instructions. However, lithium batteries must meet the requirements of 2.9.3, except when otherwise specified by these Instructions.

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- ~~g) The engines or machinery are not subject to any other requirements of these Instructions if the following requirements are met:~~
- ~~i) The engine or machinery, including the means of containment containing dangerous goods, must be in compliance with the construction requirements specified by the appropriate national authority;~~
 - ~~ii) Any valves or openings (e.g. venting devices) must be closed during transport;~~
 - ~~iii) The engines or machinery must be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during transport which would change the orientation or cause them to be damaged;~~
 - ~~iv) for UN No. 3528 and UN No. 3530:~~
 - ~~Where the engine or machinery contains more than 60 L of liquid fuel and has a capacity of not more than 450 L, the labelling requirements of 5.3 must apply.~~
 - ~~Where the engine or machinery contains more than 60 L of liquid fuel and has a capacity of more than 450 L but not more than 3 000 L, it must be labelled on two opposing sides in accordance with 5.3.~~
 - ~~Where the engine or machinery contains more than 60 L of liquid fuel and has a capacity of more than 3 000 L, it must be placarded on two opposing sides in accordance with 5.3.1.1.2.]~~
 - ~~v) for UN No. 3529:~~
 - ~~Where the fuel tank of the engine or machinery has a water capacity of not more than 450 L, the labelling requirements of 5.3 must apply.~~
 - ~~Where the fuel tank of the engine or machinery has a water capacity of more than 450 L but not more than 1 000 L, it must be labelled on two opposing sides in accordance with 5.2.2.~~
 - ~~Where the fuel tank of the engine or machinery has a water capacity of more than 1 000 L, it must be placarded on two opposing sides in accordance with 5.3.1.1.2.~~
 - ~~vi) A dangerous goods transport document in accordance with 5.4 is required, [except for UN 3528 and UN 3530, where a dangerous goods transport document is only required when the engine or machinery contains more than 60 L of liquid fuels]. Transport in accordance with this special provision must be noted on the dangerous goods transport document.]~~

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UN Model Regulations, SP 386, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

~~A209 (386) Substances which are stabilized by temperature control are forbidden for transport by air unless exempted (see 1:1.1.2). When chemical stabilization is employed, the person offering the packaging for transport must ensure that the level of stabilization is sufficient to prevent the substance in the packaging from dangerous polymerization at a bulk mean temperature of 50°C. Where chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of transport, temperature control is required and the substances are forbidden for transport by air unless exempted (see 1:1.1.2). In making this determination, factors to be taken into consideration include, but are not limited to, the capacity and geometry of the packaging and the effect of any insulation present, the temperature of the substance when offered for transport, the duration of the journey and the ambient temperature conditions typically encountered in the journey (considering also the season of year), the effectiveness and other properties of the stabilizer employed, applicable operational controls imposed by regulation (e.g. requirements to protect from sources of heat, including other cargo carried at a temperature above ambient) and any other relevant factors.~~

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Chapter 4

DANGEROUS GOODS IN LIMITED QUANTITIES

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UN Model Regulations, Chapter 3.4, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

4.5 PACKAGE MARKING

4.5.1 Packages containing limited quantities of dangerous goods must be marked as required by the applicable paragraphs of 5.2, except that 5.2.4.4.1 does not apply.

4.5.2 Packages containing limited quantities of dangerous goods and prepared in accordance with this chapter must bear the marking mark shown in Figure 3-1 below. The marking mark must be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness. The marking mark must be in the form of a square set at an angle of 45° (diamond shaped). The top and bottom portions and the surrounding line must be black. The centre area must be white or a suitable contrasting background. The minimum dimension must be 100 mm × 100 mm and the minimum width of the line forming the diamond must be 2 mm. The symbol "Y" must be placed in the centre of the mark and must be clearly visible. Where dimensions are not specified, all features must be in approximate proportion to those shown.

4.5.2.1 If the size of the package so requires, the minimum outer dimensions shown in Figure 3-1 may be reduced to be not less than 50 mm × 50 mm provided the marking mark remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm. The symbol "Y" must remain in approximate proportion to that shown in Figure 3-1.

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4.5.3 Use of overpacks

4.5.3.1 ~~When packages~~ For an overpack containing dangerous goods packed in limited quantities, the following applies: ~~are placed in an overpack, the overpack must be marked with the word "OVERPACK" and the marking required by this chapter, unless the markings~~ marks representative of all dangerous goods in the overpack are visible, the overpack must be:

- a) marked with the word "OVERPACK". The lettering of the "OVERPACK" mark must be at least 12 mm high; and
- b) marked with the marks required by this chapter.

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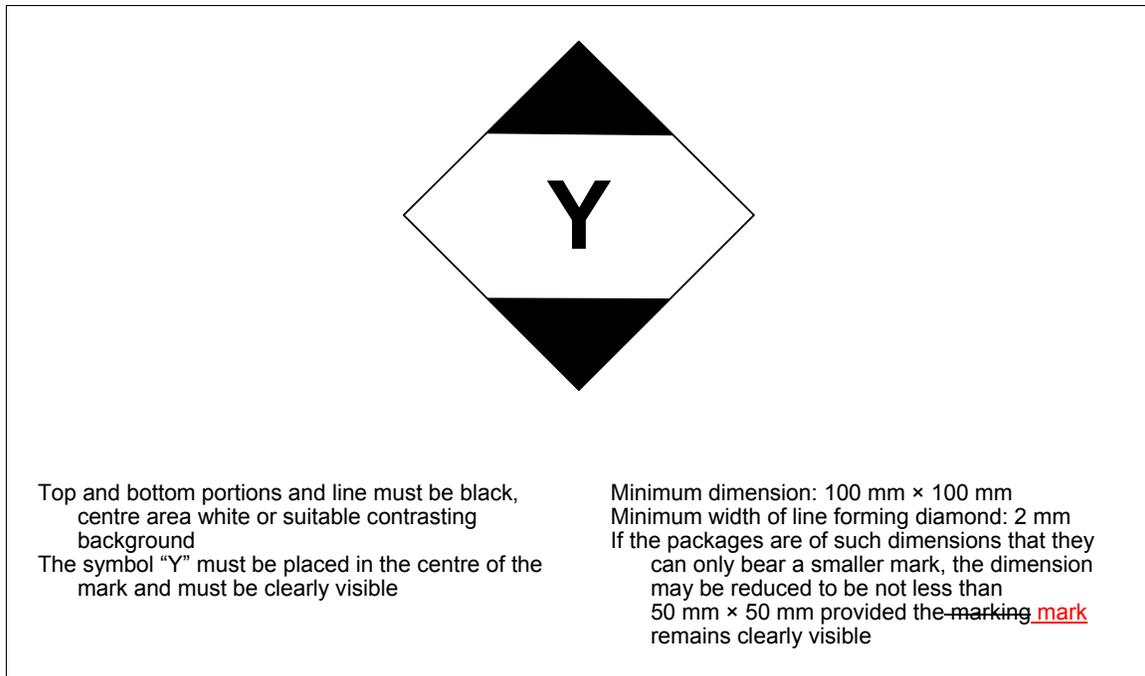


Figure 3-1. Limited quantities mark

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UN Model Regulations, Chapter 3.5, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/13 (see paragraph 3.2.3.2 of this report)

Chapter 5

DANGEROUS GOODS PACKED IN EXCEPTED QUANTITIES

...

5.2 PACKAGINGS

5.2.1 Packagings used for the transport of dangerous goods in excepted quantities must be in compliance with the following:

- a) there must be an inner packaging and each inner packaging must be constructed of plastic (when used for liquid dangerous goods it must have a thickness of not less than 0.2 mm), or of glass, porcelain, stoneware, earthenware or metal (see also 4;1.1.3.1) and the closure of each inner packaging must be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads must have a leak proof threaded type cap. The closure must be resistant to the contents;
- b) each inner packaging must be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents. ~~The intermediate packaging must completely contain the contents in case of breakage or leakage, regardless of package orientation.~~ For liquid dangerous goods, the intermediate or outer packaging must contain sufficient absorbent material to absorb the entire contents of the inner packagings. ~~In such cases~~ When placed in the intermediate packaging, the absorbent material may be the cushioning material. Dangerous goods must not react dangerously with cushioning,

absorbent material and packaging material or reduce the integrity or function of the materials. Regardless of its orientation, the package must completely contain the contents in case of breakage or leakage;

- c) the intermediate packaging must be securely packed in a strong, rigid outer packaging (wooden, fibreboard or other equally strong material);
- d) each package type must be in compliance with the provisions in 5.3;
- e) each package must be of such a size that there is adequate space to apply all necessary ~~markings~~ marks; and
- f) overpacks may be used and may also contain packages of dangerous goods or goods not subject to these Instructions provided that the packages are secured within the overpack.

...

5.4 MARKING OF PACKAGES

5.4.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this chapter must be durably and legibly marked with the mark shown in Figure 3-2. The primary hazard class or, when assigned, the division of each of the dangerous goods contained in the package must be shown in the mark. Where the name of the shipper or consignee is not shown elsewhere on the package, this information must be included within the mark.

5.4.2 The ~~marking~~ mark must be in the form of a square. The hatching and symbol must be of the same colour, black or red, on white or suitable contrasting background. The dimensions of the mark must be a minimum of 100 mm × 100 mm. Where dimensions are not specified, all features must be in approximate proportion to those shown.

5.4.3 Use of overpacks

5.4.3.1 ~~An~~ For an overpack containing dangerous goods in excepted quantities, the following applies: ~~must display the markings required by 5.4.1, u~~ Unless such the markings marks representative of all dangerous goods ~~on packages within in~~ the an overpack are clearly visible, the overpack must be:

- a) marked with the word "OVERPACK". The lettering of the "OVERPACK" mark must be at least 12 mm high; and
- b) marked with the marks required by this chapter.

The other provisions of 5:2.4.10 apply only if other dangerous goods which are not packed in excepted quantities are contained in the overpack and only in relation to these other dangerous goods.

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Part 4**PACKING INSTRUCTIONS**

...

Chapter 1**GENERAL PACKING REQUIREMENTS**

*Parts of this Chapter are affected by State Variations JP 24;
see Table A-1*

**1.1 GENERAL REQUIREMENTS APPLICABLE TO ALL CLASSES
EXCEPT CLASS 7**

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UN Model Regulations, paragraph 4.1.1.5, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

1.1.10 Inner packagings must be so packed, secured or cushioned in an outer packaging in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the outer packaging. Inner packagings containing liquids must be packaged with their closures upward and placed within outer packagings consistent with the orientation ~~markings~~ **mark** prescribed in 5;3.2.12 b) of these Instructions. Inner packagings that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastic material, must be secured in outer packagings with suitable cushioning material. Any leakage of the contents must not substantially impair the protective properties of the cushioning material or of the outer packaging.

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UN Model Regulations, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

1.1.14 Except as provided in 5;3.5.1.1 a), a package must be of such size that there is adequate space to affix all necessary labels and ~~markings~~ **marks**.

...

UN Model Regulations, paragraph 4.1.1.12, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

1.1.18 Every packaging intended to contain liquids must successfully undergo a suitable leakproofness test. **This test is part of a quality assurance programme as required by 4;1.1.2 which shows the capability** ~~and be capable~~ of meeting the appropriate test level indicated in 6;4.4.2:

- a) before it is first used for transport;
- b) after remanufacturing or reconditioning, before it is reused for transport.

For this test, packagings need not have their own closures fixed.

The inner receptacle of composite packagings may be tested without the outer packaging provided the test results are not affected. This test is not necessary for inner packagings of combination packagings.

...

Chapter 3

CLASS 1 — EXPLOSIVES

...

Packing Instruction 114

...

b) solid dry

Inner packagings

Bags
paper, kraft
plastics
textile, siftproof
woven plastics, siftproof
Receptacles
fibreboard
metal
paper
plastics
wood
woven plastics, siftproof

Intermediate packagings

Not necessary

Outer packagings

Boxes
fibreboard (4G)
natural wood, ordinary (4C1)
natural wood, with siftproof walls (4C2)
plywood (4D)
reconstituted wood (4F)
Drums
aluminium (1B1, 1B2)
fibre (1G)
other metal (1N1, 1N2)
plastics (1H1, 1H2)
plywood (1D)
steel (1A1, 1A2)

UN Model Regulations, P112(c), PP48, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

- For UN 0077, 0132, 0234, 0235 and 0236, packagings must be lead-free.
- For UN 0508 and 0509, metal packagings must not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6.3, are not considered metal packagings.
- For UN 0160 and 0161, when metal drums (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) are used as the outer packaging, metal packagings must be so constructed that the risk of explosion, by reason of increase in internal pressure from internal or external causes, is prevented.
- For UN 0160 and 0161, inner packagings are not required if drums are used as the outer packaging.

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Packing Instruction 137

Inner packagings

Bags
plastics
Boxes
fibreboard
wood
Tubes
fibreboard
metal
plastics
Dividing partitions in the
outer packagings

Intermediate packagings

Not necessary

Outer packagings

Boxes
aluminium (4B)
fibreboard (4G)
natural wood, ordinary (4C1)
natural wood, with siftproof walls (4C2)
other metal (4N)
+ plastics, solid (4H2)
plywood (4D)
reconstituted wood (4F)
steel (4A)

UN Model Regulations, packing instruction 137, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14
(see paragraph 3.2.4.1 of this report)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

- For UN 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package marked “THIS SIDE UP” **must be marked in accordance with 4.1.1.13**. When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation.

...

Chapter 4

CLASS 2 — GASES

...

UN Model Regulations, paragraph 4.1.6.12, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

4.1.1.2 Parts of cylinders and closed cryogenic receptacles that are in direct contact with dangerous goods must not be affected or weakened by those dangerous goods and must not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods). In addition to the requirements specified in the relevant packing instruction, which take precedence, the applicable provisions of ISO 11114-1:2012 and ISO 11114-2:2000¹³ must be met.

...

UN Model Regulations, paragraph 4.1.6.8, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

4.1.1.8 Valves must be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or must be protected from damage, which could cause inadvertent release of the contents of the cylinder and closed cryogenic receptacle, by one of the following methods:

- a) Valves are placed inside the neck of the cylinder and closed cryogenic receptacle and protected by a threaded plug or cap;
- b) Valves are protected by caps. Caps must possess vent holes of a sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;
- c) Valves are protected by shrouds or guards;

- d) Not used; or
- e) Cylinders and closed cryogenic receptacles are transported in an outer packaging. The packaging as prepared for transport must be capable of meeting the drop test specified in 6;4.3 at the Packing Group I performance level.

For cylinders and closed cryogenic receptacles with valves as described in b) and c), the requirements of ISO 11117:1998 must be met; for valves with inherent protection, the requirements of Annex A of ISO 10297:2006 or Annex A of ISO 10297:2014 must be met. For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 must be met.

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UN Model Regulations, paragraphs 4.1.6.12 and 4.1.6.13, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

4.1.1.12 Cylinders and closed cryogenic receptacles must not be offered for filling:

- a) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;
- b) unless the cylinder and closed cryogenic receptacle and its service equipment have been examined and found to be in good working order; or
- c) unless the required certification, retest, and filling ~~markings~~ marks are legible.

4.1.1.13 Filled cylinders and closed cryogenic receptacles must not be offered for transport:

- a) when leaking;
- b) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;
- c) unless the cylinder and closed cryogenic receptacle and its service equipment have been examined and found to be in good working order; or
- d) unless the required certification, retest, and filling ~~markings~~ marks are legible.

...

4.2 PACKING INSTRUCTIONS

Packing Instruction 200

For cylinders, the general packing requirements of 4;1.1 and 4;4.1.1 must be met.

Cylinders, constructed as specified in 6;5 are authorized for the transport of a specific substance when specified in the following tables (Table 1 and Table 2). Cylinders other than UN marked and certified cylinders may be used if the design, construction, testing, approval and ~~markings~~ marks conform to the requirements of the appropriate national authority in which they are approved and filled. The substances contained must be permitted in cylinders and permitted for air transport according to these Instructions. Cylinders for which prescribed periodic tests have become due must not be charged and offered for transport until such retests have been successfully completed. Valves must be suitably protected or must be designed and constructed in such a manner that they are able to withstand damage without leakage as specified in Annex B of ISO 10297:1999. Cylinders with capacities of one litre or less must be packaged in outer packaging constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use, and secured or cushioned so as to prevent significant movement within the outer packaging during normal conditions of transport. For some substances, the special packing provisions may prohibit a particular type of cylinder. The following requirements must be met:

- 1) Pressure relief devices must be fitted on cylinders used for the transport of UN 1013 **Carbon dioxide** and UN 1070 **Nitrous oxide**. Other cylinders must be fitted with a pressure relief device if specified by the appropriate national authority of the country of use. The type of pressure relief device, the set to discharge pressure and relief capacity of pressure relief devices, if required, must be specified by the appropriate national authority of the country of use. Manifolding of cylinders is not permitted.

UN Model Regulations, packing instruction P200, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1.1 a) of this report)

- 2) The following two tables cover compressed gases (Table 1) and liquefied and dissolved gases (Table 2). They provide:
- the UN number, name and description, and classification of the substance;
 - the LC₅₀ for toxic substances;
 - the types of cylinders authorized for the substance, shown by the letter "X";
 - the maximum test period for periodic inspection of the cylinders;

Note.— For cylinders which make use of composite materials, the maximum test period must be five years. The test period may be extended to that specified in Tables 1 and 2 (i.e. up to ten years), if approved by the appropriate national authority of the country of use.

- the minimum test pressure of the cylinders;
 - the maximum working pressure of the cylinders for compressed gases (where no value is given, the working pressure must not exceed two-thirds of the test pressure) or the maximum filling ratio(s) dependent on the test pressure(s) for liquefied and dissolved gases;
 - special packing provisions that are specific to a substance.
- 3) In no case must cylinders be filled in excess of the limit permitted in the following requirements:
- For compressed gases, the working pressure must be not more than two-thirds of the test pressure of the cylinders. Restrictions to this upper limit on working pressure are imposed by special packing provision "o". In no case must the internal pressure at 65°C exceed the test pressure.
 - For high pressure liquefied gases, the filling ratio must be such that the settled pressure at 65°C does not exceed the test pressure of the cylinders.

The use of test pressures and filling ratios other than those in the table is permitted provided that the above criterion is met, except where special packing provision "o" applies.

For high pressure liquefied gases and gas mixtures for which relevant data are not available, the maximum filling ratio (FR) must be determined as follows:

$$FR = 8.5 \times 10^{-4} \times d_g \times P_h$$

where FR = maximum filling ratio
 d_g = gas density (at 15°C, 1 bar)(in g/l)
 P_h = minimum test pressure (in bar).

If the density of the gas is unknown, the maximum filling ratio must be determined as follows:

$$FR = \frac{P_h \times MM \times 10^{-3}}{R \times 338}$$

where FR = maximum filling ratio
 P_h = minimum test pressure (in bar)
 MM = molecular mass (in g/mol)
 $R = 8.31451 \times 10^{-2}$ bar.l/mol.K (gas constant).

For gas mixtures, the average molecular mass is to be taken, taking into account the volumetric concentrations of the various components.

- For low pressure liquefied gases, the maximum mass of contents per litre of water capacity (filling factor) must equal 0.95 times the density of the liquid phase at 50°C; in addition, the liquid phase must not fill the cylinder at any temperature up to 60°C. The test pressure of the cylinder must be at least equal to the vapour pressure (absolute) of the liquid at 65°C, minus 100 kPa (1 bar).

For low pressure liquefied gases for which filling data is not provided in the table, the maximum filling ratio must be determined as follows:

$$FR = (0.0032 \times BP - 0.24) \times d_1$$

where FR = maximum filling ratio
BP = boiling point (in Kelvin)
 d_1 = density of the liquid at boiling point (in kg/l).

d) For UN 1001, **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**, see p).

e) For liquefied gases charged with compressed gases, both components — the liquid phase and the compressed gas — have to be taken into consideration in the calculation of the internal pressure in the cylinder.

The maximum mass of contents per litre of water capacity must not exceed 0.95 times the density of the liquid phase at 50°C; in addition, the liquid phase must not completely fill the cylinder at any temperature up to 60°C.

When filled, the internal pressure at 65°C must not exceed the test pressure of the cylinders. The vapour pressures and volumetric expansions of all substances in the cylinders must be considered. When experimental data is not available, the following steps must be carried out:

i) Calculation of the vapour pressure of the liquid component and of the partial pressure of the compressed gas at 15°C (filling temperature);

ii) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15°C to 65°C and calculation of the remaining volume for the gaseous phase;

iii) Calculation of the partial pressure of the compressed gas at 65°C considering the volumetric expansion of the liquid phase;

Note.— The compressibility factor of the compressed gas at 15°C and 65°C must be considered.

iv) Calculation of the vapour pressure of the liquid component at 65°C;

v) The total pressure is the sum of the vapour pressure of the liquid component and the partial pressure of the compressed gas at 65°C;

vi) Consideration of the solubility of the compressed gas at 65°C in the liquid phase;

The test pressure of the cylinder must not be less than the calculated total pressure minus 100 kPa (1bar).

If the solubility of the compressed gas in the liquid component is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph (vi)) into account.

4) Gas mixtures containing any of the following gases must not be offered for transport in aluminium alloy cylinders unless approved by the appropriate national authority of the State of Origin and the State of the Operator:

UN 1037 **Ethyl chloride**
UN 1063 **Methyl chloride**
UN 1063 **Refrigerant gas R 40**
UN 1085 **Vinyl bromide, stabilized**
UN 1086 **Vinyl chloride, stabilized**
UN 1860 **Vinyl fluoride, stabilized**
UN 1912 **Methyl chloride and methylene chloride mixture**

5) The filling of cylinders must be carried out by qualified staff using appropriate equipment and procedures. The procedures should include checks of:

- The conformity of cylinders and accessories with these Instructions;
- Their compatibility with the product to be transported;
- The absence of damage which might affect safety;
- Compliance with the degree or pressure of filling, as appropriate;
- 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 liquified 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 Gas cylinders — Acetylene cylinder bundles — Filling conditions and filling inspection

ISO 24431:2006 Gas cylinders — Cylinders for compressed and liquefied gases (excluding acetylene) — Inspection at time of filling

56) "Special packing provisions":

Material compatibility

- a) Aluminium alloy cylinders are forbidden.
- b) Copper valves are forbidden.
- c) Metal parts in contact with the contents must not contain more than 65 per cent copper.
- d) When steel cylinders are used, only those bearing the "H" mark in accordance with 6;5.2.7.4 p) are permitted.

Gas specific provisions:

- l) UN 1040 **Ethylene oxide** may also be packed in hermetically sealed glass ampoules or metal inner packagings suitably cushioned in fibreboard, wooden or metal boxes meeting the Packing Group I performance level. The maximum quantity permitted in any glass inner packaging is 30 g, and the maximum quantity permitted in any metal inner packaging is 200 g. After filling, each inner packaging must be determined to be leak-tight by placing the inner packaging in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55°C is achieved. The maximum net mass in any outer packaging must not exceed 2.5 kg. When cylinders are used, they must be of the seamless or welded steel types that are equipped with suitable pressure relief devices. Each cylinder must be tested for leakage with an inert gas before each refilling and must be insulated with three coats of heat retardant paint or in any equally efficient manner. The maximum net quantity per cylinder must not exceed 25 kg.

m) Cylinders must be filled to a working pressure not exceeding 5 bar.

o) In no case must the working pressure or filling ratio shown in the table be exceeded.

- p) For UN 1001 **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**: cylinders must be filled with a homogeneous monolithic porous mass; the working pressure and the quantity of acetylene must not exceed the values prescribed in the approval or in ISO 3807-1:2000-~~or~~ ISO 3807-2:2000 or ISO 3807:2013, as applicable.

For UN 1001 **Acetylene, dissolved**, cylinders must contain a quantity of acetone or suitable solvent as specified in the approval (see ISO 3807-1:2000-~~or~~ ISO 3807-2:2000 or ISO 3807:2013, as applicable); cylinders fitted with pressure relief devices must be transported vertically.

The test pressure of 52 bar applies only to cylinders ~~conforming to ISO 3807-2:2000~~ fitted with a fusible plug.

- ra) Ethyl chloride may be carried in securely sealed glass ampoules (IP.8) containing not more than 5 g of ethyl chloride with a ullage of not less than 7.5 per cent at 21°C. Ampoules must be cushioned with efficient non-combustible material in partitioned cartons with not more than 12 ampoules per carton. The cartons must be tightly packed to prevent movement in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) that meet the performance testing requirements of 6;4 at the Packing Group II performance level. Not more than 300 g of ethyl chloride is permitted per package.

s) Aluminium alloy cylinders must be:

- Equipped only with brass or stainless steel valves; and
- Cleaned in accordance with ISO 11621:1997 and not contaminated with oil.

Periodic inspection:

- u) The interval between periodic tests may be extended to 10 years for aluminium alloy cylinders when the alloy of the cylinder has been subjected to stress corrosion testing as specified in ~~ISO 7866:1999~~ [ISO 7866:2012 + Cor 1:2014](#).
- v) The interval between periodic inspections for steel cylinders may be extended to 15 years if approved by the appropriate national authority of the country of use.

Requirements for N.O.S. descriptions and for mixtures:

- z) The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.

The test pressure and filling ratio must be calculated in accordance with the relevant requirements of PI 200.

The necessary steps must be taken to prevent dangerous reactions (i.e. polymerization or decomposition) during transport. If necessary, stabilization or addition of an inhibitor may be required.

Note.— For the carriage of oxygen to provide life support to aquatic animals, see Note 7 of the Introductory Notes to this Part.

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Packing Instruction 202

Requirements for open cryogenic receptacles

Open cryogenic receptacles must be constructed to meet the following requirements:

...

- 9. Open cryogenic receptacles must bear the following marks permanently affixed, e.g. by stamping, engraving or etching:
 - the manufacturer's name and address;
 - the model number or name;
 - the serial or batch number;
 - the UN number and proper shipping name of gases for which the receptacle is intended;
 - the capacity of the receptacle in litres.

Note.— The size of the ~~marking~~ [mark](#) must be as set out for cylinders in Part 6;5.2.7.1. Open cryogenic receptacles manufactured prior to 1 January 2012 are not required to be so marked.

- 10. Open cryogenic receptacles are permitted for nitrogen, argon, krypton, neon and xenon refrigerated liquids.

DGP-WG/14 Report (see paragraph 3.2.4.1 of DGP-WG/14-WP/32):

Packing Instruction 203

Passenger and cargo aircraft for UN 1950 and 2037 only

The general packing requirements of 4;1 must be met.

For the purposes of this packing instruction, a receptacle is considered to be an inner packaging.

Note.— “Receptacle” has the same meaning as set out in 1;3. Any reference in this packing instruction to receptacle will include “aerosols” of UN 1950 and “receptacles, small, containing gas” and “gas cartridges” of UN 2037.

Metal aerosols (IP.7, IP.7A, IP.7B) and non-refillable receptacles containing gas (gas cartridges)

Non-refillable metal aerosols and non-refillable receptacles containing gas (gas cartridges) must not exceed 1 000 mL capacity.

The following conditions must be met:

- a) the pressure in the receptacle must not exceed 1 500 kPa at 55°C and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55°C;
- b) if the pressure in the receptacle exceeds 970 kPa at 55°C but does not exceed 1 105 kPa at 55°C, an IP.7, IP.7A or IP.7B metal receptacle must be used;
- c) if the pressure in the receptacle exceeds 1 105 kPa at 55°C but does not exceed 1 245 kPa at 55°C, an IP.7A or IP.7B metal receptacle must be used;
- d) if the pressure in the receptacle exceeds 1 245 kPa at 55°C, an IP.7B metal receptacle must be used;
- e) IP.7B metal receptacles having a minimum burst pressure of 1 800 kPa may be equipped with an inner capsule charged with a non-flammable, non-toxic compressed gas to provide the propellant function. In this case, the pressures indicated in a), b), c) or d) do not apply to the pressure within the capsule for an aerosol. The quantity of gas contained in the capsule must be so limited such that the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into the outer metal receptacle;
- f) the liquid content must not completely fill the closed receptacle at 55°C;
- g) each receptacle exceeding 120 mL capacity must have been heated until the pressure in the receptacle is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect. For aerosols, non-flammable (tear gas devices) this heat test applies to all aerosols regardless of their capacity.

Plastic aerosols (IP.7C)

Non-refillable plastic aerosols must not exceed 120 mL capacity, except when the propellant is a non-flammable, non-toxic gas and the contents are not dangerous goods in accordance with the provisions of the ~~se~~ Technical Instructions, in which case the quantity must not exceed 500 mL.

The following conditions must be met:

- a) the contents must not completely fill the closed receptacle at 55°C;
- b) the pressure in the receptacle may not exceed 970 kPa at 55°C; and

- c) each receptacle must be leak tested in accordance with the provisions of 6;3.2.8.1.6.

Non-flammable aerosols containing medical preparations or biological products

Aerosols, non-flammable, containing only a non-toxic substance or substances and biological products or a medical preparation which will be deteriorated by a heat test, are acceptable in inner non-refillable receptacles not exceeding 575 mL capacity each, providing all the following conditions are met:

- a) the pressure in the aerosol must not exceed 970 kPa at 55°C;
 b) the liquid contents must not completely fill the closed receptacle at 55°C;
 c) one aerosol out of each lot of 500 or less must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect;
 d) the valves must be protected by a cap or other suitable means during transport.

<u>UN number and name</u>	<u>Net quantity per package</u>	
	<u>Passenger</u>	<u>Cargo</u>
<u>UN 1950 Aerosols, flammable</u>	<u>75 kg</u>	<u>150 kg</u>
<u>UN 1950 Aerosols, flammable (engine starting fluid)</u>	<u>Forbidden</u>	<u>150 kg</u>
<u>UN 1950 Aerosols, non-flammable</u>	<u>75 kg</u>	<u>150 kg</u>
<u>UN 1950 Aerosols, non-flammable (tear gas devices)</u>	<u>Forbidden</u>	<u>50 kg</u>

DGP-WG/14 Report (see paragraph 3.2.4.1 of DGP-WG/14-WP/32) and DGP-WG/15-WP/14 (see paragraph 3.2.4.1.1 b) of this report)

ADDITIONAL PACKING REQUIREMENTS

- Packagings must meet Packing Group II performance requirements.
- Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents during normal conditions of air transport.
- **Receptacles must be tightly packed, so as to prevent excessive movement and inadvertent discharge during normal conditions of transport.**

DGP-WG/14 Report (see paragraph 3.2.4.1 of DGP-WG/14-WP/32):

UN 1950 Aerosols, non-flammable (tear gas devices) – Cargo Aircraft Only

- Only metal receptacles, IP.7, IP.7A, IP.7B are permitted. The aerosols must be individually placed into spiral wound tubes fitted with metal ends or a double-faced fibreboard box with suitable padding before being packed into the outer packaging.

OUTER PACKAGINGS (see 6;3.1)

<i>Boxes</i>	<i>Drums</i>
Aluminium (4B)	Aluminium (1B2)
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Other metal (1N2)
Other metal (4N)	Plastics (1H2)
Plastics (4H1, 4H2)	Plywood (1D)
Plywood (4D)	Steel (1A2)
Reconstituted wood (4F)	
Steel (4A)	

Packing Instruction Y203

Passenger and cargo aircraft for UN 1950 and 2037 only

The requirements of 3;4 must be met.

For the purposes of this packing instruction, a receptacle is considered to be an inner packaging.

Note.— “Receptacle” has the same meaning as set out in 1;3. Any reference in this packing instruction to receptacle will include “aerosols” of UN 1950 and “receptacles, small, containing gas” and “gas cartridges” of UN 2037.

Metal aerosols (IP.7, IP.7A, IP.7B) and non-refillable receptacles containing gas (gas cartridges)

Non-refillable metal aerosols and non-refillable receptacles containing gas (gas cartridges) containing toxic substances must not exceed 120 mL capacity.

All other non-refillable metal aerosols and non-refillable receptacles containing gas (gas cartridges) must not exceed 1 000 mL capacity.

The following conditions must be met:

- a) the pressure in the receptacle must not exceed 1 500 kPa at 55°C and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55°C;
- b) if the pressure in the receptacle exceeds 970 kPa at 55°C but does not exceed 1 105 kPa at 55°C, an IP.7, IP.7A or IP.7B metal receptacle must be used;
- c) if the pressure in the receptacle exceeds 1 105 kPa at 55°C, an IP.7A or IP.7B metal receptacle must be used;
- d) if the pressure in the receptacle exceeds 1 245 kPa at 55°C, an IP.7B metal receptacle must be used;
- e) IP.7B metal receptacles having a minimum burst pressure of 1 800 kPa may be equipped with an inner capsule charged with a non-flammable, non-toxic compressed gas to provide the propellant function. In this case, the pressures indicated in a), b), c) or d) do not apply to the pressure within the capsule for an aerosol. The quantity of gas contained in the capsule must be so limited such that the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into the outer metal receptacle;
- f) the liquid content must not completely fill the closed receptacle at 55°C;
- g) each receptacle exceeding 120 mL capacity must have been heated until the pressure in the receptacle is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect.

Plastic aerosols (IP.7C)

Non-refillable plastic aerosols must not exceed 120 mL capacity, except when the propellant is a non-flammable, non-toxic gas and the contents are not dangerous goods in accordance with the provisions of ~~the Technical~~ these Instructions, in which case the quantity must not exceed 500 mL.

The following conditions must be met:

- a) the contents must not completely fill the closed receptacle at 55°C;
- b) the pressure in the receptacle may not exceed 970 kPa at 55°C; and
- c) each receptacle must be leak tested in accordance with the provisions of 6;3.2.8.1.6.

Non-flammable aerosols containing medical preparations or biological products

Aerosols, non-flammable, containing only a non-toxic substance or substances and biological products or a medical preparation which will be deteriorated by a heat test, are acceptable in inner non-refillable receptacles not exceeding 575 mL capacity each, providing all the following conditions are met:

- a) the pressure in the aerosol must not exceed 970 kPa at 55°C;
- b) the liquid contents must not completely fill the closed receptacle at 55°C;
- c) one aerosol out of each lot of 500 or less must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect;
- d) the valves must be protected by a cap or other suitable means during transport.

UN Model Regulations, packing instruction P207, ST/SG/AC.10/42/Add.1

The words “and inadvertent discharge during normal conditions of transport” is included in the 18th revised edition of the UN Model Regulations. DGP-WG/15 is invited to consider whether these words should be included in the Technical Instructions along with the word “excessive” introduced through ST/SG/AC.10/42/Add.1.

ADDITIONAL PACKING REQUIREMENTS

- Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents during normal conditions of air transport.
- [Receptacles must be tightly packed, so as to prevent excessive movement and inadvertent discharge during normal conditions of transport.]

OUTER PACKAGINGS (see 6;3.1)

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Packing Instruction 204

~~The general packing requirements of 4;1 must be met.~~

~~Aerosols, non-flammable, containing biological products or a medical preparation which will be deteriorated by a heat test, are acceptable in inner non-refillable receptacles not exceeding 575 mL capacity each, providing all the following conditions are met:~~

- ~~— a) the pressure in the aerosol must not exceed 970 kPa at 55°C;~~
- ~~— b) the liquid contents must not completely fill the closed receptacle at 55°C;~~
- ~~— c) one aerosol out of each lot of 500 or less must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect;~~
- ~~— d) the valves must be protected by a cap or other suitable means during transport;~~
- ~~— e) aerosols must be tightly packed, so as to prevent movement, in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) of Packing Group II.~~

Packing Instruction Y204

~~The requirements of 3;4 must be met.~~

~~Single packagings are not permitted.~~

COMBINATION PACKAGINGS:

INNER:

~~Aerosols, non flammable, containing only a non-toxic substance or substances and biological products or a medical preparation which will be deteriorated by a heat test, are acceptable in inner non-refillable receptacles not exceeding 575 mL capacity each, providing all the following conditions are met:~~

- ~~— a) the pressure in the aerosol must not exceed 970 kPa at 55°C;~~
- ~~— b) the liquid contents must not completely fill the closed receptacle at 55°C;~~
- ~~— c) one aerosol out of each lot of 500 or less must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect;~~
- ~~— d) the valves must be protected by a cap or other suitable means during transport;~~
- ~~— e) aerosols must be tightly packed, so as to prevent movement, in one of the following boxes:~~

OUTER:**Boxes**

- ~~— Fibreboard~~
- ~~— Plastics~~
- ~~— Plywood~~
- ~~— Reconstituted wood~~
- ~~— Wooden~~

...

Packing Instruction 212

The general packing requirements of 4;1 must be met.

~~Aerosols, non flammable, which are tear gas devices are permitted in inner non-refillable metal receptacles not exceeding 1 000 mL capacity each providing all the following conditions are met:~~

- ~~— a) the pressure in the aerosol must not exceed 1 500 kPa at 55°C and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55°C;~~
- ~~— b) if the pressure in the aerosol does not exceed 1 105 kPa at 55°C, an IP.7, IP.7A or IP.7B metal receptacle must be used;~~
- ~~— c) if the pressure in the aerosol exceeds 1 105 kPa at 55°C but does not exceed 1 245 kPa at 55°C, an IP.7A or IP.7B metal receptacle must be used;~~
- ~~— d) if the pressure in the aerosol exceeds 1 245 kPa at 55°C, an IP.7B metal receptacle must be used;~~
- ~~— e) IP.7B metal receptacles having a minimum burst pressure of 1 800 kPa may be equipped with an inner capsule charged with a non flammable, non-toxic compressed gas to provide the propellant function. In this case, the pressures indicated in a), b), c) or d) do not apply to the pressure within the capsule. The quantity of gas contained in the capsule must be so limited such that the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into an aerosol;~~
- ~~— f) the liquid content must not completely fill the closed receptacle at 55°C;~~
- ~~— g) each aerosol must have been heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect;~~
- ~~— h) the valves must be protected by a cap or other suitable means during transport;~~

- ~~i) aerosols must be individually placed into spiral wound tubes fitted with metal ends or a double faced fibreboard box with suitable padding, which must be tightly packed in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) of Packing Group II. Maximum net quantity per package is 50 kg.~~

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UN Model Regulations, packing instruction P205, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

Packing Instruction 214

Cargo aircraft only for UN 3468 only

This Instruction applies to storage systems containing hydrogen absorbed in a metal hydride (UN 3468) individually or when contained in equipment and apparatus when transported on cargo aircraft.

- 1) For metal hydride storage systems, the general packing requirements of 4;4.1 must be met.
- 2) Only cylinders not exceeding 150 L in water capacity and having a maximum developed pressure not exceeding 25 MPa are covered by this packing instruction.
- 3) Metal hydride storage systems meeting the applicable requirements of 6;5 for the construction and testing of cylinders containing gas may be used for the transport of hydrogen only.
- 4) When steel cylinders or composite cylinders with steel liners are used, only those bearing the "H" mark, in accordance with 6;5.2.9.2 j) are permitted.
- 5) Metal hydride storage systems must meet the service conditions, design criteria, rated capacity, type tests, batch tests, routine tests, test pressure, rated charging pressure and provisions for pressure relief devices for transportable metal hydride storage systems specified in ISO 16111:2008, and their conformity and approval must be assessed in accordance with 6;5.2.5.
- 6) Metal hydride storage systems must be filled with hydrogen at a pressure not exceeding the rated charging pressure shown in the permanent ~~markings~~ mark on the system as specified in ISO 16111:2008.
- 7) The periodic test requirements for a metal hydride storage system must be in accordance with ISO 16111:2008 and carried out in accordance with 6;5.2.6, and the interval between periodic inspections must not exceed five years.
- 8) Storage systems with a water capacity of less than 1 L must be packaged in rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use. They must be adequately secured or cushioned so as to prevent damage during normal conditions of transport.
- 9) Maximum net quantity per package for cargo aircraft is 100 kg of metal hydride storage systems, including when such storage systems are packed with equipment or contained in equipment.

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UN Model Regulations, packing instruction P206, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

Packing Instruction 218

Passenger and cargo aircraft for UN 3500, 3501, 3502, 3503, 3504 and 3505 only

General requirements

The general requirements of 4;4.1 applicable to cylinders must be met. Cylinders, constructed as specified in 6;5 are authorized for the transport of UN 3500, UN 3501, UN 3502, UN 3503, UN 3504 and UN 3505. Cylinders other than UN marked and certified cylinders may be used if the design, construction, testing, approval and ~~markings~~ marks conform to the requirements of the appropriate national authority of the State in which they are approved and filled. The substances contained must be permitted in cylinders and permitted for air transport according to these Instructions. Cylinders for which prescribed periodic tests have become due must not be charged and offered for transport until such retests have been successfully completed.

Compatibility requirements

- The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.
- The necessary steps must be taken to prevent dangerous reactions (i.e. polymerization or decomposition) during transport. If necessary, stabilization or addition of an inhibitor may be required.

Periodic inspection

- The maximum test period for periodic inspection of the cylinders must be 5 years.

ADDITIONAL PACKING REQUIREMENTS

- Cylinders must be so filled that at 50°C the non-gaseous phase does not exceed 95% of their water capacity and they are not completely filled at 60°C. When filled, the internal pressure at 65°C must not exceed the test pressure of the cylinders. The vapour pressures and volumetric expansion of all substances in the cylinders must be taken into account.
- Spray application equipment (such as a hose and wand assembly) must not be connected during transport.
- The minimum test pressure must be in accordance with Packing Instruction 200 for the propellant but must not be less than 20 bar.
- Non-refillable cylinders used may have a water capacity in litres not exceeding 1 000 litres divided by the test pressure expressed in bars provided capacity and pressure restrictions of the construction standard comply with ISO 11118:1999, which limits the maximum capacity to 50 litres.

— For liquids charged with a compressed gas both components — the liquid phase and the compressed gas — have to be taken into consideration in the calculation of the internal pressure in the cylinder. When experimental data is not available, the following steps must be carried out:

a) Calculation of the vapour pressure of the liquid component and of the partial pressure of the compressed gas at 15°C (filling temperature);

b) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15°C to 65°C and calculation of the remaining volume for the gaseous phase;

c) Calculation of the partial pressure of the compressed gas at 65°C considering the volumetric expansion of the liquid phase;

— Note.— The compressibility factor of the compressed gas at 15°C and 65°C must be considered.

d) Calculation of the vapour pressure of the liquid component at 65°C;

e) The total pressure is the sum of the vapour pressure of the liquid component and the partial pressure of the compressed gas at 65°C;

f) Consideration of the solubility of the compressed gas at 65°C in the liquid phase.

The test pressure of the cylinders or pressure drums must not be less than the calculated total pressure minus 100 kPa (1 bar).

If the solubility of the compressed gas in the liquid component is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph f) into account.

OUTER PACKAGINGS

Boxes

Drums

Jerricans

Strong outer packagings

UN Model Regulations, packing instruction P208, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

Packing Instruction 219

For cylinders, the general packing requirements of 4;1.1 and 4;4.1.1 must be met.

This Instruction applies to Class 2 adsorbed gases.

- 1) The following packagings are permitted provided the general packing requirements of 4.1.1 are met:
 - a) Cylinders constructed as specified in 6;5.2 and in accordance with ISO 11513:2011 or ISO 9809-1:2010; and
 - b) Cylinders constructed before 1 January 2016 in accordance with 6;5.3 and a specification approved by the appropriate national authorities of the countries of transport and use.
- 2) The pressure of each filled cylinder must be less than 101.3 kPa at 20°C and less than 300 kPa at 50°C.
- 3) The minimum test pressure of the cylinder is 21 bar.
- 4) The minimum burst pressure of the cylinder is 94.5 bar.
- 5) The internal pressure at 65°C of the filled cylinder must not exceed the test pressure of the cylinder.
- 6) The adsorbent material must be compatible with the cylinder and must not form harmful or dangerous compounds with the gas to be adsorbed. The gas in combination with the adsorbent material must not affect or weaken the cylinder or cause a dangerous reaction (e.g. a catalyzing reaction).
- 7) The quality of the adsorbent material must be verified at the time of each fill to assure the pressure and chemical stability requirements of this packing instruction are met each time an adsorbed gas package is offered for transport.
- 8) The adsorbent material must not meet the criteria of any of the classes or divisions in these Instructions.
- 9) The filling procedure must be in accordance with Annex A of ISO 11513:2011.
- 10) The maximum period for periodic inspections is five years.
- 11) The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.

UN Model Regulations, packing instruction P005, ST/SG/AC.10/42/Add.1, DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 d) of this report) and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

Packing Instruction ~~951~~ **220**

Cargo aircraft only for UN ~~3166~~ **3529** only

(See Packing Instruction ~~950-378~~ for flammable liquid-powered ~~vehicles~~ and engines or machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles, or Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

- Substances must be compatible with their packagings as required by 4;1.1.3.

<i>UN number and proper shipping name</i>	<i>Quantity — passenger</i>	<i>Quantity — cargo</i>
UN 3166 3529 <u>Engines, internal combustion, flammable gas powered, Machinery, internal combustion, flammable gas powered</u> or <u>Vehicle, flammable gas powered</u> or <u>Vehicle, fuel cell, flammable gas powered</u> , or <u>Engine, fuel cell, flammable gas powered</u> <u>or Machinery, fuel cell, flammable gas powered</u>	Forbidden	No limit

ADDITIONAL PACKING REQUIREMENTS

Flammable gas vessels

- 1) for flammable gas-powered ~~vehicles~~, machines or equipment, pressurized vessels containing the flammable gas must be completely emptied of flammable gas. Lines from vessels to gas regulators, and gas regulators themselves, must also be drained of all trace of flammable gas. To ensure that these conditions are met, gas shut-off valves must be left open and connections of lines to gas regulators must be left disconnected upon delivery of the ~~vehicle~~ engine or machinery to the operator. Shut-off valves must be closed and lines reconnected at gas regulators before loading ~~the vehicle~~ aboard the aircraft;

or alternatively,

- 2) flammable gas-powered ~~vehicles~~, machines or equipment that have pressure receptacles (fuel tanks) equipped with electrically operated valves that close automatically in case the power is disconnected, or with manual shut-off valves, may be transported under the following conditions:
 - i) the tank shut-off valves must be in the closed position and in the case of electrically operated valves, power to those valves must be disconnected;
 - ii) after closing the tank shut-off valves, the ~~vehicle~~, equipment or machinery must be operated until it stops from lack of fuel before being loaded aboard the aircraft;
 - iii) in no part of the closed system must the remaining pressure of compressed gases exceed 5 per cent of the maximum allowable working pressure of the pressure receptacle (fuel tank) system, or more than 2 000 kPa (20 bar), whichever is the lower.

Batteries

All batteries must be installed and securely fastened in the battery holder of the ~~vehicle~~, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

- 1) if spillable batteries are installed, and it is possible for the ~~vehicle~~, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;

- 2) if lithium batteries are installed, they must meet the provisions of Part 2;9.3, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the ~~vehicle~~, machinery or equipment and must be protected in such a manner so as to prevent damage and short circuits; and
- 3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

Other operational equipment

- 1) Dangerous goods required for the operation or safety of the ~~vehicle~~, machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the ~~vehicle~~, machine or equipment. ~~Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.~~
- 2) ~~Vehicles equipped with theft protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.~~

Internal combustion or fuel cell engine shipped separately (not installed)

- 1) When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.
- 2) This requirement also applies to ~~vehicles~~, machines or equipment containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

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Chapter 5

CLASS 3 — FLAMMABLE LIQUIDS

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Packing Instruction ~~950~~ **378**Passenger and cargo aircraft for UN ~~3466~~ **3528** only

(See Packing Instruction ~~951~~ **200** for flammable gas-powered ~~vehicles and engines~~ or machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles, or Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

- Substances must be compatible with their packagings as required by 4;1.1.3.

<i>UN number and proper shipping name</i>	<i>Quantity — passenger</i>	<i>Quantity — cargo</i>
UN 3166 Engines, internal combustion, flammable liquid powered or Machinery, internal combustion, flammable liquid powered Vehicle, flammable liquid powered or Vehicle, fuel cell, flammable liquid powered or Engine, fuel cell, flammable powered or Machinery, fuel cell, flammable liquid powered	No limit	No limit

ADDITIONAL PACKING REQUIREMENTS*Flammable liquid fuel tanks*

Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of ~~vehicles~~, machines or equipment incorporating internal combustion engines, such as lawn mowers and outboard motors, where such machines or equipment could possibly be handled in other than an upright position. ~~When it is not possible to handle in other than an upright position, vehicles, except those with diesel engines, must be drained of fuel as far as practicable, and if any fuel remains, it must not exceed one quarter of the tank capacity.~~

Diesel engines

~~Vehicles equipped with diesel engines are excepted from the requirement to drain the fuel tanks, provided that a sufficient ullage space has been left inside the tank to allow fuel expansion without leakage, and the tank caps are tightly closed. A careful check must be made to ensure there are no fuel leakages.~~

Batteries

All batteries must be installed and securely fastened in the battery holder of the ~~vehicle~~, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

- 1) if spillable batteries are installed, and it is possible for the ~~vehicle~~, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;
- 2) if lithium batteries are installed, they must meet the provisions of Part 2;9.3, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the ~~vehicle~~, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits; and
- 3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

Other operational equipment

- 1) Dangerous goods required for the operation or safety of the ~~vehicle~~, machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the ~~vehicle~~, machine or equipment. ~~Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.~~
- 2) ~~Vehicles equipped with theft protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.~~

Internal combustion or fuel cell engine shipped separately (not installed)

- 1) When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.
- 2) This requirement also applies to vehicles, ~~machines or equipment~~ containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

Chapter 6

**CLASS 4 — FLAMMABLE SOLIDS; SUBSTANCES
LIABLE TO SPONTANEOUS COMBUSTION;
SUBSTANCES WHICH, IN CONTACT WITH WATER,
EMIT FLAMMABLE GASES**

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UN Model Regulations, packing instruction P412 , ST/SG/AC.10/42/Add.1 (see paragraph 3.2.4.1 of this report)

Packing Instruction 450

Passenger and cargo aircraft for UN 3527 (Packing Group II or III) only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) Compatibility requirements

- Substances must be compatible with their packagings as required by 4;1.1.3.
- Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary risk.

2) Closure requirements

- Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS						SINGLE PACKAGINGS
<i>Packing conditions</i>	<i>Inner packaging (see 6;3.2)</i>	<i>Inner packaging quantity (per receptacle) — for base liquid material</i>	<i>Inner packaging quantity (per receptacle) — for liquid activator</i>	<i>Inner packaging quantity (per receptacle) — for solid activator</i>	<i>Total quantity per package</i>	
Activator (Organic peroxide)	Plastics*	n/a	125 mL	500 g	5 kg	No
	Metal*	n/a	125 mL	500 g		
Base material Class 3 Packing Group II	Glass	1.0 L	n/a	n/a	5 kg	
	Plastics	5.0 L	n/a	n/a		
	Metal	5.0 L	n/a	n/a		
Activator (Organic peroxide)	Plastics*	n/a	125 mL	500 g	10 kg	
	Metal*	n/a	125 mL	500 g		
Base material Class 3 Packing Group III	Glass	2.5 L	n/a	n/a	10 kg	
	Plastics	10.0 L	n/a	n/a		
	Metal	10.0 L	n/a	n/a		

*Including tubes.

The total quantity of kits per package is to be calculated on a one-to-one basis of their volume, i.e. 1 L equal to 1 kg.

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of leakage (see 4;1.1.7).

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6:3.1)

<u>Boxes</u>	<u>Drums</u>	<u>Jerricans</u>
<u>Aluminium (4B)</u>	<u>Aluminium (1B1, 1B2)</u>	<u>Aluminium (3B1, 3B2)</u>
<u>Fibreboard (4G)</u>	<u>Fibre (1G)</u>	<u>Plastics (3H1, 3H2)</u>
<u>Natural wood (4C1, 4C2)</u>	<u>Other metal (1N1, 1N2)</u>	<u>Steel (3A1, 3A2)</u>
<u>Other metal (4N)</u>	<u>Plastics (1H1, 1H2)</u>	
<u>Plastics (4H1, 4H2)</u>	<u>Steel (1A1, 1A2)</u>	
<u>Plywood (4D)</u>		
<u>Reconstituted wood (4F)</u>		
<u>Steel (4A)</u>		

Packing Instruction Y450

Limited quantities

Passenger and cargo aircraft for UN 3527 (Packing Group II or III) only

General requirements

Part 4, Chapter 1 requirements must be met (except that 4:1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including:

1) Compatibility requirements

- Substances must be compatible with their packagings as required by 4:1.1.3.
- Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary risk.

2) Closure requirements

- Closures must meet the requirements of 4:1.1.4.

3) Limited quantity requirements

- Part 3, Chapter 4 requirements must be met, including:
 - the capability of the package to pass a 1.2 m drop test;
 - a 24-hour stacking test; and
 - inner packagings for liquids must be capable of passing a pressure differential test (4:1.1.6).

COMBINATION PACKAGINGS							SINGLE PACKAGINGS
<u>Packing conditions</u>	<u>Inner packaging (see 6:3.2)</u>	<u>Inner packaging quantity (per receptacle) — for base liquid material</u>	<u>Inner packaging quantity (per receptacle) — for liquid activator</u>	<u>Inner packaging quantity (per receptacle) — for solid activator</u>	<u>Total quantity per package</u>	<u>Total gross mass per package</u>	
<u>Activator (Organic peroxide)</u>	<u>Plastics*</u>	<u>n/a</u>	<u>30 mL</u>	<u>100 g</u>	<u>1 kg</u>	<u>30 kg</u>	<u>No</u>
	<u>Metal*</u>	<u>n/a</u>	<u>30 mL</u>	<u>100 g</u>			
<u>Base material Class 3 Packing Group II</u>	<u>Glass</u>	<u>1.0 L</u>	<u>n/a</u>	<u>n/a</u>			
	<u>Plastics</u>	<u>1.0 L</u>	<u>n/a</u>	<u>n/a</u>			
	<u>Metal</u>	<u>1.0 L</u>	<u>n/a</u>	<u>n/a</u>			
<u>Activator (Organic peroxide)</u>	<u>Plastics*</u>	<u>n/a</u>	<u>30 mL</u>	<u>100 g</u>			
	<u>Metal*</u>	<u>n/a</u>	<u>30 mL</u>	<u>100 g</u>			
<u>Base material Class 3 Packing Group III</u>	<u>Glass</u>	<u>2.5 L</u>	<u>n/a</u>	<u>n/a</u>			
	<u>Plastics</u>	<u>5.0 L</u>	<u>n/a</u>	<u>n/a</u>			
	<u>Metal</u>	<u>5.0 L</u>	<u>n/a</u>	<u>n/a</u>			

*Including tubes.

The total quantity of kits per package is to be calculated on a one-to-one basis of their volume, i.e. 1 L equal to 1 kg.

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of leakage (see 4:1.1.7).

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6:3.1)

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Steel

Jerricans

Aluminium
Plastics
Steel

Packing Instruction 451

Passenger and cargo aircraft — wetted explosives (Packing Group I)

...

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

- Packagings must be designed and constructed to prevent the loss of water or alcohol content or the content of the phlegmatizer.
- Packagings must be so constructed and closed so as to avoid an explosive over pressure or pressure build-up of more than 300 kPa (3 bar).
- The type of packaging and maximum permitted quantity per packaging are limited by the provisions of Part 2;1.5.2 and may be less than the limits shown above.
- Plastic or glass inner packagings must be packed in tightly closed metal or rigid plastic receptacles before packing in outer packagings. Inner packagings must be packed with absorbent material in sufficient quantity to absorb the contents in the event of leakage.

UN Model Regulations, P406, PP48, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1.1 c) of this report)

For UN 3474

Metal packagings must not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in 6:3, are not considered metal packagings.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6:3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H1, 1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Other metal (3N2)
Plastics (3H1, 3H2)
Steel (3A2)

...

Chapter 7

CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

...

Packing Instructions 553 – 555

Cargo aircraft only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) Compatibility requirements

- Substances must be compatible with their packagings as required by 4;1.1.3.
- Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary risk.

2) Closure requirements

- Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS
Packing instruction	Packing Group	Inner packaging (see 6;3.2)	Inner packaging quantity (per receptacle)	Total quantity per package	
553	I	Glass	1.0 L	2.5 L	No
		Plastics	1.0 L		
		Metal	1.0 L		
554	II	Glass	2.5 L	5 L	No
		Plastics	2.5 L		
		Metal	2.5 L		
555	III	Glass	5.0 L	30 L	30 L
		Plastics	5.0 L		
		Metal	5.0 L		

UN Model Regulations, P502, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

- UN 1873—~~only glass inner packagings are permitted.~~ parts of packagings which are in direct contact with perchloric acid must be constructed of glass or plastics.
- Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

Packing Group III

- Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)*Boxes*

Aluminium (4B)
 Fibreboard (4G)
 Natural wood (4C1, 4C2)
 Other metal (4N)
 Plastics (4H1, 4H2)
 Plywood (4D)
 Reconstituted wood (4F)
 Steel (4A)

Drums

Aluminium (1B1, 1B2)
 Fibre (1G)
 Other metal (1N1, 1N2)
 Plastics (1H1, 1H2)
 Steel (1A1, 1A2)

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS*Packing Group III*

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP III (PI 555)*Composites*

All (see 6;3.1.18)

Drums

Aluminium (1B1)
 Other metal (1N1)
 Plastics (1H1)
 Steel (1A1)

Jerricans

Aluminium (3B1)
 Plastics (3H1)
 Steel (3A1)

...

Chapter 8

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

UN Model Regulations, P603, ST/SG/AC.10/42/Add.1, DGP-WG/15-WP/12 (see paragraph 3.2.2.1.2 of this report) and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

Move Packing Instruction 877 from Chapter 10 and renumber it 603

Packing Instruction ~~877~~603

Passenger and cargo aircraft for UN 3507 only

General requirements

Part 4, Chapter 1 and Part 4;9.1.2, 9.1.4 and 9.1.7 requirements must be met, including:

1) Compatibility requirements

- Substances must be compatible with their packagings as required by 4;1.1.3.
- Metal packagings must be corrosion resistant or be protected against corrosion.

2) Closure requirements

- Closures must meet the requirements of 4;1.1.4.

<i>UN number and name</i>	<i>Quantity per package — passenger</i>	<i>Quantity per package — cargo</i>
UN 3507 Uranium hexafluoride, radioactive material, excepted package, non-fissile or fissile-excepted	Less than 0.1 kg	Less than 0.1 kg

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

- Substances must be packed in a metal or plastics primary receptacle in a leakproof rigid secondary packaging in a rigid outer packaging.
- Primary inner receptacles must 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 must be secured in outer packagings with suitable cushioning material to prevent movement. If multiple primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated so as to prevent contact between them.
- The contents must comply with the provisions of 2;7.2.4.5.2.
- The provisions of 6;7.3 must be met.
- In the case of fissile-excepted material, limits specified in 2;7.2.3.5 and 6;7.10.2.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

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Packing Instruction 620

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Special packing provisions

- a) Shippers of infectious substances must ensure that packages are prepared in such a manner that they arrive at their destination in good condition and present no hazard to persons or animals during transport.
- b) The definition in 1;3, and the general packing requirements of 4;1, apply to infectious substances packages.
- c) An itemized list of contents must be enclosed between the secondary packaging and the outer packaging. When the infectious substances to be transported are unknown, but suspected of meeting the criteria for inclusion in Category A, the words "suspected Category A infectious substance" must be shown in parentheses following the proper shipping name on the itemized list of contents inside the outer packaging.
- d) Before an empty packaging is returned to the shipper, or sent elsewhere, it must be disinfected or sterilized to nullify any hazard, and any label or ~~marking~~ **mark** indicating that it had contained an infectious substance must be removed or obliterated.

UN Model Regulations, P650, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

Packing Instruction 650

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- 10) When packages are placed in an overpack, the package ~~markings~~ **marks** required by this packing instruction must either be clearly visible or the ~~markings~~ **marks** must be reproduced on the outside of the overpack and the overpack must be marked with the word "Overpack".
- 11) Infectious substances assigned to UN 3373 which are packed and marked in accordance with this packing instruction are not subject to any other requirement in these Instructions except for the following:
 - a) the name and address of the shipper and of the consignee must be provided on each package;
 - b) the name and telephone number of a person responsible must be provided on a written document (such as an air waybill) or on the package;
 - c) classification must be in accordance with 2;6.3.2;
 - d) the incident reporting requirements in 7;4.4 must be met;
 - e) the inspection for damage or leakage requirements in 7;3.1.3 and 7;3.1.4; and
 - f) passengers and crew members are prohibited from transporting infectious substances either as, or in, carry-on baggage or checked baggage or on their person.

Note.— When the shipper or consignee is also the "person responsible" as referred to in b), the name and address need be marked only once in order to satisfy the name and marking provisions in both a) and b).
- 12) Clear instructions on filling and closing such packages must be provided to the shipper or to the person who prepares the package (e.g. patient) by packaging manufacturers and subsequent distributors to enable the package to be correctly prepared for transport.
- 13) Other dangerous goods must not be packed in the same packaging as Division 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Class 3, 8 or 9 may be packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 3;5. When these small quantities of dangerous goods are packed with infectious substances in accordance with this packing instruction no other requirements in these Instructions need be met.

Additional requirements:

- 1) Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4;2.8.

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Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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UN Model Regulations, packing instruction P005, ST/SG/AC.10/42/Add.1, DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 d) of this report) and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

Packing Instruction 950

Passenger and cargo aircraft for UN 3166 only

(See [Packing Instruction 220 for flammable gas-powered engines and machinery](#), [Packing Instruction 378 for flammable liquid-powered engines and machinery](#), [Packing Instruction 951 for flammable gas-powered vehicles and engines or](#), [Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels](#))

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

- Substances must be compatible with their packagings as required by 4;1.1.3.

<i>UN number and proper shipping name</i>	<i>Quantity — passenger</i>	<i>Quantity — cargo</i>
UN 3166 Engines, internal combustion, flammable liquid powered or Vehicle, flammable liquid powered or Vehicle, fuel cell, flammable liquid powered or Engine, fuel cell, flammable powered	No limit	No limit

ADDITIONAL PACKING REQUIREMENTS*Flammable liquid fuel tanks*

Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of vehicles, ~~machines or equipment~~ incorporating internal combustion engines, such as lawn mowers and outboard motors, where such machines or equipment could possibly be handled in other than an upright position. When it is not possible to handle in other than an upright position, vehicles, except those with diesel engines, must be drained of fuel as far as practicable, and if any fuel remains, it must not exceed one-quarter of the tank capacity.

Diesel engines

Vehicles equipped with diesel engines are excepted from the requirement to drain the fuel tanks, provided that a sufficient ullage space has been left inside the tank to allow fuel expansion without leakage, and the tank caps are tightly closed. A careful check must be made to ensure there are no fuel leakages.

Batteries

All batteries must be installed and securely fastened in the battery holder of the vehicle, ~~machine or equipment~~ and must be protected in such a manner so as to prevent damage and short circuits. In addition:

- 1) if spillable batteries are installed, and it is possible for the vehicle, ~~machine or equipment~~ to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;
- 2) if lithium batteries are installed, they must meet the provisions of Part 2;9.3, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the vehicle, ~~machine or equipment~~ and must be protected in such a manner so as to prevent damage and short circuits; and

- 3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

Other operational equipment

- 1) Dangerous goods required for the operation or safety of the vehicle, ~~machine or equipment~~, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the vehicle, ~~machine or equipment~~. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.
- 2) Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

Internal combustion or fuel cell engine shipped separately (not installed)

- 1) When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.
- 2) This requirement also applies to vehicles, ~~machines or equipment~~ containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

UN Model Regulations, packing instruction P005, ST/SG/AC.10/42/Add.1, DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 d) of this report) and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

Packing Instruction 951

Cargo aircraft only for UN 3166 only

(See [Packing Instruction 220 for flammable gas-powered engines and machinery](#), [Packing Instruction 378 for flammable liquid-powered engines and machinery](#), [Packing Instruction 950 for flammable liquid-powered vehicles, and engines](#) or [Packing Instruction 952 for battery-powered equipment and vehicles](#) or [Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels](#))

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

- Substances must be compatible with their packagings as required by 4;1.1.3.

<i>UN number and proper shipping name</i>	<i>Quantity — passenger</i>	<i>Quantity — cargo</i>
UN 3166 Engines, internal combustion, flammable gas powered or Vehicle, flammable gas powered or Vehicle, fuel cell, flammable gas powered, or Engine, fuel cell, flammable gas powered	Forbidden	No limit

ADDITIONAL PACKING REQUIREMENTS

Flammable gas vessels

- 1) for flammable gas-powered vehicles, ~~machines or equipment~~, pressurized vessels containing the flammable gas must be completely emptied of flammable gas. Lines from vessels to gas regulators, and gas regulators themselves, must also be drained of all trace of flammable gas. To ensure that these conditions are met, gas shut-off valves must be left open and connections of lines to gas regulators must be left disconnected upon delivery of the vehicle to the operator. Shut-off valves must be closed and lines reconnected at gas regulators before loading the vehicle aboard the aircraft;

or alternatively,

- 2) flammable gas-powered vehicles, ~~machines or equipment~~ that have pressure receptacles (fuel tanks) equipped with electrically operated valves that close automatically in case the power is disconnected, or with manual shut-off valves, may be transported under the following conditions:
 - i) the tank shut-off valves must be in the closed position and in the case of electrically operated valves, power to those valves must be disconnected;
 - ii) after closing the tank shut-off valves, the vehicle, ~~equipment or machinery~~ must be operated until it stops from lack of fuel before being loaded aboard the aircraft;
 - iii) in no part of the closed system must the remaining pressure of compressed gases exceed 5 per cent of the maximum allowable working pressure of the pressure receptacle (fuel tank) system, or more than 2 000 kPa (20 bar), whichever is the lower.

Batteries

All batteries must be installed and securely fastened in the battery holder of the vehicle, ~~machine or equipment~~ and must be protected in such a manner so as to prevent damage and short circuits. In addition:

- 1) if spillable batteries are installed, and it is possible for the vehicle, ~~machine or equipment~~ to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;

- 2) if lithium batteries are installed, they must meet the provisions of Part 2;9.3, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the vehicle, ~~machinery or equipment~~ and must be protected in such a manner so as to prevent damage and short circuits; and
- 3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

Other operational equipment

- 1) Dangerous goods required for the operation or safety of the vehicle, ~~machine or equipment~~, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the vehicle, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.
- 2) Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

Internal combustion or fuel cell engine shipped separately (not installed)

- 1) When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.
- 2) This requirement also applies to vehicles, machines or equipment containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

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DGP-WG/14 Report (see paragraph 3.2.7.2 of DGP-WG/14-WP/32) and DGP-WG/15-WP/31, Revision No. 2 (see paragraph 3.2.7.4 of this report)

Packing Instruction 954

Passenger and cargo aircraft for UN 1845 only

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Dry ice ~~used for other than dangerous goods~~ may be shipped in a unit load device ~~or other type of pallet~~ prepared by a single shipper provided that:

- a) the shipper has made prior arrangements with the operator;
- b) the unit load device does not contain dangerous goods other than UN 3373, Biological substance, Category B or ID 8000, Consumer commodity. Where the unit load device contains UN 3373 or ID 8000, the provisions of these Instructions that apply to those substances must be met in addition to the provisions set out in this packing instruction;**
- b) the unit load device, ~~or other type of pallet~~, must allow the venting of the carbon dioxide gas to prevent a dangerous build-up of pressure (the marking requirements of 5;2 and the labelling requirements of 5;3 do not apply to the unit load device); and
- c) the shipper must provide the operator with written documentation or, where agreed with the operator, information by EDP or EDI techniques, stating the total quantity of the dry ice contained in the unit load device ~~or other type of pallet~~.

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Packing Instruction 956

Passenger and cargo aircraft for UN 1841, UN 1931, UN 3432, UN 2969, UN 3077, UN 3152 and UN 3335 only

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UN Model Regulations, P906, ST/SG/AC.10/42/Add. and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

UN number and proper shipping name	COMBINATION PACKAGINGS				SINGLE PACKAGINGS	
	Inner packaging (see 6.3.2)	Inner packaging quantity (per receptacle)	Total quantity per package — passenger	Total quantity per package — cargo	Quantity — passenger	Quantity — cargo
UN 1841 Acetaldehyde ammonia	Glass	10.0 kg	200 kg	200 kg	200 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 1931 Zinc dithionite or Zinc hydrosulphite	Glass	10.0 kg	100 kg	200 kg	100 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 2969 Castor beans or Castor flake or Castor meal or Castor pomace	Glass	10.0 kg	No limit	No limit	No Limit	No Limit
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 3077 Environmentally hazardous substance, solid, n.o.s.	Glass	10.0 kg	400 kg	400 kg	400 kg	400 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 3152 Polyhalogenated biphenyls, solids or Polyhalogenated terphenyls, solids or <u>Halogenated monomethyl-diphenylmethanes, solids</u>	Glass	10.0 kg	100 kg	200 kg	100 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 3335 Aviation regulated solid, n.o.s.	Glass	10.0 kg	400 kg	400 kg	400 kg	400 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 3432 Polychlorinated biphenyls, solid	Glass	10.0 kg	100 kg	200 kg	100 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				

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Packing Instruction 959

Passenger and cargo aircraft for UN 3245 only

General requirements

Part 4, Chapters 1 and 2 requirements must be met, including:

1) Compatibility requirements

- Substances must be compatible with their packagings as required by 4;1.1.3.

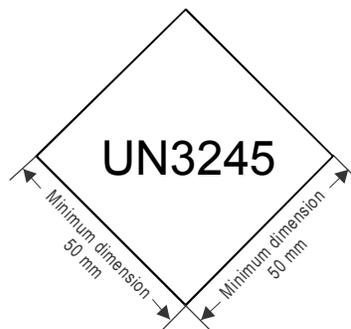
2) Closure requirements

- Closures must meet the requirements of 4;1.1.4.

The following packagings are authorized:

- 1) Packagings meeting the provisions of 4;1.1.1, 4;1.1.3.1, 4;1.1.5 and 4;2 and so designed that they meet the construction requirements of 6;3. Outer packagings constructed of suitable material of adequate strength and designed in relation to the packaging capacity and its intended use must be used. Where this packing instruction is used for the transport of inner packagings of combination packagings, the packaging must be designed and constructed to prevent inadvertent discharge during normal conditions of transport.
- 2) Packagings, which need not conform to the packaging test requirements of Part 6, but conforming to the following:
 - a) an inner packaging comprising:
 - 1) primary receptacle(s) and a secondary packaging, the primary receptacle(s) or the secondary packaging must be leakproof for liquids or siftproof for solids;
 - 2) for liquids, absorbent material placed between the primary receptacle(s) and the secondary packaging. The absorbent material must be in a quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;
 - 3) if multiple fragile primary receptacles are placed in a single secondary packaging they must be individually wrapped or separated to prevent contact between them;
 - b) an outer packaging must be strong enough for its capacity, mass and intended use, and with a smallest external dimension of at least 100 mm.

For transport, the mark illustrated below must be displayed on the external surface of the outer packaging on a background of a contrasting colour and must be clearly visible and legible. The mark must be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm; the width of the line must be at least 2 mm and the letters and numbers must be at least 6 mm high.



When packages are placed in an overpack, the package ~~markings~~ marks required by this packing instruction must either clearly be visible or the ~~markings~~ marks must be reproduced on the outside of the overpack and the overpack must be marked with the word "Overpack".

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GMOs or GMMOs assigned to UN 3245 which are packed and marked in accordance with this packing instruction are not subject to any other requirement in these Instructions except for the following:

- 1) the name and address of the shipper and of the consignee must be provided on each package;
- 2) classification must be in accordance with 2;9.2.1 c);
- 3) the incident reporting requirements in 7;4.4 must be met;
- 4) the inspection for damage or leakage requirements in 7;3.1.3 and 7;3.1.4;
- 5) passengers and crew members are prohibited from transporting UN 3245 either as, or in, carry-on baggage or checked baggage or on their person.

ADDITIONAL PACKING REQUIREMENTS

- When dry ice or liquid nitrogen is used, all applicable requirements of these Instructions must be met. When used, ice or dry ice must be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports must be provided to secure the secondary packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack must be leakproof. If dry ice is used, the requirements in Packing Instruction 954 must be met.
- The primary receptacle and the secondary packaging must 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.

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Packing Instruction 964

Passenger and cargo aircraft for UN 1941, UN 1990, UN 2315, UN 3151, UN 3082 and UN 3334 only

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UN Model Regulations, P906, ST/SG/AC.10/42/Add. and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

COMBINATION PACKAGINGS					SINGLE PACKAGINGS	
<i>UN number and proper shipping name</i>	<i>Inner packaging (see 6;3.2)</i>	<i>Inner packaging quantity (per receptacle)</i>	<i>Total quantity per package — passenger</i>	<i>Total quantity per package — cargo</i>	<i>Passenger</i>	<i>Cargo</i>
UN 1941 Dibromodifluoromethane	Glass	10.0 L	100 L	220 L	100 L	220 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 1990 Benzaldehyde	Glass	10.0 L	100 L	220 L	100 L	220 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 2315 Polychlorinated biphenyls, liquid	Glass	10.0 L	100 L	220 L	100 L	220 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 3082 Environmentally hazardous substance, liquid, n.o.s.	Glass	10.0 L	450 L	450 L	450 L	450 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 3151 Polyhalogenated biphenyls, liquids or Polyhalogenated terphenyls, liquids or Halogenated monomethyldiphenylmethanes, liquids	Glass	10.0 L	100 L	220 L	100 L	220 L
	Plastics	30.0 L				
	Metal	40.0 L				
UN 3334 Aviation regulated liquid, n.o.s.	Glass	10.0 L	450 L	450 L	450 L	450 L
	Plastics	30.0 L				
	Metal	40.0 L				

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Packing Instruction Y963

Passenger and cargo aircraft for ID 8000 only

Consumer commodities are materials that are packaged and distributed in a form intended or suitable for retail sale for the purposes of personal care or household use. These include items administered or sold to patients by doctors or medical administrations. Except as otherwise provided below, dangerous goods packed in accordance with this packing instruction do not need to comply with 4.1 or Part 6 of these Instructions; they must, however, comply with all other applicable requirements.

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- k) Consumer commodities shipped according to these provisions may be shipped in a unit load device ~~or other type of pallet~~ prepared by a single shipper provided they contain no other dangerous goods. The shipper must provide the operator with written documentation stating the number of packages of consumer commodities contained in each unit load device ~~or other type of pallet~~.

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Packing Instruction 965

Passenger and cargo aircraft for UN 3480

UN Model Regulations, SP 188, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.4.1.1 d) of this report)

1. Introduction

This entry applies to lithium ion or lithium polymer batteries. This packing instruction is structured as follows:

- Section IA applies to lithium ion cells with a Watt-hour rating in excess of 20 Wh and lithium ion batteries with a Watt-hour rating in excess of 100 Wh, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions;
- Section IB applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section II, Table 965-II; and
- Section II applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities not exceeding the allowance permitted in Section II, Table 965-II.

[A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN Manual of Tests and Criteria is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.](#)

2. Lithium batteries forbidden from transport

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

IA. SECTION IA

Each cell or battery must meet all the provisions of 2;9.3.

1A.1 General requirements

Part 4;1 requirements must be met.

Table 965-IA

<i>UN number and proper shipping name</i>	<i>Net quantity per package</i>	
	<i>Passenger</i>	<i>Cargo</i>
UN 3480 Lithium ion batteries	5 kg	35 kg

IA.2 Additional requirements

- Lithium ion cells and batteries must be protected against short circuits.
- Lithium ion cells and batteries must be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
- Lithium ion batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates) not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.
- Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

Packing Instruction 965

IA.3 Outer packagings

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

IB. SECTION IB

Quantities of lithium ion cells or batteries that exceed the allowance permitted in Section II, Table 965-II are subject to all of the applicable provisions of these Instructions (including the requirements in paragraph 2 of this packing instruction and of this section) except for the the provisions of Part 6.

Lithium ion cells or batteries shipped in accordance with the provisions of Section IB must be described on a dangerous goods transport document as set in Part 5;4. The packing instruction number "965" required by 5;4.1.5.8.1 a) must be supplemented with "IB". All other applicable provisions of Part 5;4 apply.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009;

IB.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Table 965-IB

<i>Contents</i>	<i>Net quantity per package</i>	
	<i>Passenger</i>	<i>Cargo</i>
Lithium ion cells and batteries	10 kg	10 kg

Packing Instruction 965

IB.2 Additional requirements

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.

UN Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 (see paragraphs and 3.2.5.1.1 b) and c) of this report)

- Each package must be ~~labelled~~ **marked** with ~~a~~ **the appropriate** lithium battery ~~handling label~~ **mark** (Figure ~~5-32~~ **5-3**) in addition to the Class 9 hazard label.

Note.— Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018.

UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 (see paragraph 3.2.4.1.1 of this report)

- ~~— Each consignment must be accompanied with a document with an indication that:~~
 - ~~— the package contains lithium ion cells or batteries;~~
 - ~~— the package must be handled with care and that a flammability hazard exists if the package is damaged;~~
 - ~~— special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and~~
 - ~~— a telephone number for additional information.~~

~~Note.— This information may be provided on the dangerous goods transport document.~~

IB.3 Outer packagings

Boxes

Drums

Jerricans

Strong outer packagings

Packing Instruction 965

DGP-WG/15-WP/5 (see paragraph 3.5.1.4.1 of this report) and DGP-WG/15-WP/7 (see paragraph 3.5.1.1.1 of this report)

II. SECTION II

~~With the exception of Part 1;2.3 (General — Transport of dangerous goods by post), 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents), 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium ion cells and batteries offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium ion cells and batteries, when complying with Section II of this Packing Instruction, are only subject to the following additional provisions of these Instructions:~~

- ~~— Part 1;2.3 (General — Transport of dangerous goods by post);~~
- ~~— Part 5;1.1 g) and j) (Shipper's responsibilities — General requirements);~~
- ~~— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);~~
- ~~— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and~~
- ~~— Paragraph 2 of this packing instruction.~~

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009.

II.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Table 965-II

<i>Contents</i>	<i>Lithium ion cells and/or batteries with a Watt-hour rating not more than 2.7 Wh</i>	<i>Lithium ion cells with a Watt-hour rating more than 2.7 Wh, but not more than 20 Wh</i>	<i>Lithium ion batteries with a Watt-hour rating more than 2.7 Wh, but not more than 100 Wh</i>
1	2	3	4
Maximum number of cells / batteries per package	No limit	8 cells	2 batteries
Maximum net quantity (mass) per package	2.5 kg	n/a	n/a

The limits specified in columns 2, 3 and 4 of Table 965-II must not be combined in the same package.

Packing Instruction 965

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report) and UN Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 and DGP-WG/15-WPs/14 and 15 (see paragraphs 3.2.4.1 and 3.2.5.1.1 b) and c) of this report)

II.2 Additional requirements

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong rigid outer packaging.
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be ~~labelled~~ marked with ~~a~~ the appropriate lithium battery handling label mark (Figure-5-32 5-3).
 - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.

Note.— Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018.

UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 (see paragraph 3.2.4.1 of this report)

- ~~Each consignment must be accompanied with a document with an indication that:~~
 - ~~the package contains lithium ion cells or batteries;~~
 - ~~the package must be handled with care and that a flammability hazard exists if the package is damaged;~~
 - ~~special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and~~
 - ~~a telephone number for additional information.~~
- The words "lithium ion batteries, in compliance with Section II of PI965" must be placed on the air waybill, when an air waybill is used.

DGP-WG/15-WP/7 (see paragraph 3.5.1.1.1 of this report)

- Packages and overpacks of lithium ion batteries prepared in accordance with the provisions of Section II must be offered to the operator separately from cargo which is not subject to these Instructions and must not be loaded into a unit load device before being offered to the operator.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report)

II.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

~~Strong outer packagings~~

Packing Instruction 965

DGP-WG/15-WP/7 (see paragraph 3.5.1.1.1 of this report) (pending outcome of working group on performance standards) and DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 b) of this report)

II.4 Overpacks

[Not more than [four (4)] packages may be placed into an overpack and the overpack must not contain other packages containing dangerous goods]. When packages are placed in an overpack, the lithium battery-handling label mark required by this packing instruction must either be clearly visible or the label mark must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

Packing Instruction 966

Passenger and cargo aircraft for UN 3481 (packed with equipment) only

UN Model Regulations, SP 188, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.4.1.1 d) of this report)

1. Introduction

This entry applies to lithium ion or lithium polymer batteries packed with equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

[A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN Manual of Tests and Criteria is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.](#)

2. Lithium batteries forbidden from transport

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. SECTION I

Each cell or battery must meet all the provisions of 2;9.3.

I.1 General requirements

Part 4;1 requirements must be met.

<i>UN number and proper shipping name</i>	<i>Package quantity (Section I)</i>	
	<i>Passenger</i>	<i>Cargo</i>
UN 3481 Lithium ion batteries packed with equipment	5 kg of lithium ion cells or batteries	35 kg of lithium ion cells or batteries

I.2 Additional requirements

- Lithium ion cells and batteries must be protected against short circuits.
- Lithium ion cells or batteries must:
 - be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
 - be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a packaging that meets the Packing Group II performance requirements.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium ion batteries with which it is packed for its operation.
- Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

Packing Instruction 966

I.3 Outer packagings

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

DGP-WG/15-WP/5 (see paragraph 3.5.1.4.1 of this report)

II. SECTION II

~~With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;4.4 (Reporting of dangerous goods accidents and incidents), 8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium ion cells and batteries packed with equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium ion cells and batteries packed with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:~~

- ~~— Part 1;2.3 (General — Transport of dangerous goods by post);~~
- ~~— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);~~
- ~~— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and~~
- ~~— Paragraph 2 of this packing instruction.~~

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009.

II.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

<i>Contents</i>	<i>Package quantity (Section II)</i>	
	<i>Passenger</i>	<i>Cargo</i>
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

Packing Instruction 966

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report) and UN Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 (see paragraphs 3.2.4.1 and 3.2.5.1.1 b and c) of this report):

II.2 Additional requirements

- Lithium ion cells and batteries must:
 - be placed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging; or
 - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong rigid outer packaging.
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be ~~labelled~~ marked with ~~a~~ the appropriate lithium battery ~~handling label~~ mark (Figure 5-32 5-3).
 - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.

Note.— Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018.

UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 (see paragraph 3.2.4.1 of this report)

- ~~Each consignment must be accompanied with a document with an indication that:~~
 - ~~the package contains lithium ion cells or batteries;~~
 - ~~the package must be handled with care and that a flammability hazard exists if the package is damaged;~~
 - ~~special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and~~
 - ~~a telephone number for additional information.~~
- The words "lithium ion batteries, in compliance with Section II of PI966" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report):

II.3 Outer packagings

<i>Boxes</i>	<i>Drums</i>	<i>Jerricans</i>
<u>Aluminium</u>	<u>Aluminium</u>	<u>Aluminium</u>
<u>Fibreboard</u>	<u>Fibre</u>	<u>Plastics</u>
<u>Natural wood</u>	<u>Other metal</u>	<u>Steel</u>
<u>Other metal</u>	<u>Plastics</u>	
<u>Plastics</u>	<u>Plywood</u>	
<u>Plywood</u>	<u>Steel</u>	
<u>Reconstituted wood</u>		
<u>Steel</u>		

Strong outer packagings

DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 b) of this report)

II.4 Overpacks

When packages are placed in an overpack, the lithium battery ~~handling label~~ mark required by this packing instruction must either be clearly visible or the ~~label~~ mark must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

Packing Instruction 967

Passenger and cargo aircraft for UN 3481 (contained in equipment) only

UN Model Regulations, SP 188, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.4.1.1 d) of this report)

1. Introduction

This entry applies to lithium ion or lithium polymer batteries contained in equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN Manual of Tests and Criteria is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

2. Lithium batteries forbidden from transport

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. SECTION I

Each cell or battery must meet all the provisions of 2;9.3.

I.1 General requirements

Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

UN number and proper shipping name	Package quantity (Section I)	
	Passenger	Cargo
UN 3481 Lithium ion batteries contained in equipment	5 kg of lithium ion cells or batteries	35 kg of lithium ion cells or batteries

I.2 Additional requirements

- The equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport.
- The equipment must 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.
- Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case

I.3 Outer packagings

Boxes

Drums

Jerricans

Strong outer packagings

Packing Instruction 967

DGP-WG/15-WP/5 (see paragraph 3.5.1.4.1 of this report)

II. SECTION II

~~With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;4.4 (Reporting of dangerous goods accidents and incidents), 8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium ion cells and batteries contained in equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium ion cells and batteries contained in equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:~~

- ~~— Part 1;2.3 (General — Transport of dangerous goods by post);~~
- ~~— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);~~
- ~~— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and~~
- ~~— Paragraph 2 of this packing instruction.~~

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009.

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 when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport.

II.1 General requirements

Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

<i>Contents</i>	<i>Package quantity (Section II)</i>	
	<i>Passenger</i>	<i>Cargo</i>
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

Packing Instruction 967

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report) and UN Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 (see paragraphs 3.2.4.1 and 3.2.5.1.1 b and c) of this report):

II.2 Additional requirements

- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- Cells and batteries must be protected so as to prevent short circuits.
- The equipment must be packed in strong rigid 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.
- ~~Each package containing more than four cells or more than two batteries installed in equipment must be labelled with a lithium battery handling label (Figure 5-32) (except button cell batteries installed in equipment (including circuit boards)).~~ Each package must be marked with the appropriate lithium battery mark (Figure 5-3). The package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
 - this requirement does not apply to:
 - packages containing only button cell batteries installed in equipment (including circuit boards); and
 - packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.

Note.— Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018.

UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 (see paragraph 3.2.4.1 of this report)

- ~~Each consignment with packages bearing the lithium battery handling label must be accompanied with a document with an indication that:~~
 - ~~the package contains lithium ion cells or batteries;~~
 - ~~the package must be handled with care and that a flammability hazard exists if the package is damaged;~~
 - ~~special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and~~
 - ~~a telephone number for additional information.~~
- Where a consignment includes packages bearing the lithium battery handling label mark, the words "lithium ion batteries, in compliance with Section II of PI967" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report):

II.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

Strong outer packagings

DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 b) of this report)

II.4 Overpacks

When packages are placed in an overpack, the lithium battery handling label mark required by this packing instruction must either be clearly visible or the label mark must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

Packing Instruction 968

Cargo aircraft only for UN 3090

UN Model Regulations, SP 188, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.4.1.1 d) of this report)

1. Introduction

This entry applies to lithium metal or lithium alloy batteries. This packing instruction is structured as follows:

- Section IA applies to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with a lithium metal content in excess of 2 g, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions;
- Section IB applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities that exceed the allowance permitted in Section II, Table 968-II; and
- Section II applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities not exceeding the allowance permitted in Section II, Table 968-II.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

2. Lithium batteries forbidden from transport

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

IA. SECTION IA

Each cell or battery must meet all the provisions of 2;9.3.

IA.1 General requirements

Part 4;1 requirements must be met.

Table 968-IA

<i>UN number and proper shipping name</i>	<i>Net quantity per package</i>	
	<i>Passenger</i>	<i>Cargo</i>
UN 3090 Lithium metal batteries	Forbidden	35 kg

IA.2 Additional requirements

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells and batteries must be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
- Lithium metal batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates) not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.

Packing Instruction 968

IA.3 Outer packagings

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

IB. SECTION IB

Quantities of lithium metal cells or batteries that exceed the allowance permitted in Section II, Table 968-II, are subject to all of the applicable provisions of these Instructions (including the requirements in paragraph 2 of this packing instruction and of this section) except for the provisions of Part 6.

Lithium metal cells or batteries shipped in accordance with the provisions of Section IB must be described on a dangerous goods transport document as set in Part 5;4. The packing instruction number "968" required by 5;4.1.5.8.1 a) must be supplemented with "IB". All other applicable provisions of Part 5;4 apply.

Lithium metal or lithium alloy cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium metal cells, the lithium content is not more than 1 g;
- 2) for lithium metal or lithium alloy batteries, the aggregate lithium content is not more than 2 g.

IB.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Table 968-IB

Contents	Net quantity per package	
	Passenger	Cargo
Lithium metal cells and batteries	Forbidden	2.5 kg

IB.2 Additional requirements

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.

UN Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 (see paragraphs 3.2.5.1.1 b) and c) of this report)

- Each package must be ~~labelled~~ **marked** with ~~a the appropriate~~ **the appropriate** lithium battery ~~handling label mark~~ **handling label mark** (Figure 5-32 ~~5-3~~) in addition to the Class 9 hazard label and the cargo aircraft only label (Figure 5-26).

Note.— Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018.

UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 (see paragraph 3.2.4.1 of this report)

Packing Instruction 968

- ~~— Each consignment must be accompanied with a document with an indication that:~~
- ~~— the package contains lithium metal cells or batteries;~~
- ~~— the package must be handled with care and that a flammability hazard exists if the package is damaged;~~
- ~~— special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and~~
- ~~— a telephone number for additional information.~~

~~Note. — This information may be provided on the dangerous goods transport document.~~

IB.3 Outer packagings

Boxes

Drums

Jerricans

Strong outer packagings

DGP-WG/15-WP/5 (see paragraph 3.5.1.4.1 of this report)

II. SECTION II

~~With the exception of Part 1;2.3 (General — Transport of dangerous goods by post), 5;1.1 g), 5;1.1 j) (Shipper's responsibilities — General requirements), 7;2.1 (Operator's responsibilities — Loading restrictions on the flight deck and for passenger aircraft), 7;2.4.1 (Operator's responsibilities — Loading of cargo aircraft), 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents), 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium metal or lithium alloy cells and batteries offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium metal or lithium alloy cells and batteries, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:~~

- ~~— Part 1;2.3 (General — Transport of dangerous goods by post);~~
- ~~— Part 5;1.1 g) and j) (Shipper's responsibilities — General requirements);~~
- ~~— Part 7;2.1 (Operator's responsibilities — Loading restrictions on the flight deck and for passenger aircraft);~~
- ~~— Part 7;2.4.1 (Operator's responsibilities — Loading of cargo aircraft);~~
- ~~— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);~~
- ~~— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and~~
- ~~— Paragraph 2 of this packing instruction.~~

Lithium metal or lithium alloy cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for a lithium metal cell, the lithium content is not more than 1 g;
- 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

II.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Table 968-II

<i>Contents</i>	<i>Lithium metal cells and/or batteries with a lithium content not more than 0.3 g</i>	<i>Lithium metal cells with a lithium content more than 0.3 g but not more than 1 g</i>	<i>Lithium metal batteries with a lithium content more than 0.3 g but not more than 2 g</i>
1	2	3	4
Maximum number of cells / batteries per package	No limit	8 cells	2 batteries
Maximum net quantity (mass) per package	2.5 kg	n/a	n/a

The limits specified in columns 2, 3 and 4 of Table 968-II must not be combined in the same package.

Packing Instruction 968

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report) and UN Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 and DGP-WG/15-WPs/14 and 15 (see paragraphs 3.2.4.1 and 3.2.5.1.1 b) and c) of this report)

II.2 Additional requirements

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging.
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be ~~labelled~~ marked with ~~a~~ the appropriate lithium battery ~~handling label~~ mark (Figure 5-32 ~~5-3~~) and the cargo aircraft only label (Figure 5-26).
 - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
- the cargo aircraft only label must be located on the same surface of the package near the lithium battery ~~handling label~~ mark, if the package dimensions are adequate.

Note.— Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018.

UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 (see paragraph 3.2.4.1 of this report) and DGP-WG/15-WP/7 (see paragraph 3.5.1.1.1 of this report)

- ~~Each consignment must be accompanied with a document with an indication that:~~
 - ~~the package contains lithium metal cells or batteries;~~
 - ~~the package must be handled with care and that a flammability hazard exists if the package is damaged;~~
 - ~~special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and~~
 - ~~a telephone number for additional information.~~
- The words "lithium metal batteries, in compliance with Section II of PI968 — cargo aircraft only" or "lithium metal batteries, in compliance with Section II of PI968 — CAO" must be placed on the air waybill, when an air waybill is used.
- ~~Consignments~~ Packages and overpacks of lithium metal batteries prepared in accordance with the provisions of Section II ~~must not be consolidated with other shipments of dangerous goods or non-dangerous goods~~ be offered to the operator separately from cargo which is not subject to these Instructions and must not be loaded into a unit load device before being offered to the operator.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report):

II.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

Strong outer packagings

Packing Instruction 968

DGP-WG/15-WP/7 (see paragraph 3.5.1.1.1 of this report) (pending outcome of working group on performance standards) and DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 b) of this report)

II.4 Overpacks

Not more than [four (4)] packages may be placed into an overpack and the overpack must not contain other packages containing dangerous goods. When packages are placed in an overpack, the lithium battery-handling label, mark and the cargo aircraft only label (Figure 5-26) required by this packing instruction must either be clearly visible or the labels, mark and label must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

Packing Instruction 969

Passenger and cargo aircraft for UN 3091 (packed with equipment) only

UN Model Regulations, SP 188, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.4.1.1 d) of this report)

1. Introduction

This entry applies to lithium metal or lithium alloy batteries packed with equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN Manual of Tests and Criteria is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

2. Lithium batteries forbidden from transport

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. SECTION I

Each cell or battery must meet all the provisions of 2;9.3.

I.1 General requirements

Part 4;1 requirements must be met.

UN number and proper shipping name	Package quantity (Section I)	
	Passenger	Cargo
UN 3091 Lithium metal batteries packed with equipment	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

Packing Instruction 969

I.2 Additional requirements

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells or batteries must:
 - be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
 - be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a packaging that meets the Packing Group II performance requirements.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium batteries with which it is packed for its operation.
- For lithium metal cells and batteries prepared for transport on passenger aircraft as Class 9:
 - cells and batteries offered for transport on passenger aircraft must be packed in intermediate or outer rigid metal packaging surrounded by cushioning material that is non-combustible and non-conductive and placed inside an outer packaging.

I.3 Outer packagings

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

DGP-WG/15-WP/5 (see paragraph 3.5.1.4.1 of this report)

II. SECTION II

~~With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;4.4 (Reporting of dangerous goods accidents and incidents);8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium metal cells and batteries packed with equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium metal or lithium alloy cells and batteries packed with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:~~

- ~~— Part 1;2.3 (General — Transport of dangerous goods by post);~~
- ~~— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);~~
- ~~— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and~~
- ~~— Paragraph 2 of this packing instruction.~~

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for a lithium metal cell, the lithium content is not more than 1 g;
- 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

Packing Instruction 969

II.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Contents	Package quantity (Section II)	
	Passenger	Cargo
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report) and UN Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 (see paragraphs 3.2.4.1 and 3.2.5.1.1 e) of this report):

II.2 Additional requirements

- Lithium metal cells or batteries must:
 - be placed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging; or
 - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong rigid outer packaging.
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be ~~labelled~~ marked with ~~a~~ the appropriate lithium battery ~~handling label~~ mark (Figure 5-32 ~~5-3~~).
 - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.

Note.— Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018.

UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 (see paragraph 3.2.4.1 of this report)

- ~~Each consignment must be accompanied with a document with an indication that:~~
 - ~~the package contains lithium metal cells or batteries;~~
 - ~~the package must be handled with care and that a flammability hazard exists if the package is damaged;~~
 - ~~special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and~~
 - ~~a telephone number for additional information.~~
- The words "lithium metal batteries, in compliance with Section II of PI969" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

Packing Instruction 969

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report):

II.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

Strong outer packagings

DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 b) of this report)

II.4 Overpacks

When packages are placed in an overpack, the lithium battery ~~handling label~~ **mark** required by this packing instruction must either be clearly visible or the ~~label~~ **mark** must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

Packing Instruction 970

Passenger and cargo aircraft for UN 3091 (contained in equipment) only

UN Model Regulations, SP 188, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.4.1.1 d) of this report)

1. Introduction

This entry applies to lithium metal or lithium alloy batteries contained in equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN Manual of Tests and Criteria is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

2. Lithium batteries forbidden from transport

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. SECTION I

Each cell or battery must meet all the provisions of 2;9.3.

I.1 General requirements

Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

UN number and proper shipping name	Package quantity (Section I)	
	Passenger	Cargo
UN 3091 Lithium metal batteries contained in equipment	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

I.2 Additional requirements

- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The equipment must 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.
- The quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

I.3 Outer packagings

Boxes

Drums

Jerricans

Strong outer packagings

Packing Instruction 970

DGP-WG/15-WP/5 (see paragraph 3.5.1.4.1 of this report)

II. SECTION II

~~With the exception of Part 1:2.3 (Transport of dangerous goods by post), 7:4.4 (Reporting of dangerous goods accidents and incidents), 8:1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium metal cells and batteries contained in equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium metal or lithium alloy cells and batteries contained with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:~~

- ~~— Part 1:2.3 (General — Transport of dangerous goods by post);~~
- ~~— Part 7:4.4 (Operator’s responsibilities — Reporting of dangerous goods accidents and incidents);~~
- ~~— Part 8:1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and~~
- ~~— Paragraph 2 of this packing instruction.~~

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2:9.3.1 a) and e) and the following:

- 1) for a lithium metal cell, the lithium content is not more than 1 g;
- 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

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 when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport.

II.1 General requirements

Equipment containing batteries must be packed in strong outer packagings that conform to Part 4:1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

<i>Contents</i>	<i>Package quantity (Section II)</i>	
	<i>Passenger</i>	<i>Cargo</i>
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

Packing Instruction 970

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report) and UN Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 (see paragraphs 3.2.4.1 and 3.2.5.1.1 b) and c) of this report):

II.2 Additional requirements

- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- Cells and batteries must be protected so as to prevent short circuits.
- The equipment must be packed in strong rigid 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.
- ~~Each package containing more than four cells or more than two batteries installed in equipment must be labelled with a lithium battery handling label (Figure 5-32) (except button cell batteries installed in equipment (including circuit boards)).~~ Each package must be marked with the appropriate lithium battery mark (Figure 5-3). The package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
 - this requirement does not apply to:
 - packages containing only button cell batteries installed in equipment (including circuit boards); and
 - packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.

Note.— Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018.

UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 (see paragraph 3.2.4.1 of this report)

- ~~Each consignment with packages bearing the lithium battery handling label must be accompanied with a document with an indication that:~~
 - ~~the package contains lithium metal cells or batteries;~~
 - ~~the package must be handled with care and that a flammability hazard exists if the package is damaged;~~
 - ~~special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and~~
 - ~~a telephone number for additional information.~~
- Where a consignment includes packages bearing the lithium battery ~~handling label~~ mark, the words "lithium ion batteries, in compliance with Section II of PI970" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

DGP-WG/15-WP/6 (see paragraph 3.5.1.1.1 of this report):

II.3 Outer packagings

<i>Boxes</i>	<i>Drums</i>	<i>Jerricans</i>
<u>Aluminium</u>	<u>Aluminium</u>	<u>Aluminium</u>
<u>Fibreboard</u>	<u>Fibre</u>	<u>Plastics</u>
<u>Natural wood</u>	<u>Other metal</u>	<u>Steel</u>
<u>Other metal</u>	<u>Plastics</u>	
<u>Plastics</u>	<u>Plywood</u>	
<u>Plywood</u>	<u>Steel</u>	
<u>Reconstituted wood</u>		
<u>Steel</u>		

Strong outer packagings

DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 b) of this report)

II.4 Overpacks

When packages are placed in an overpack, the lithium battery ~~handling label~~ mark required by this packing instruction must either be clearly visible or the ~~label~~ mark must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

...

UN Model Regulations, packing instruction P005, ST/SG/AC.10/42/Add.1, DGP-WG/15-WP/13 (see paragraph 3.2.3.2.1 d) of this report) and DGP-WG/15-WP/14 (see paragraph 3.2.4.1 of this report)

Packing Instruction 972

Cargo aircraft only for UN 3530 only

(See Packing Instruction 220 for flammable gas-powered engines and machinery, Packing Instruction 378 for flammable liquid-powered engines and machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles, Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

General requirements

Part 4, Chapter 1 requirements must be met, including:

Compatibility requirements

— Substances must be compatible with their packagings as required by 4:1.1.3.

<u>UN number and proper shipping name</u>	<u>Quantity — passenger</u>	<u>Quantity — cargo</u>
<u>UN 3530 Engine, internal combustion or Machinery, internal combustion</u>	<u>Forbidden</u>	<u>No limit</u>

If the engine or machinery is constructed and designed so that the means of containment containing the dangerous goods affords adequate protection, an outer packaging is not required.

Dangerous goods in engines or machinery must otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4.1.1.1, or they must be fixed in such a way that they will not become loose during normal conditions of transport, e.g. in cradles or crates or other handling devices.

In addition, the manner in which means of containment are contained within the engine or machinery, must be such that under normal conditions of transport, damage to the means of containment containing the dangerous goods is prevented; and in the event of damage to the means of containment containing liquid dangerous goods, no leakage of the dangerous goods from the engine or machinery is possible (a leakproof liner may be used to satisfy this requirement).

Means of containment containing dangerous goods must be so installed, secured or cushioned as to prevent their breakage or leakage and so as to control their movement within the engine or machinery during normal conditions of transport. Cushioning material must not react dangerously with the content of the means of containment. Any leakage of the contents must not substantially impair the protective properties of the cushioning material.

Other dangerous goods (e.g. batteries, fire extinguishers, compressed gas accumulators or safety devices) required for the functioning or safe operation of the engine or machinery must be securely mounted in the engine or machine.

Part 5

SHIPPER'S RESPONSIBILITIES

...

Chapter 1

GENERAL

...

1.1 GENERAL REQUIREMENTS

Before a person offers any package or overpack of dangerous goods for transport by air, that person must ensure that:

...

DGP-WG/15-WP/31, Revision No. 2 (see paragraph 3.2.7.4 of this report)

g) ~~the dangerous goods are not included in any freight container/unit load device except for radioactive material as specified in 7.2.9 (subject to the approval of the operator, this does not apply to a unit load device containing consumer commodities prepared according to Packing Instruction Y063 or dry ice used as a refrigerant for other than dangerous goods when prepared according to Packing Instruction 954 or magnetized material when prepared according to Packing Instruction 953)~~ as specified in 7.1.4;

...

1.2 GENERAL PROVISIONS FOR CLASS 7

...

1.2.3 Determination of transport index (TI) and criticality safety index (CSI)

1.2.3.1 Determination of transport index

1.2.3.1.1 The transport index (TI) for a package, overpack or freight container, must be the number derived in accordance with the following procedure:

- a) Determine the maximum radiation level in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, or freight container. The value determined must be multiplied by 100 and the resulting number is the transport index. For uranium and thorium ores and their concentrates, the maximum radiation level at any point 1 m from the external surface of the load may be taken as:
 - 0.4 mSv/h for ores and physical concentrates of uranium and thorium;
 - 0.3 mSv/h for chemical concentrates of thorium;
 - 0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride;
- b) For freight containers, the value determined in step a) above must be multiplied by the appropriate factor from Table 5-1;
- c) The value obtained in steps a) and b) above must be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero.

DGP-WG/15-WP/2 and DGP-WG/15-WP/32 (see paragraph 3.2.5.2 of this report)

Note.— DGP-WG/15 proposed adding the following note to the 2017-2018 Edition of the Technical Instructions provided there were no objections from TRAANSC and the UN Sub-Committee (the Secretary would seek comments from both groups at their summer sessions).

[Note.— If the measured dose rate comprises more than one type of radiation, then the transport index should be based on the sum of all the dose rates from each type of radiation (see paragraph 523.1 of the IAEA Specific Safety Guide No. SSG-26 (2012 Edition)).]

...

The following amendment is made in accordance with UN Model Regulations ST/SG/AC.10/42/Add.1, which introduced consistent use of the terms “mark” and “marking”.

- h) before a package or overpack is reused, all inappropriate dangerous goods labels and ~~markings~~ **marks** are removed or completely obliterated;

UN Model Regulations, paragraph 5.1.2.2, ST/SG/AC.10/42/Add. and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

- i) each package contained within an overpack is properly packed, marked, labelled and is free of any indication that its integrity has been compromised and in all respects is properly prepared as required in these Instructions. The “overpack” ~~marking~~ **mark** described in 2.4.10 is an indication of compliance with this requirement. The intended function of each package must not be impaired by the overpack; and

...

1.5 SALVAGE PACKAGINGS

Before a person offers any salvage packaging for transport by air, that person must ensure that:

- it is marked with the proper shipping name and UN number of, and bear all the labels appropriate for, the dangerous goods contained therein;

The following amendment is made in accordance with UN Model Regulations ST/SG/AC.10/42/Add.1, which introduced consistent use of the terms “mark” and “marking”.

- it is marked with the word “Salvage” and the lettering of the “Salvage” ~~marking~~ **mark** must be at least 12 mm high;
- the words “Salvage package” are added after the description of the goods in the dangerous goods transport document required by 4.1; and
- where the package contains dangerous goods restricted to transport on cargo aircraft only, it bears a “Cargo aircraft only” label and the dangerous goods transport document contains the necessary statement according to 4.1.5.7.1 b).

In addition, that person must ensure that all other applicable requirements are met.

— *Note.— The size requirement for the “Salvage” marking applies as from 1 January 2016.*

The following amendment is made in accordance with UN Model Regulations ST/SG/AC.10/42/Add.1, which introduced consistent use of the terms “mark” and “marking”.

1.6 EMPTY PACKAGINGS

1.6.1 Other than for Class 7, a packaging which previously contained dangerous goods must be identified, marked, labelled and placarded as required for those dangerous goods unless steps such as cleaning, purging of vapours or refilling with a non-dangerous substance are taken to nullify any hazard.

1.6.2 Before an empty packaging which had previously contained an infectious substance is returned to the shipper, or sent elsewhere, it must be disinfected or sterilized to nullify any hazard, and any label or ~~marking~~ **mark** indicating that it had contained an infectious substance must be removed or obliterated.

1.6.3 Freight containers as well as other packagings and overpacks used for the transport of radioactive material must not be used for the storage or transport of other goods unless decontaminated below the level of 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm² for all other alpha emitters.

...

The following amendments are made in accordance with UN Model Regulations ST/SG/AC.10/42/Add.1, which introduced consistent use of the terms “mark” and “marking”. “Package” is removed from the chapter title for the sake of consistency with Chapter 3 (Labelling) and 5.2 of the UN Model Regulations.

Chapter 2

~~PACKAGE MARKINGS~~ **MARKING**

...

2.1 THE REQUIREMENT TO MARK

Unless otherwise provided in these Instructions, packages of dangerous goods and overpacks containing dangerous goods offered for transport by air must be marked as required by this Chapter.

2.2 ~~APPLICATION OF MARKINGS~~ **MARKS**

2.2.1 All ~~markings~~ **marks** must be so placed on the packagings that they are not covered or obscured by any part of or attachment to the packaging or any other label or ~~marking~~ **mark**.

UN Model Regulations, paragraph 5.2.1.2, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

2.2.2 All package ~~markings~~ **marks** required by 2.1:

- a) must be durable and printed or otherwise marked on, or affixed to, the external surface of the package;
- b) must be readily visible and legible;
- c) must be able to withstand open weather exposure without a substantial reduction in effectiveness;
- d) must be displayed on a background of contrasting colour; and
- e) must not be located with other package ~~markings~~ **marks** that could substantially reduce their effectiveness.

2.3 PROHIBITED-MARKING MARKS

Arrows for purposes other than indicating proper package orientation must not be displayed on a package containing liquid dangerous goods.

2.4 MARKING SPECIFICATIONS AND REQUIREMENTS

2.4.1 Marking with proper shipping name and UN or ID number

UN Model Regulations, paragraph 5.2.1.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

2.4.1.1 Unless otherwise provided in these Instructions, the proper shipping name of the dangerous goods (supplemented with the technical name(s) if appropriate, see Part 3, Chapter 1) and, when assigned, the corresponding UN number preceded by the letters "UN" or "ID", as appropriate, must be displayed on each package. The UN number and the letters "UN" or "ID" must be at least 12 mm high, except for packagings of 30 litres capacity or less or of 30 kg maximum net mass and for cylinders of 60 litres water capacity, when they must be at least 6 mm in height and except for packagings of 5 litres or 5 kg or less when they must be of an appropriate size. In the case of unpackaged articles, the ~~marking mark~~ marking mark must be displayed on the article, on its cradle or on its handling, storage or launching device. A typical package ~~marking mark~~ marking mark would be:

"Corrosive liquid, acidic, organic, n.o.s. (caprylyl chloride) UN 3265".

2.4.1.2 For solid substances, unless the word "molten" is already included in the proper shipping name, it must be added to the proper shipping name on the package when a substance is offered for air transport in the molten state (see Part 3, Chapter 1).

Note.— Additional descriptive text in the entries in column 1 of the Dangerous Goods List (Table 3-1) are not part of the proper shipping name but may be used in addition to the proper shipping name.

2.4.2 Shipper and consignee identification

The name and address of the person who offers the dangerous goods for transport by air and of the consignee must be provided on each package and should be located on the same surface of the package near the proper shipping name ~~marking mark~~ marking mark, if the package dimensions are adequate.

2.4.3 Special marking requirements for explosives

The proper shipping name required by 2.4.1 may be supplemented by additional descriptive text to indicate commercial or military names.

2.4.4 Packaging specification ~~markings marks~~ marks

2.4.4.1 Each outer or single packaging used for dangerous goods, for which specification packaging is required in Part 4, must bear the ~~markings marks~~ marks appropriate to the contents as specified in Part 6, Chapter 2.

2.4.4.2 ~~Markings~~ Marks must be stamped, printed or otherwise marked on the package to provide adequate permanency.

2.4.5 Special marking requirements for radioactive material

2.4.5.1 The marking of excepted packages of radioactive material of Class 7 must be as required by 1.2.4.1.

2.4.5.2 Each package of gross mass exceeding 50 kg must have its permissible gross mass legibly and durably marked on the outside of the packaging.

2.4.5.3 Each package which conforms to:

- a) a Type IP-1 package, a Type IP-2 package or a Type IP-3 package design must be legibly and durably marked on the outside of the packaging with "TYPE IP-1", "TYPE IP-2" or "TYPE IP-3" as appropriate;
- b) a Type A package design must be legibly and durably marked on the outside of the packaging with "TYPE A";
- c) a Type IP-2 package, a Type IP-3 package or a Type A package design must be legibly and durably marked on the outside of the packaging with the international vehicle registration code (VRI Code) of the country of origin of design and either the name of the manufacturer, or other identification of the packaging specified by the competent authority of the country of origin of design.

2.4.5.4 Each package which conforms to a design approved under one or more of 1.2.2.1, 6;7.21.1 to 6;7.21.4, 6;7.24.2.1 and 6.4.23.4 to 6.4.23.7 of the UN Model Regulations must be legibly and durably marked on the outside of the package with the following information:

- a) the identification mark allocated to that design by the competent authority;
- b) a serial number to uniquely identify each packaging which conforms to that design; and
- c) "Type B(U)", "Type B(M)" or "Type C" in the case of a Type B(U), Type B(M) or Type C package design.

Note.— Empty Type B(U) or Type B(M) packages, as specified in the Note to 2;7.2.4.1.1.7, shipped as industrial packages Type IP-1 must bear the appropriate specification-marking marks for a Type IP-1 in which case the appropriate specification-markings marks specified in 2.4.5.4 must be obliterated.

2.4.5.5 Each package which conforms to a Type B(U), Type B(M) or Type C package design must have the outside of the outermost receptacle which is resistant to the effects of fire and water plainly marked by embossing, stamping or other means resistant to the effects of fire and water with the trefoil symbol, as shown in Figure 5-1 below.

2.4.5.6 In all cases of international transport of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the ~~marking mark~~ must be in accordance with the certificate of the country of origin of the design.

2.4.6 Special marking requirements for refrigerated liquefied gas

The upright position of each package must be indicated prominently by either the "Package orientation" label (Figure 5-27) or pre-printed package orientation labels meeting the same specification as either Figure 5-27 or ISO Standard 780:1997. The label must be affixed to or printed on at least two opposite vertical sides of the package with the arrows pointing in the correct direction. The wording "KEEP UPRIGHT" must be placed at 120° intervals around the package or on each side. Packages must also be clearly marked "DO NOT DROP — HANDLE WITH CARE".

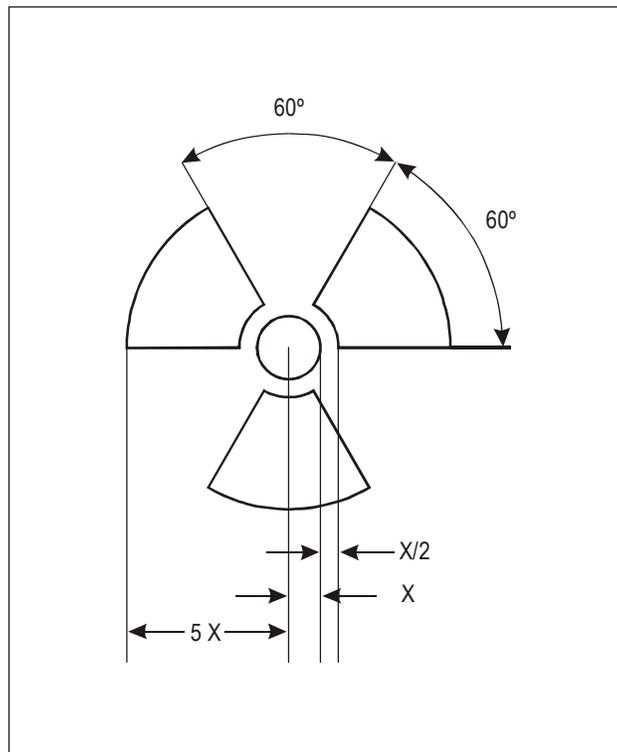


Figure 5-1. Basic trefoil symbol with proportions based on a central circle of radius X. The minimum allowable size of X must be 4 mm.

2.4.7 Special marking requirement for dry ice

The net mass of solid carbon dioxide (dry ice) must be marked on any package containing such substance.

2.4.8 Special marking requirement for biological substances, Category B

Packages containing biological substances, Category B packed in accordance with Packing Instruction 650 must be marked "Biological substance, Category B".

2.4.9 Special marking provisions for environmentally hazardous substances

2.4.9.1 Unless otherwise specified in these Instructions, packages containing environmentally hazardous substances meeting the criteria of 2.9.2.1 a) (UN Nos. 3077 and 3082) must be durably marked with the environmentally hazardous substance mark and the packages must also bear a Class 9 hazard label.

UN Model Regulations, paragraph 5.2.1.6.3, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

2.4.9.2 The environmentally hazardous substance mark must be located adjacent to the ~~markings~~ marks required by 2.4.1.1. The requirements of 2.2.2 must be met.

2.4.9.3 The environmentally hazardous substance mark must be as shown in Figure 5-2. The ~~marking~~ mark must be in the form of a square set at an angle of 45° (diamond-shaped). The symbol (fish and tree) must be black on white or suitable contrasting background. The minimum dimensions must be 100 mm × 100 mm and the minimum width of line forming the diamond must be 2 mm. If the size of the package so requires, the dimensions/line thickness may be reduced, provided the

marking **mark** remains clearly visible. Where dimensions are not specified, all features must be in approximate proportion to those shown.

Note.— The labelling provisions of 5;3 apply in addition to any requirement for packages to bear the environmentally hazardous substance mark.



Figure 5-2. Symbol (fish and tree): black on white or suitable contrasting background

2.4.10 Marking of overpacks

UN Model Regulations, paragraph 5.1.2.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

2.4.10.1 Unless marks and labels representative of all dangerous goods in the overpack are visible, the overpack must be:

- a) marked with the word “OVERPACK”. The lettering of the “OVERPACK” mark must be at least 12 mm high; and
- b) labelled and marked with the proper shipping name, UN number and other marks, as required for packages in accordance with this chapter and Chapter 3, for each item of dangerous goods contained in the overpack.

2.4.10.2 Labelling of overpacks containing radioactive material must be in accordance with 3.2.6 and 3.5.1.1 h) to i). An overpack must be marked with the word “Overpack”, with the proper shipping name, UN number, and special handling instructions appearing on interior packages for each item of dangerous goods contained in the overpack unless markings and labels representative of all dangerous goods in the overpack are visible, except as required in 3.2.6 and 3.5.1.1 h) to i).

2.4.10.3 Packaging specification markings **marks** must not be reproduced on the overpack.

The following amendment is made in accordance with UN Model Regulations ST/SG/AC.10/42/Add.1, which introduced consistent use of the terms “mark” and “marking”.

2.4.10.4 When packages containing dangerous goods in limited quantities are placed in an overpack, the overpack must also be marked with the limited quantity marking shown in Figure 3-1 unless the markings **marks** representative of all dangerous goods in the overpack are visible. The lettering of the “Overpack” marking **mark** must be at least 12 mm high.

~~+ Note. The size requirement for the “Overpack” marking applies as from 1 January 2016.~~

2.4.11 Additional ~~markings~~ marks of packages containing dangerous goods in limited quantities

Provisions for the marking of packages containing dangerous goods in limited quantities are contained in 3;4.

2.4.12 Specific provisions for dangerous goods packed in excepted quantities

Provisions for the marking of packages containing dangerous goods in excepted quantities are contained in 3;5.

2.4.13 ~~Markings~~ Marks required by other modes of transport

The following amendment is made in accordance with UN Model Regulations ST/SG/AC.10/42/Add.1, which introduced consistent use of the terms “mark” and “marking”.

~~Markings~~ Marks required by other international or national transport regulations are permitted in addition to ~~markings~~ marks required by these Instructions, provided that they cannot be confused with or conflict with any ~~markings~~ marks prescribed by these Instructions, because of their colour, design or shape.

2.4.14 Special marking requirement for chemical oxygen generators

When chemical oxygen generators contained in protective breathing equipment (PBE) are being transported under Special Provision A144, the statement “Aircrew protective breathing equipment (smoke hood) in accordance with Special Provision A144” shall be marked adjacent to the proper shipping name on the package.

2.4.15 Marking requirements for IBCs used to transport UN 3077

Intermediate bulk containers must comply with the marking requirements applicable to other packagings, except that intermediate bulk containers of more than 450 L capacity must be marked with the proper shipping name and UN number, as required in 2.4.1, and the environmentally hazardous substance mark, on two opposite sides.

DGP-WG/15-WP/15 (see paragraphs 3.2.5.1.1 b) and c) of this report):

2.4.16 Special marking requirements for lithium batteries

2.4.16.1 Packages containing lithium cells or batteries prepared in accordance with Section II of Packing Instructions 965 to 970 and Section IB of Packing Instructions 965 and 968 must be marked as shown in Figure 5-3.

2.4.16.2 The mark must indicate:

a) the appropriate UN number as follows:

- 1) “UN 3090” for lithium metal cells or batteries;
- 2) “UN 3480” for lithium ion cells or batteries;
- 3) “UN 3091” for lithium metal cells or batteries contained in or packed with equipment; or
- 4) “UN 3481” for lithium metal cells or batteries contained in or packed with equipment;

Where a package contains lithium cells or batteries assigned to different UN numbers, all applicable UN numbers must be indicated on one or more marks.

b) a telephone number for additional information.

2.4.16.3 The mark must be in the form of a rectangle with hatched edging. The symbol (group of batteries, one damaged and emitting flame, above the UN number for lithium ion or lithium metal batteries or cells) must be black on white. The hatching must be red. The mark must be a minimum dimension of 120 mm wide × 110 mm high and the minimum width of the hatching must be 5 mm. If the size of the package so requires, the dimensions/line thickness may be reduced to not less than 105 mm wide × 74 mm high. Where dimensions are not specified, all features must be in approximate proportion to

those shown on the full-size mark (Figure 5-3).

2.4.16.4 Packages containing lithium batteries that meet the requirements of Section IB of Packing Instructions 965 or 968 must bear both the lithium battery mark (Figure 5-3) and the lithium battery Class 9 hazard label (Figure 5-26).

Insert new Figure 5-3:

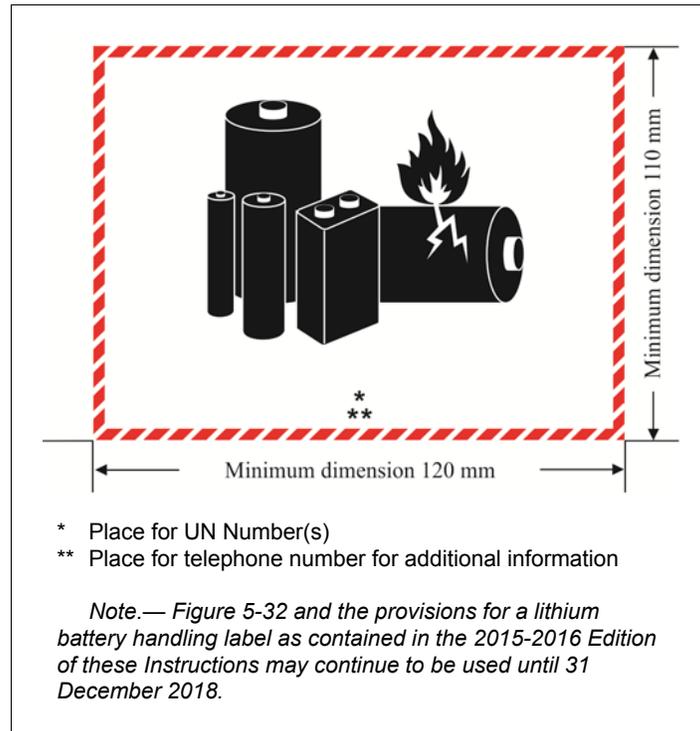


Figure 5-3. Lithium battery mark

Renumber subsequent figures and update references accordingly

2.5 LANGUAGES TO BE USED

In addition to the languages which may be required by the State of Origin, English should be used.

...

...

Chapter 3

LABELLING

UN Model Regulations, paragraph 5.2.2.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

Note 1.— These provisions relate essentially to danger labels. However, additional ~~marking marks~~ or symbols indicating precautions to be taken in handling or storing a package (e.g. a symbol representing an umbrella indicating that a package should be kept dry) may be displayed on a package as appropriate. For such purposes, it is preferable to use the symbols recommended by the International Organization for Standardization (ISO).

Note 2.— In 3.6 of this Chapter there are provisions concerning the placarding of large freight containers for radioactive material.

Note 3.— The provisions concerning the placarding of portable tanks are shown in the Supplement, Part S-4;12.4.

3.1 THE REQUIREMENT TO LABEL

3.1.1 Where articles or substances are specifically listed in the Dangerous Goods List (Table 3-1), a danger class label must be affixed for the hazard shown in column 3 of Table 3-1. A subsidiary risk label must also be affixed for any risk indicated by a class or division number in column 4 of Table 3-1. However, special provisions indicated in column 7 may also require a subsidiary risk label where no subsidiary risk is indicated in column 4 or may exempt from the requirement for a subsidiary risk label where such a risk is indicated in the Dangerous Goods List.

3.1.2 Labels identifying the primary and subsidiary risks of the dangerous goods must bear the class or division number as required in 3.5.1.

3.1.3 All labels must be able to withstand open weather exposure without a substantial reduction in effectiveness.

3.2 APPLICATION OF LABELS

3.2.1 The labels required to be displayed on packages of dangerous goods are identified in the Dangerous Goods List for articles and substances specifically listed by name and for articles and substances not specifically listed by name which are covered by generic or n.o.s. entries.

3.2.2 Packages containing substances of Class 8 need not show a subsidiary risk label for Division 6.1 if the toxicity arises solely from the destructive effect on tissue. Substances of Division 4.2 need not show a subsidiary risk label for Division 4.1 if the substance is also a flammable solid.

3.2.3 Packages containing organic peroxides which meet the criteria for Class 8, Packing Group I or II must be labelled with a corrosive subsidiary risk label.

Note.— Many liquid organic peroxide formulations are flammable; however, no subsidiary risk flammable label is required because the organic peroxide label itself is considered to imply that the product may be flammable.

3.2.4 In addition to the primary hazard label (Figure ~~5-18~~ 5-19), infectious substances packages must bear any other label required by the nature of the contents. This is not required if a quantity of 30 ml or less of dangerous goods included in classes 3, 8 or 9 is packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 3.5.1.2.

3.2.5 Packages containing radioactive material having additional hazardous characteristics must also be labelled to indicate those characteristics.

UN Model Regulations, paragraph 5.2.2.1.12.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

3.2.6 Except when enlarged labels are used in accordance with 3.6, each package, overpack and freight container containing radioactive material must bear the labels conforming to Figures ~~5-19~~ 5-20, 5-20²¹ and 5-24²² according to the appropriate category. Labels must be affixed to two opposite sides on the outside of the package or overpack or on the outside of all four sides of a freight container. Each overpack containing radioactive material must bear at least two labels on opposite sides of the outside of the overpack. In addition, each package, overpack and freight container containing fissile material, other than fissile material excepted under the provisions of 2.7.2.3.5 must bear labels conforming to the model shown in Figure 5-22²³; such labels, where applicable, must be affixed adjacent to the labels conforming to Figure 5-19²⁰, 5-20²¹, or 5-24²², as applicable. Labels must not cover the ~~markings~~ marks specified in Chapter 2. Any labels which do not relate to the contents must be removed or covered.

3.2.7 Intermediate bulk containers must comply with the labelling requirements applicable to other packagings, except that intermediate bulk containers of more than 450 L capacity must be labelled on two opposite sides.

UN Model Regulations, paragraph 5.1.2.2.1.6 a) and b), ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

3.2.8 Except as provided in 3.5.1.1 d), each class hazard label must:

- a) be affixed to a background of contrasting colour or must have a dotted or solid line outer boundary;
- b) be located on the same surface of the package near the proper shipping name ~~marking~~ mark, if the package dimensions are adequate;
- c) be so placed on the packaging that they are not covered or obscured by any part of or attachment to the packaging or any other label or ~~marking~~ mark;
- d) when primary and subsidiary risk labels are required, be displayed next to each other; and
- e) be affixed at an angle of 45° (diamond shaped), unless the package dimensions are inadequate.

3.2.9 Labels must not be folded. Cylindrical packages must be of such dimensions that a label will not overlap itself. In the case of cylindrical packages containing radioactive materials, which require two identical labels, these labels must be centred on opposite points of the circumference and must not overlap each other. If the dimensions of the package are such that two identical labels cannot be affixed without overlapping each other, one label is acceptable provided it does not overlap itself.

3.2.10 Labels must be firmly affixed to or printed on the package of dangerous goods. Where a package is of such an irregular shape that a label cannot be affixed to or printed on a surface, it is acceptable to attach the label to the package by an adequately strong tag.

3.2.11 Since packages or consignments of magnetized material (Class 9) must bear the "Magnetized material" label (Figure 5-25²⁷) as required by column 5 of Table 3-1, such packages or consignments do not need to bear the "Miscellaneous dangerous goods" label (Figure 5-24²⁵).

3.2.12 In addition to the class hazard labels specified in 3.1, handling labels must also be affixed to packages of dangerous goods as follows:

- a) the "Cargo aircraft only" label (Figure 5-26²⁸) must be affixed:
 - 1) when the package containing the dangerous goods may only be transported on a cargo aircraft. However, where the packing instruction number and the permitted quantity per package are identical for passenger and cargo aircraft, the "Cargo aircraft only" label should not be used;
 - 2) to each Type B(M) package of radioactive material and any freight container containing such a Type B(M) package;
 - 3) on the same surface of the package near the hazard labels;
- b) when required by the provisions of 4.1.1.13, either the "Package orientation" label (Figure 5-27²⁹), or preprinted package orientation labels meeting the same specification as either Figure 5-27²⁹ or ISO Standard 780:1997, must be affixed to or printed on at least two opposite vertical sides of the package with the arrows pointing in the correct direction. The words "Dangerous goods" may be inserted on the label below the line;

- c) for packages containing refrigerated liquefied gases, the “Cryogenic liquid” label (Figure 5-29~~31~~) must be affixed on all packages;
- d) for packages containing self-reactive substances of Division 4.1 or Division 5.2 organic peroxides, the “Keep away from heat” label (Figure 5-30~~32~~) must be affixed on all packages. This label should be affixed on the same surface of the package near the hazard label(s);
- e) for excepted packages of radioactive material the “Radioactive material, excepted package” handling label (Figure 5-34~~33~~) must be affixed;
- f) be affixed to a background of contrasting colour or must have a dashed or solid line outer boundary;

The following amendment is made in accordance with UN Model Regulations ST/SG/AC.10/42/Add.1, which introduced consistent use of the terms “mark” and “marking”.

- g) be so placed on the packaging that they are not covered or obscured by any part of or attachment to the packaging or any other label or ~~marking~~ mark.

3.2.13 Where a text is indicated in Figures 5-1 to 5-32~~33~~, an equivalent text in another language may be used.

3.2.14 Labels required by other international or national transport regulations are permitted in addition to labels required by these Instructions, provided that they cannot be confused with or conflict with any label prescribed by these Instructions, because of their colour, design or shape.

3.3 LABELLING OF OVERPACKS

3.3.1 An overpack must be labelled as required for packages by Chapter 3, for each item of dangerous goods contained in the overpack unless labels representative of all dangerous goods in the overpack are visible.

3.3.2 An overpack containing single packages with end closures containing liquid dangerous goods must be labelled with either the “Package Orientation” label (Figure 5-27), or pre-printed package orientation labels meeting the same specification as either Figure 5-27 or ISO Standard 780:1997, unless such labels are affixed to the package and are visible from the outside of the overpack. Such labels must be affixed to or printed on at least two opposite vertical sides of the overpack with the arrows pointing in the direction required to indicate the orientation of the overpack required to ensure that end closures are upward, notwithstanding that such single packages may also have side closures.

3.4 PROHIBITED LABELLING

Arrows for purposes other than indicating proper package orientation must not be displayed on a package containing liquid dangerous goods.

3.5 LABEL SPECIFICATIONS

3.5.1 Class hazard label specifications

3.5.1.1 Labels must satisfy the provisions of this section and conform, in terms of colour, symbols and general format, to the specimen labels shown in Figures 5-34 to 5-24~~26~~.

Note.— Where appropriate, labels in Figures 5-34 to 5-24~~26~~ are shown with a dotted outer boundary as provided for in 3.5.1.1 a). This is not required when the label is applied on a background of contrasting colour.

Class hazard labels must conform to the following specifications:

- a) Labels must be configured as described below (see Figure 5-34).
 - i) Labels must be displayed on a background of contrasting colour, or must have either a dotted or solid outer boundary line.
 - ii) The label must be in the form of a square set at an angle of 45° (diamond shaped). The minimum dimensions must be 100 mm × 100 mm and the minimum width of the line inside the edge forming the diamond must be 2

mm. The line inside the edge must be parallel and 5 mm from the outside of that line to the edge of the label. The line inside the edge on the upper half of the label must be the same colour as the symbol, and the line inside the edge on the lower half of the label must be the same colour as the class or division number in the bottom corner. Where dimensions are not specified, all features must be in approximate proportion to those shown.

- iii) Labels of 50 mm × 50 mm may be used on packages containing infectious substances where the packages are of dimensions such that they can only bear smaller labels. The line inside the edge must remain 5 mm to the edge of the label. The minimum width of the line inside the edge must remain 2 mm. Dimensions for labels on cylinders must comply with 3.5.1.1 b).

~~Note.— The provisions of 3.5.1.1 a) from the 2013-2014 Edition of these Instructions may continue to be applied until 31 December 2016. When so applied, 3.5.1.1 a) i), ii) and iii) need not apply until 1 January 2017.~~

UN Model Regulations, paragraph 5.2.2.2.1.2, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraphs 3.2.5.1.1 a) of this report)

- b) Cylinders for Class 2 may, on account of their shape, orientation and securing mechanisms for transport, bear labels representative of those specified in this chapter, which have been reduced in size, according to ISO 7225:2005, for display on the non-cylindrical part (shoulder) of such cylinders. Labels may overlap to the extent provided for by ISO 7225:2005 "Gas cylinders — Precautionary labels"; however, in all cases the labels representing the primary hazard and the numbers appearing on any label must remain fully visible and the symbols recognizable.

Note.— When the diameter of the cylinder is too small to permit the display of the reduced size labels on the non-cylindrical upper part of the cylinder, the reduced sized labels may be displayed on the cylindrical part.

- c) With the exception of labels for Divisions 1.4, 1.5 and 1.6 of Class 1, the upper half of the label must contain the pictorial symbol and the lower half must contain the class or, in the case of labels for Class 5, the division number, as appropriate. **The lower half of the label must also contain the symbol in the case of the Class 9 for lithium cells and batteries (Figure 26).** The label may include such text as the UN number, or words describing the hazard class (e.g. "flammable") in accordance with 3.5.1.1 e) provided that the text does not obscure or detract from the other required label elements.
- d) In addition, except for Divisions 1.4, 1.5 and 1.6, labels for Class 1 must show in the lower half, above the class number, the division number and compatibility group letter for the substance or article. Labels for Divisions 1.4, 1.5 and 1.6 must show in the upper half the division number and in the lower half the class number and the compatibility group letter.

UN Model Regulations, paragraph 5.2.2.2.1.5, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

It is suggested that new text in sub-paragraph e) may not be suitable, i.e. "no text other than the class mark", since the class mark is not text. Additionally, the term "class mark" is not used anywhere else in the Instructions. DGP-WG/15 is invited to consider whether alternate wording would be more suitable.

- e) Unless otherwise provided for in these Instructions, only text indicating the nature of the risk may be inserted in the lower half of the label (in addition to the class or division number or compatibility group). **No text other than the class mark must be included in the bottom part of the Class 9 label for lithium cells and batteries (Figure 26).**
- f) The symbols, texts and numbers must be shown in black on all labels except:
 - 1) the Class 8 label, where the text (if any) and class number must appear in white;
 - 2) labels with entirely green, red or blue backgrounds, where they may be shown in white;
 - 3) the Division 5.2 label, where the symbol may be shown in white; and
 - 4) the Division 2.1 label displayed on cylinders and gas cartridges for liquefied petroleum gases, where they may be shown in the background colour of the receptacle if adequate contrast is provided.
- g) A label may contain form identification information, including the name of its maker, provided that information is printed outside of the solid line border in no larger than 10-point type.

Labelling of radioactive material

- h) Each label conforming to the applicable Figure 5-49~~20~~, 5-29~~21~~ or 5-24~~22~~ must be completed with the following information:
- 1) Contents:
 - A) except for LSA-I material, the name(s) of the radionuclide(s) as taken from Table 2-12, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides must be listed to the extent the space on the line permits. The group of LSA or SCO must be shown following the name(s) of the radionuclide(s). The terms "LSA-II", "LSA-III", "SCO-I" and "SCO-II" must be used for this purpose;
 - B) for LSA-I material, the term "LSA-I" is all that is necessary; the name of the radionuclide is not necessary;
 - 2) Activity: The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol. For fissile material, the total mass of fissile nuclides in units of grams (g), or multiples thereof, may be used in place of activity;
 - 3) For overpacks and freight containers the "contents" and "activity" entries on the label must bear the information required in 3.5.1.1 h) 1) A) and B), respectively, totalled together for the entire contents of the overpack or freight container except that on labels for overpacks or freight containers containing mixed loads of packages containing different radionuclides, such entries may read "See Transport Documents";
 - 4) Transport index: The number determined in accordance with 1.2.3.1.1 and 1.2.3.1.2. (No transport index entry is required for category I-WHITE.)
- i) Each label conforming to Figure 5-22~~23~~ must be completed with the criticality safety index (CSI) as stated in the certificate of approval applicable in the States through or into which the consignment is transported and issued by the competent authority.
- j) For overpacks and freight containers, the label conforming to Figure 5-22~~23~~ must bear the sum of the criticality safety indexes of all the packages contained therein.
- k) In all cases of international transport of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the labelling must be in accordance with the certificate of the country of origin of design.

3.5.1.2 Illustrations of the class hazard labels, showing the approved symbols and colours, are given in Figures 5-4-~~5~~ to 5-24-~~26~~. The label descriptions used in column 5 of Table 3-1 are indicated in parentheses.

Note 1.— The asterisk appearing in the bottom corner of the label indicates the location of the class or division number when the label is used to show the primary risk. See Figures 5-4-~~5~~ to 5-7-~~8~~ concerning the location of information on explosives labels.

Note 2.— Minor variations in the design of the symbol on labels or other differences such as the width of vertical lines on labels as shown in these Instructions or in regulations of other modes, which do not affect the obvious meaning of the label, are acceptable. For example the hand shown on the Class 8 label may be shown with or without shading, the extreme right and left vertical lines on the Division 4.1 and Class 9 label may extend to the edge of the label or there may be some white space at the edge, etc.

3.5.2 Handling labels

3.5.2.1 Handling label specifications

An illustration of each of the handling labels showing the approved design and colour is given in Figures 5-25~~27~~ to 5-27-~~29~~ and Figures 5-29~~31~~ to 5-32~~33~~. The minimum label dimensions are shown in the figures. Where dimensions or features are not specified, these must be in approximate proportion to those shown; however:

- a) labels having dimensions not smaller than half of those indicated may be used on packages containing infectious substances when the packages are of dimensions such that they can only bear smaller labels; and
- b) orientation labels may meet the specification of either Figure 5-27~~29~~ or ISO Standard 780:1997.

UN Model Regulations, paragraph 5.2.1.9, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 b) of this report)
Requirement for a handling label now a requirement for a mark (see 5.2.4.16)

~~— 3.5.2.2 Lithium battery handling label~~

~~≠ — Packages containing lithium batteries that meet the requirements of Section II of Packing Instructions 965 to 970 must bear a "Lithium battery" handling label shown in Figure 5-32, as required by the applicable packing instruction. The label must be a minimum dimension of 120 mm wide × 110 mm high except labels of 105 mm wide × 74 mm high may be used on packages containing lithium batteries where the packages are of dimensions such that they can only bear smaller labels. When the reduced size label is used, the label features must be in approximate proportion to those shown on the full size label (Figure 5-32). The label must show "Lithium metal batteries" or "Lithium ion batteries", as applicable, and a telephone number for additional information. Where the package contains both types of batteries, the label must show "Lithium metal and lithium ion batteries". Packages containing lithium batteries that meet the requirements of Section IB of Packing Instructions 965 and 968 must bear both a "Lithium battery" handling label shown in Figure 5-32 and a Class 9 hazard label (Figure 5-24).~~

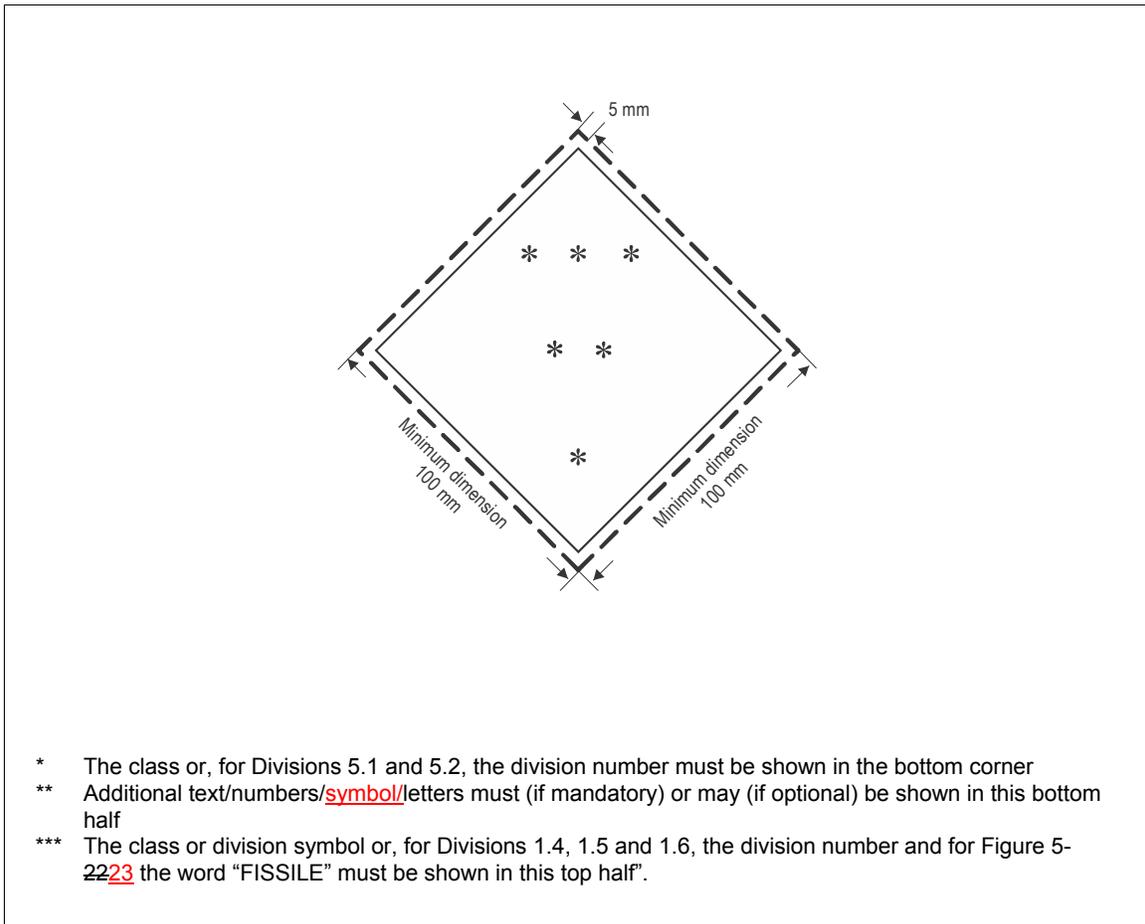
3.6 PLACARDING OF LARGE FREIGHT CONTAINERS CONTAINING RADIOACTIVE MATERIAL

3.6.1 Special provisions for Class 7

3.6.1.1 Large freight containers carrying packages (other than excepted packages) and tanks must bear four placards which conform with Figure 5-28~~30~~. The placards must be affixed in a vertical orientation to each side wall and each end wall of the large freight container. Any placards which do not relate to the contents must be removed. Instead of using both labels and placards, it is permitted as an alternative to use enlarged labels only, as shown in Figures 5-19~~20~~, 5-20~~21~~ and 5-21~~22~~, and where appropriate Figure 5-22~~23~~, with dimensions as required for the placard in Figure 5-28~~30~~.

3.6.1.2 For Class 7, the placard must have minimum overall dimensions of 250 mm by 250 mm with a black line running 5 mm inside the edge and parallel with it, and must be otherwise as shown in Figure 5-28~~30~~. The number 7 must not be less than 25 mm high. The background colour of the upper half of the placard must be yellow and of the lower half white, the colour of the trefoil and the printing must be black. The use of the word "Radioactive" in the bottom half is optional to allow the use of this placard to display the appropriate United Nations number for the consignment.

...



- * The class or, for Divisions 5.1 and 5.2, the division number must be shown in the bottom corner
- ** Additional text/numbers/symbol/letters must (if mandatory) or may (if optional) be shown in this bottom half
- *** The class or division symbol or, for Divisions 1.4, 1.5 and 1.6, the division number and for Figure 5-2223 the word "FISSILE" must be shown in this top half.

Figure 5-34. Class/division label

UN Model Regulations, paragraph 5.2.5, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 c) of this report)

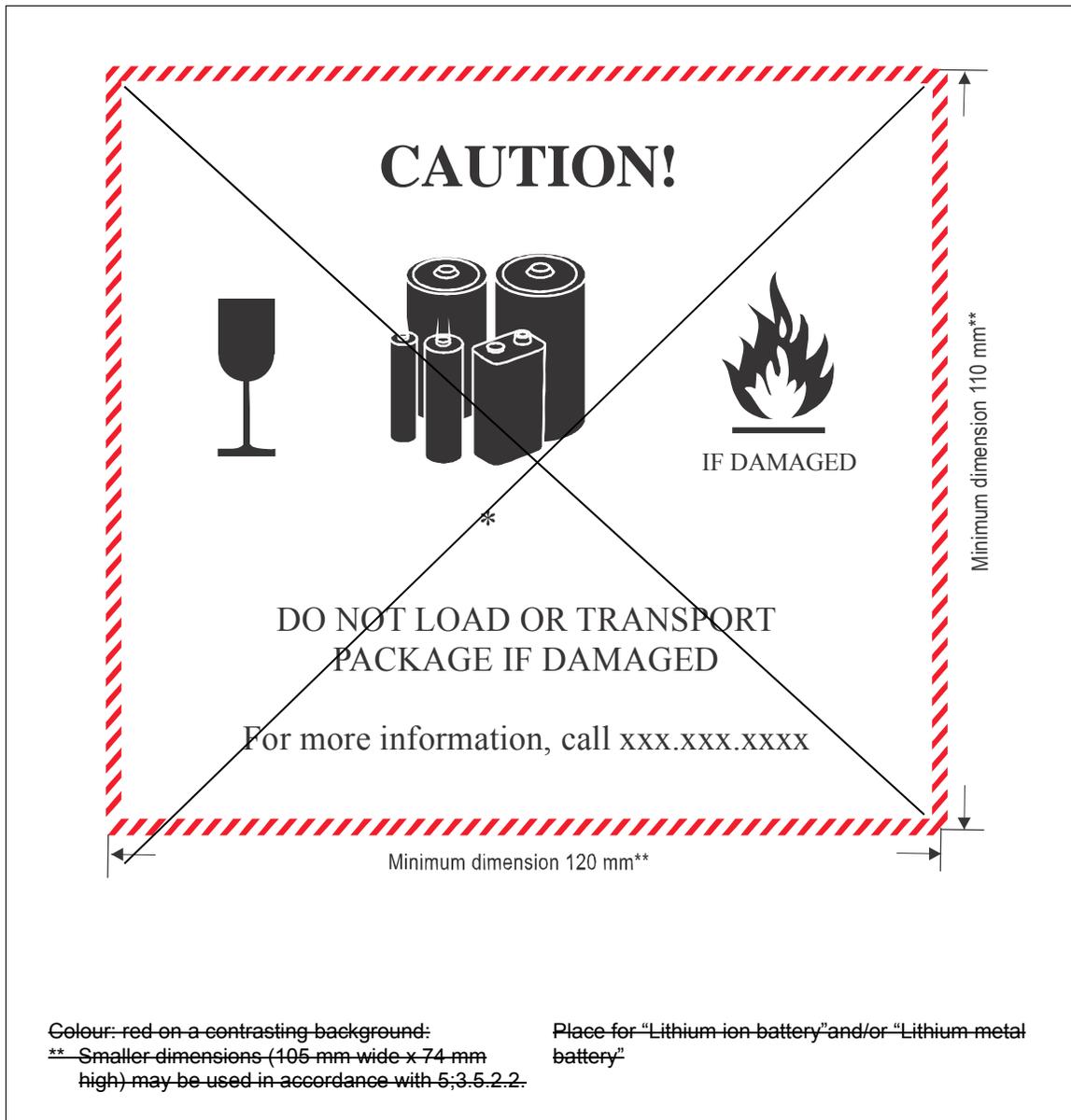


Figure 5-32. Lithium battery handling label

UN Model Regulations, paragraph 5.2.2.2.2, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1 of this report)

Insert the following new Figure 5-26:

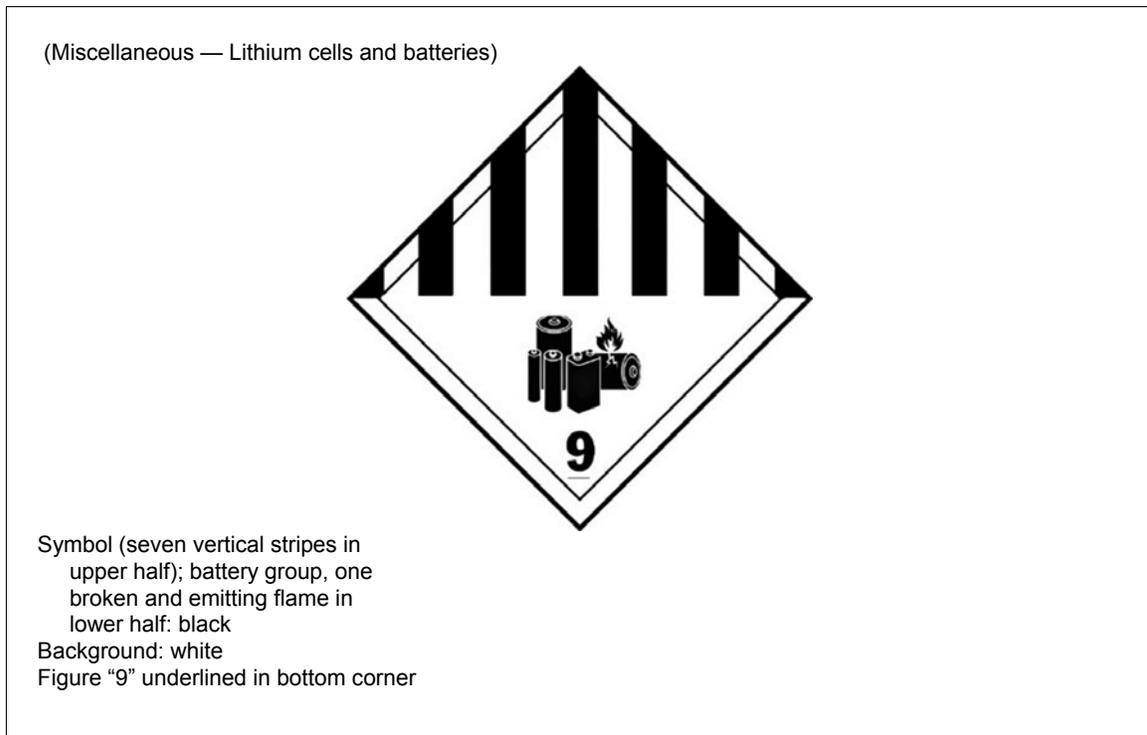


Figure 5-26. Miscellaneous dangerous goods — lithium batteries, Class 9

Renumber subsequent figures accordingly and revise references throughout Technical Instructions as applicable.

...

Chapter 4

DOCUMENTATION

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4.1.5 Information required in addition to the dangerous goods description

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DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 d) of this report):

4.1.5.8 Additional requirements

4.1.5.8.1 The dangerous goods transport document must also contain:

- a) except for radioactive material, the packing instruction applied. For shipments of lithium batteries prepared in accordance with Section IB of Packing Instruction 965 or Packing Instruction 968, the letters "IB" must be added following the packing instruction number;
- b) when applicable, reference to Special Provision A1, A2, A4-~~or~~ A5, A202 or A208;
- c) a statement indicating that the shipment is within the limitations prescribed for either passenger and cargo aircraft or cargo-only aircraft, as appropriate;

Note.— To qualify as acceptable for transport aboard passenger aircraft, passenger aircraft packing instruction number(s) must be used, and the package must not bear the "Cargo aircraft only" label. To qualify as acceptable for transport aboard cargo-only aircraft, cargo aircraft packing instruction number(s) must be used, and the package must bear the "Cargo aircraft only" label; or passenger aircraft instruction number(s) must be shown and no "Cargo aircraft only" label applied. However, where the packing instruction number(s) and the permitted quantity per package are identical for passenger and cargo aircraft, the "Cargo aircraft only" label should not be used.

- d) special handling information, when appropriate;
- e) an indication that an overpack has been used, when appropriate; and
- f) the "Q" value rounded up to the first decimal place, if substances are packed in accordance with 3;4.3.3 or 4;1.1.9 e).

DGP-WG/15-WP/10 (see paragraph 3.2.5.4 of this report):

4.1.5.8.2 For explosive substances, where Packing Instruction 101 has been adopted by an appropriate national authority, the State's distinguishing sign for motor vehicles in international traffic of the country for which the authority acts must be marked on the dangerous goods transport document as follows:

Packaging ~~authorized~~ approved by the competent authority of ...

Note.— In this instance, the term "competent authority" is used for intermodal compatibility; it refers to the appropriate national authority.

...

UN Model Regulations, paragraph 5.4.1.5.12, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/15 (see paragraph 3.2.5.1.1 d) of this report)

4.1.5.9 Classification where new data is available (see Part 2;1.2)

For transport in accordance with 2;1.2, a statement to this effect must be included on the dangerous goods transport document, as follows "Classified in accordance with 2;1.2 of the Technical Instructions"

Part 6

PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

...

Chapter 2

MARKING OF PACKAGINGS OTHER THAN INNER PACKAGINGS

UN Model Regulations, paragraph 6.1.3, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

Introductory Notes

Note 1.— The ~~marking~~ marks ~~indicates~~ indicate that the packaging which bears ~~it~~ them ~~corresponds~~ correspond to a successfully tested design type and that it complies with the provisions of Chapters 3 and 4 which are related to the manufacture, but not to the use, of the packaging. In itself, therefore, the marks ~~does~~ do not necessarily confirm that the packaging may be used for any particular substance.

Note 2.— The ~~marking~~ marks ~~is~~ are intended to be of assistance to packaging manufacturers, reconditioners, packaging users, operators and appropriate authorities. In relation to the use of a new packaging, the original ~~marking~~ marks ~~is~~ are a means for its manufacturer(s) to identify the type and to indicate those performance test regulations that have been met.

Note 3.— The ~~marking~~ marks ~~does~~ do not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, test reports or register of successfully tested packagings. For example, a packaging having an X or Y ~~marking~~ mark may be used for substances to which a packing group having a lesser degree of danger has been assigned with the relevant maximum permissible value of the relative density, determined by taking into account the factor 1.5 or 2.25 indicated in the test requirements for packagings in Chapter 4 as appropriate, i.e. a Packing Group I packaging tested for products with a relative density of 1.2 could be used as a Packing Group II packaging for products with a relative density of 1.8 or a Packing Group III packaging for products with a relative density of 2.7, provided of course that all the performance criteria can still be met with the higher relative density.

2.1 MARKING REQUIREMENTS FOR PACKAGINGS OTHER THAN INNER PACKAGINGS

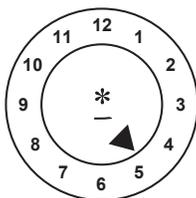
UN Model Regulations, paragraph 6.1.3.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

2.1.1 Each packaging intended for use according to these Instructions must bear ~~markings~~ **marks** which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. For packages with a gross mass of more than 30 kg the ~~markings~~ **marks**, or a duplicate thereof, must appear on the top or on a side of the packaging. Letters, numerals and symbols must be at least 12 mm high, except for packagings of 30 L or 30 kg capacity or less, when they must be at least 6 mm in height and for packagings of 5 L or 5 kg or less when they must be of an appropriate size. The ~~markings~~ **marks** must show:

- a) the United Nations packaging symbol 

This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapters 1 to 6. For embossed metal packagings the capital letters "UN" may be applied as the symbol;

- b) the code designating the type of packaging according to 1.2;
- c) a code in two parts:
- 1) a letter designating the packing group(s) for which the design type has been successfully tested:
 - X for Packing Groups I, II and III
 - Y for Packing Groups II and III
 - Z for Packing Group III only;
 - 2) A) for single packagings intended to contain liquids: the relative density, rounded off to the first decimal, for which the design type has been tested; this may be omitted when the relative density does not exceed 1.2;
 - B) for packagings intended to contain solids or inner packagings: the maximum gross mass, in kilograms, at which the design type has been tested;
- d) 1) for single packagings intended to contain liquids: the hydraulic test pressure which the packaging was shown to withstand, in kPa rounded down to the nearest 10 kPa;
- 2) for packagings intended to contain solids or inner packagings: the letter "S";
- e) the last two digits of the year during which the packaging was manufactured. Packagings of types 1H1, 1H2, 3H1 and 3H2 must also be appropriately marked with the month of manufacture; this may be marked on the packaging in a different place from the remainder of the ~~marking~~ **mark**. An appropriate method is:



- * The last two digits of the year of manufacture may be displayed at that place. In such a case, the two digits of the year in the type approval ~~marking~~ **mark** and in the inner circle of the clock must be identical.

Note.— Other methods that provide the minimum required information in a durable, visible and legible form are also acceptable.

- f) the State authorizing the allocation of the mark, indicated by the distinguishing sign for motor vehicles in international traffic;
- g) the name of the manufacturer or other identification of the packaging specified by the appropriate national authority.

UN Model Regulations, paragraph 6.1.3.2 to 6.1.3.11, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

2.1.2 In addition to the durable ~~markings~~ marks prescribed in 2.1.1, every new metal drum of a capacity greater than 100 L must bear the marks described in 2.1.1. a) to e) on the bottom, with an indication of the nominal thickness of at least the metal used in the body (in mm, to 0.1 mm), in a permanent form (e.g. embossed). When the nominal thickness of either head of a metal drum is thinner than that of the body, the nominal thicknesses of the top head, body and bottom head must be marked on the bottom in a permanent form (e.g. embossed), for example “1.0-1.2-1.0” or “0.9-1.0-1.0”. Nominal thicknesses of metal must be determined according to the appropriate ISO Standard, for example ISO 3574:1999 for steel. The marks indicated in 2.1.1 f) and g) must not be applied in a permanent form (e.g. embossed) except as provided for in 2.1.5.

2.1.3 Every packaging liable to undergo a reconditioning process other than those referred to in 2.1.2 must bear the marks indicated in 2.1.1 a) to e) in a permanent form. Marks are permanent if they are able to withstand the reconditioning process (e.g. embossed). For packagings other than metal drums of a capacity greater than 100 L, these permanent marks may replace the corresponding durable ~~markings~~ marks prescribed in 2.1.1.

2.1.4 For re-manufactured metal drums, if there is no change to the packaging type and no replacement or removal of integral structural components, the required ~~markings~~ marks need not be permanent (e.g. embossed). Every other re-manufactured metal drum must bear the ~~markings~~ marks indicated in 2.1.1 a) to e) in a permanent form (e.g. embossed) on the top head or side.

2.1.5 Metal drums made from materials (e.g. stainless steel) designed to be reused repeatedly may bear the ~~markings~~ marks indicated in 2.1.1 f) and g) in a permanent form (e.g. embossed).

2.1.6 Packagings manufactured with recycled plastic material as defined in 1;3 must be marked “REC”. This mark must be placed near the ~~marking~~ marks prescribed in 2.1.1.

2.1.7 ~~Marking~~ Marks must be applied in the sequence of the sub-paragraphs in 2.1.1; each ~~element of the marking~~ mark required in these sub-paragraphs and when appropriate sub-paragraphs h) to j) of 2.1.8 must be clearly separated, e.g. by a slash or space, so as to be easily identified; for examples see 2.1.10; 2.2.3; and 2.3. Any additional ~~markings~~ marks authorized by the appropriate national authority must still enable the ~~parts of the marking~~ other marks required in 2.1.1 to be correctly identified ~~with reference to 2.1.1~~.

2.1.8 After reconditioning a packaging, the reconditioner must apply to it, in sequence, ~~a durable marking~~ marks showing:

- h) the State in which the reconditioning was carried out, indicated by the distinguishing sign for motor vehicles in international traffic;
- i) the name of the reconditioner or other identification of the packaging specified by the appropriate national authority;
- j) the year of reconditioning; the letter “R”; and for every packaging successfully passing the leakproofness test in 4.4, the additional letter “L”.

2.1.9 When, after reconditioning, the ~~markings~~ marks required by 2.1.1 a) to d) no longer appear on the top head or the side of a metal drum, the reconditioner must apply them in a durable form followed by those required by 2.1.8. ~~The markings~~ These marks must not identify a greater performance capability than that for which the original design type had been tested and marked.

2.1.10 Examples of ~~for~~ for markings for NEW packagings:

for a new fibreboard box

(u n)	4G/Y145/S/02	as in 2.1.1 a), b), c)1), c)2)B), d)2) and e)
	NL/VL823	as in 2.1.1 f) and g)

for a new steel drum to contain liquids

(u n)	1A1/Y1.4/150/98	as in 2.1.1 a), b), c)1), c)2)A), d)1) and e)
	NL/VL824	as in 2.1.1 f) and g)

for a new steel drum to contain solids, or inner packagings

(u n)	1A2/Y150/S/01	as in 2.1.1 a), b), c)1), c)2)B), d)2) and e)
	NL/VL825	as in 2.1.1 f) and g)

for a new plastic box of equivalent specification

(u n)	4HW/Y136/S/98 NL/VL826	as in 2.1.1 a), b), c)1), c)2)B), d)2) and e) as in 2.1.1 f) and g)
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for a remanufactured steel drum to contain liquids

(u n)	1A2/Y100/01 USA/MM5	as in 2.1.1 a), b), c)1), c)2)A), d)1) and e) as in 2.1.1 f) and g)
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2.1.11 Examples of **for** markings for RECONDITIONED packagings:

(u n)	1A1/Y1.4/150/97 NL/RB/01 RL	as in 2.1.1 a), b), c)1), c)2)A), d)1) and e) as in 2.1.8 h), i) and j)
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(u n)	1A2/Y150/S/99 USA/RB/00 R	as in 2.1.1 a), b), c)1), c)2)B), d)2) and e) as in 2.1.8 h), i) and j)
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UN Model Regulations, paragraph 6.1.3.12, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 a) of this report)

2.3 PACKAGING MARKINGS FOR SALVAGE PACKAGINGS

Example of **for** marking for SALVAGE packagings:

(u n)	1A2T/Y300/S/01 USA/abc	as in 2.1.1 a), b), c)2)B), d)2) and e) as in 2.1.1 f) and g)
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Note.— ~~In the~~ The marking, for which examples are given in 2.1.10, 2.2.3 and 2.3, the markings are shown, for convenience, in two lines; however, the markings can, may be applied in a single line or in multiple lines provided they are given in the correct sequence is respected. Additionally, the inclusion in the specification marking of the "/" symbol is optional.

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Chapter 4

PACKAGING PERFORMANCE TESTS

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4.1 PERFORMANCE AND FREQUENCY OF TESTS

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UN Model Regulations, paragraph 6.1.5.1.6, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

4.1.6 Reserved.

Note.— ~~For the conditions for assembling~~ using different inner packagings in an outer packaging and permissible variations in inner packagings, see 4;1.1.10.1. These conditions do not limit the use of inner packagings when applying 4.1.7.

...

4.5 INTERNAL PRESSURE (HYDRAULIC) TEST

4.5.1 Packagings to be tested: the internal pressure (hydraulic) test must be carried out on all design types of metal, plastic and composite packagings intended to contain liquids. This test is not required for the inner packagings of combination packagings. For the internal pressure requirements for inner packagings see 4;1.1.6.

4.5.2 Number of test samples: three test samples per design type and manufacturer.

UN Model Regulations, paragraph 6.1.5.5.4, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

4.5.3 Test method and pressure to be applied: metal packagings including their closures must be subjected to the test pressure for 5 minutes. Plastic packagings and composite packagings (plastic material) including their closures must be subjected to the test pressure for 30 minutes. This pressure is the one to be included in the ~~marking~~ **mark** required by 2.1.1 d). The manner in which the packagings are supported must not invalidate the test. The test pressure must be applied continuously and evenly: it must be kept constant throughout the test period. The hydraulic pressure (gauge) applied, as determined by any one of the following methods, must be:

- a) not less than the total gauge pressure measured in the packaging (i.e. the vapour pressure of the filling liquid and the partial pressure of the air or other inert gases minus 100 kPa) at 55°C, multiplied by a safety factor of 1.5. This total gauge pressure must be determined on the basis of a maximum degree of filling in accordance with Part 4;1.1.5 and a filling temperature of 15°C. The test pressure must be not less than 95 kPa (not less than 75 kPa for liquids in Packing Group III of Class 3 or Division 6.1); or
- b) not less than 1.75 times the vapour pressure at 50°C of the liquid to be transported, minus 100 kPa but with a minimum test pressure of 100 kPa; or
- c) not less than 1.5 times the vapour pressure at 55°C of the liquid to be transported, minus 100 kPa but with a minimum test pressure of 100 kPa.

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Chapter 5

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF CYLINDERS AND CLOSED CRYOGENIC RECEPTACLES, AEROSOL DISPENSERS AND SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES) AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS

Note 1.— Aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas are not subject to the requirements of 6;5.1 to 6;5.3.

Note 2.— For open cryogenic receptacles the requirements of Packing Instruction 202 must be met.

5.1 GENERAL REQUIREMENTS

5.1.1 Design and construction

5.1.1.1 Cylinders and closed cryogenic receptacles and their closures must be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during normal conditions of transport.

UN Model Regulations, paragraph 6.2.1.1.2, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.1.1.2 In recognition of scientific and technological advances, and recognizing that cylinders and closed cryogenic receptacles other than those that are marked with a bear "UN" certification marking marks may be used on a national or regional basis, cylinders and closed cryogenic receptacles conforming to requirements other than those specified in these Instructions may be used if approved by the appropriate national authorities in the countries of transport and use.

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UN Model Regulations, paragraph 6.2.1.1.9, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.1.1.9 Additional requirements for the construction of pressure receptacles for acetylene

Cylinders for UN 1001— **Acetylene, dissolved** and UN 3374 — **Acetylene, solvent free** must be filled with a porous mass, uniformly distributed, of a type that conforms to the requirements and testing specified by a standard or technical code recognized by the appropriate national authority and which:

- a) is compatible with the cylinder and does not form harmful or dangerous compounds either with the acetylene or with the solvent in the case of UN 1001; and
- b) is capable of preventing the spread of decomposition of the acetylene in the porous mass.

In the case of UN 1001, the solvent must be compatible with the cylinders.

...

UN Model Regulations, paragraph 6.2.1.5.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.1.5 Initial inspection and testing

5.1.5.1 New cylinders, other than closed cryogenic receptacles and metal hydride storage systems, must be subjected to inspection and testing during and after manufacture in accordance with the applicable design standards including the following:

On an adequate sample of cylinders:

- a) testing of the mechanical characteristics of the material of construction;
- b) verification of the minimum wall thickness;
- c) verification of the homogeneity of the material for each manufacturing batch;
- d) inspection of the external and internal conditions of the cylinders;
- e) inspection of the neck threads;
- f) verification of the conformance with the design standard;

For all cylinders:

- g) a hydraulic pressure test. Cylinders must ~~withstand the test pressure without expansion greater than that allowed in the design specifications~~ meet the acceptance criteria specified in the design and construction technical standard or technical code;

Note.— With the agreement of the appropriate national authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.

- h) inspection and assessment of manufacturing defects and either repairing them or rendering the cylinders unserviceable. In the case of welded cylinders, particular attention must be paid to the quality of the welds;

- i) an inspection of the ~~markings~~ **marks** on the cylinders;
- j) in addition, cylinders intended for the transport of UN 1001 — **Acetylene, dissolved**, and UN 3374 — **Acetylene, solvent free**, must be inspected to ensure proper installation and condition of the porous mass and, if applicable, the quantity of solvent.

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UN Model Regulations, paragraph 6.2.1.6.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.1.6 Periodic inspection and testing

5.1.6.1 Refillable cylinders must be subjected to periodic inspections and tests by a body authorized by the appropriate national authority, in accordance with the following:

- a) check of the external conditions of the cylinder and verification of the equipment and the external ~~markings~~ **marks**;
- b) check of the internal conditions of the cylinder (e.g. internal inspection, verification of minimum wall thickness);
- c) check of the threads if there is evidence of corrosion or if the fittings are removed;
- d) a hydraulic pressure test and, if necessary, verification of the characteristics of the material by suitable tests;

Note 1.— With the agreement of the appropriate national 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.— With the agreement of the appropriate national authority, the hydraulic pressure test of cylinders may be replaced by an equivalent method based on acoustic emission testing or a combination of acoustic emission testing and ultrasound examination. ISO 16148:2006 may be used as a guide for acoustic emission testing procedures.

Note 3.— The hydraulic pressure test may be replaced by ultrasonic examination carried out in accordance with ISO 10461:2005 + A1:2006 for seamless aluminium alloy gas cylinders and in accordance with ISO 6406:2005 for seamless steel gas cylinders.

- e) check of service equipment, other accessories and pressure-relief devices, if to be reintroduced into service.

Note.— For the periodic inspection and test frequencies, see Packing Instruction 200 or, for a chemical under pressure, Packing Instruction 218.

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UN Model Regulations, paragraph 6.2.2.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraphs 3.2.6.1 and 3.2.6.1 b) of this report)

5.2.1 Design, construction and initial inspection and testing

5.2.1.1 The following standards apply for the design, construction and initial inspection and test of UN cylinders, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5:

Reference	Title	Applicable for manufacture
ISO 9809-1:1999	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa. <i>Note.— The note concerning the F factor in section 7.3 of this standard must not be applied for UN cylinders.</i>	Until 31 December 2018

ISO 9809-1:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa.	Until further notice
ISO 9809-2:2000	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa.	Until 31 December 2018
ISO 9809-2:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa.	Until further notice
ISO 9809-3:2000	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders.	Until 31 December 2018
ISO 9809-3:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders.	Until 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 further notice
ISO 7866:1999	Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing. <i>Note.— The note concerning the F factor in section 7.2 of this standard must not be applied for UN cylinders. Aluminium alloy 6351A — T6 or equivalent must not be authorized.</i>	Until further notice Until 31 December 2020
ISO ISO 7866: 2012+ Cor 1:2014	Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing <i>Note.— Aluminium alloy 6351A or equivalent must not be used.</i>	Until further notice
ISO 4706:2008	Gas cylinders — Refillable welded steel cylinders — Test pressure 60 bar and below.	Until further notice
ISO 18172-1:2007	Gas cylinders — Refillable welded stainless steel cylinders — Part 1: Test pressure 6 MPa and below.	Until further notice
ISO 20703:2006	Gas cylinders — Refillable welded aluminium-alloy cylinders — Design, construction and testing.	Until further notice
ISO 11118:1999	Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods.	Until further notice
ISO 11119-1:2002	Gas cylinders of composite construction — Specification and test methods — Part 1: Hoop wrapped composite gas cylinders.	Until further notice Until 31 December 2020
ISO 11119-1:2012	Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 L	Until 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 further notice 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 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.	Until further notice 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	Until further notice

Note 1.— In the above-referenced standards, composite cylinders must be designed for ~~unlimited service life~~ [a design life of not less than fifteen years](#).

Note 2.— ~~After the first 15 years of service, composite cylinders manufactured according to these standards, may be approved for extended service by the appropriate national authority which was responsible for the original approval of the cylinders and which will base its decision on the test information supplied by the manufacturer or owner or user.~~ [Composite cylinders with a design life longer than fifteen years must not be filled after fifteen years from the date of manufacture, unless the design has successfully passed a service life test programme. The programme must be part of the initial design type approval and must specify inspections and tests to demonstrate that cylinders manufactured accordingly remain safe to the end of their design life. The service life test programme and the results must be approved by the competent authority of the country of approval that is responsible for the initial approval of the cylinder design. The service life of a composite cylinder must not be extended beyond its initial approved design life.](#)

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5.2.1.3 The following standards apply for the design, construction and initial inspection and test of UN acetylene cylinders except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5.

Note.— The maximum of 1 000 L volume as mentioned in the ISO standard ISO 21029-1:2004 Cryogenic vessels, does not apply for refrigerated liquefied gases in closed cryogenic receptacles installed in apparatus (e.g. MRI or cooling machines).

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UN Model Regulations, paragraph 6.2.2.1.3, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

For the porous mass in the cylinder:

Reference	Title	Applicable for manufacture
ISO 3807-1:2000	Cylinders for acetylene — Basic requirements — Part 1: Cylinders without fusible plugs.	Until further notice <u>Until 31 December 2020</u>
ISO 3807-2:2000	Cylinders for acetylene — Basic requirements — Part 2: Cylinders with fusible plugs.	Until further notice <u>Until 31 December 2020</u>
<u>ISO 3807:2013</u>	<u>Gas cylinders — Acetylene cylinders — Basic requirements and type testing</u>	Until further notice

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UN Model Regulations, paragraph 6.2.2.2, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.2 Materials

In addition to the material requirements specified in the cylinder and closed cryogenic receptacle design and construction standards, and any restrictions specified in the applicable Packing Instruction for the gas(es) to be transported (e.g. Packing Instruction 200, Packing Instruction 202 or Packing Instruction 214), the following standards apply to material compatibility:

Reference	Title	Applicable for manufacture
ISO 11114-1:2012	Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials.	Until further notice
ISO 11114-2:2000 <u>ISO 11114-2:2013</u>	Transportable gas Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials.	Until further notice

UN Model Regulations, paragraph 6.2.2.3, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.3 Service equipment

The following standards apply to 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 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 further notice Until 31 December 2020
ISO 10297:2014	Gas cylinders — Cylinder valves — Specification and type testing	Until further notice
ISO 13340:2001	Transportable gas cylinders — Cylinder valves for non-refillable cylinders — Specification and prototype testing.	Until further notice

For UN metal hydride storage systems, the requirements specified in the following standard apply to closures and their protection:

Reference	Title	Applicable for manufacture
ISO 16111:2008	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.	Until further notice

UN Model Regulations, paragraph 6.2.2.4, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.4 Periodic inspection and test

The following standards apply to the periodic inspection and testing of UN cylinders and UN metal hydride storage systems:

Reference	Title	Applicable for manufacture
ISO 6406:2005	Seamless steel gas cylinders — Periodic inspection and testing.	Until further notice
ISO 10460:2005	Gas cylinders – Welded carbon-steel gas cylinders – Periodic inspection and testing. <i>Note.— The repair of welds described in clause 12.1 of this standard must not be permitted. Repairs described in clause 12.2 require the approval of the appropriate national authority which approved the periodic inspection and test body in accordance with 5.2.6.</i>	Until further notice
ISO 10461:2005/A1:2006	Seamless aluminium-alloy gas cylinders — Periodic inspection and testing.	Until further notice
ISO 10462:2005	Transportable cylinders for dissolved acetylene — Periodic inspection and maintenance.	Until further notice Until 31 December 2018
ISO 10462:2013	Gas cylinders — Acetylene cylinders — Periodic inspection and maintenance.	Until further notice
ISO 11513:2011	Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection.	Until further notice
ISO 11623:2002	Transportable gas cylinders — Periodic inspection and testing of composite gas cylinders.	Until further notice
ISO 16111:2008	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.	Until further notice

Note.— The repair of welds described in clause 12.1 of this standard must not be permitted. Repairs described in clause 12.2 require the approval of the appropriate national authority which approved the periodic inspection and test body in accordance with 5.2.6.

5.2.5 Conformity assessment system and approval for manufacture of cylinders and closed cryogenic receptacles

UN Model Regulations, paragraph 6.2.2.5.2.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.5.2 General requirements

5.2.5.2.1 Appropriate national authority

5.2.5.2.1.1 The appropriate national authority that approves the cylinder and closed cryogenic receptacle must approve the conformity assessment system for the purpose of ensuring that cylinders and closed cryogenic receptacles conform to the requirements of these Instructions. In instances where the appropriate national authority that approves a cylinder and closed cryogenic receptacle is not the appropriate national authority in the country of manufacture, the marks of the approval country and the country of manufacture must be indicated in the cylinder and closed cryogenic receptacle ~~marking marks~~ (see 5.2.7 and 5.2.8). The appropriate national authority of the country of approval must supply to its counterpart in a country of use, upon request, evidence demonstrating compliance to this conformity assessment system.

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5.2.5.5 Production inspection and certification

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UN Model Regulations, paragraph 6.2.2.5.5, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.5.5.4 The manufacturer must, after approval by the inspection body, make a declaration of conformity with the certified design type. The application of the cylinder and closed cryogenic receptacle certification ~~marking marks~~ must be considered a declaration that the cylinder and closed cryogenic receptacle comply with the applicable cylinder and closed cryogenic receptacle standards, the requirements of this conformity assessment system and these Instructions. The inspection body must affix or delegate the manufacturer to affix the cylinder and closed cryogenic receptacle certification ~~marking marks~~ and the registered mark of the inspection body to each approved cylinder or closed cryogenic receptacle.

5.2.5.5.5 A certificate of compliance, signed by the inspection body and the manufacturer, must be issued before the cylinders and closed cryogenic receptacles are filled.

5.2.5.6 Records

Design type approval and certificate of compliance records must be retained by the manufacturer and the inspection body for not less than 20 years.

5.2.6 Approval system for periodic inspection and test of cylinders and closed cryogenic receptacles

5.2.6.1 Definitions

For the purposes of this section:

Approval system: means a system for the appropriate national authority approval of a body performing the periodic inspection and test of cylinders and closed cryogenic receptacles (hereinafter referred to as "periodic inspection and test body"), including approval of that body's quality system.

UN Model Regulations, paragraph 6.2.2.6.2.1, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.6.2 General requirements

5.2.6.2.1 Appropriate national authority

5.2.6.2.1.1 The appropriate national authority must establish an approval system for the purpose of ensuring that the periodic inspection and test of cylinders and closed cryogenic receptacles conform to the requirements of these Instructions. In instances where the appropriate national authority that approves the body performing periodic inspection and test of a cylinder and closed cryogenic receptacle is not the appropriate national authority of the country approving the manufacture of the cylinder, the marks of the approval country of periodic inspection and test must be indicated in the cylinder and closed cryogenic receptacle ~~marking~~ marks (see 5.2.7).

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UN Model Regulations, paragraph 6.2.2.6.5, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.6.5 Periodic inspection and test and certification

5.2.6.5.1 The application of the periodic inspection and test ~~marking~~ marks to a cylinder and closed cryogenic receptacle must be considered a declaration that the cylinder and closed cryogenic receptacle complies with the applicable cylinder and closed cryogenic receptacle standards and the requirements of these Instructions. The periodic inspection and test body must affix the periodic inspection and test ~~marking~~ marks, including its registered mark, to each approved cylinder and closed cryogenic receptacle (see 5.2.7.8).

5.2.6.5.2 A record certifying that a cylinder and closed cryogenic receptacle have passed the periodic inspection and test must be issued by the periodic inspection and test body before the cylinder and closed cryogenic receptacle are filled.

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UN Model Regulations, paragraph 6.2.2.7.4, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.7.4 The following manufacturing marks must be applied:

- m) Identification of the cylinder thread (e.g. 25E). (This mark is not required for closed cryogenic receptacles);
- n) The manufacturer's mark registered by the appropriate national authority. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark must be preceded by the character(s) identifying the country of manufacture, as indicated by the distinguishing signs of motor vehicles in international traffic. The country mark and the manufacturer's mark must be separated by a space or slash;
- o) The serial number assigned by the manufacturer;
- ≠ p) In the case of steel cylinders and closed cryogenic receptacles and composite cylinders and closed cryogenic 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 11114-1:2012):
 - q) For composite cylinders having a limited design life, the letters "FINAL" followed by the design life shown as the year (four digits) followed by the month (two digits) separated by a slash (i.e. "/");
 - r) For composite cylinders having a limited design life greater than fifteen years and for composite cylinders and tubes having non-limited design life, the letters "SERVICE" followed by the date fifteen years from the date of manufacture (initial inspection) shown as the year (four digits) followed by the month (two digits) separated by a slash (i.e. "/").

Note.— Once the initial design type has passed the service life test programme requirements in accordance with 5.2.1.1 Note 2, future production no longer requires this initial service life mark. The initial service life mark must be made unreadable on cylinders of a design type that has met the service life test programme requirements.

UN Model Regulations, paragraph 6.2.2.7.5, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.7.5 The above marks must be placed in three groups:

- a) Manufacturing marks must be the top grouping and must appear consecutively in the sequence given in 5.2.7.4 except for the marks described in 5.2.7.4 q) and r) which must be adjacent to the periodic inspection and test marks of 5.2.7.8;
- b) The operational marks in 5.2.7.3 must be the middle grouping and the test pressure f) which must be immediately preceded by the working pressure (i) when the latter is required;
- c) Certification marks must be the bottom grouping and must appear in the sequence given in 5.2.7.2.

The following is an example of the markings applied to a cylinder:

m) 25E	n) D MF	o) 765432	p) H		
i) PW200PH	f) 300BAR	g) 62.1KG	j) 50L	h) 5.8MM	
<div style="display: inline-block; border: 1px solid black; border-radius: 50%; padding: 2px; text-align: center;">u n</div> a)	b) ISO 9809-1	c) F	d) IB	e) 2000/12	

5.2.7.6 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. In the case of closed cryogenic receptacles, such marks may be on a separate plate attached to the outer jacket. Such marks must not conflict with required marks.

5.2.7.7 Cylinders of composite construction with limited life must be marked with the letters "FINAL" followed by the expiry date, the year (four digits) and the month (two digits).

UN Model Regulations, paragraph 6.2.2.7.7, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.7.8 In addition to the preceding marks, each refillable cylinder and closed cryogenic receptacle that meets the periodic inspection and test requirements of 5.2.4 must be marked indicating:

- a) the character(s) identifying the country authorizing the body performing the periodic inspection and test. This marking mark is not required if this body is approved by the appropriate national authority of the country approving manufacture;
- b) the registered mark of the body authorized by the appropriate national authority for performing the periodic inspection and test;
- c) the date of the periodic inspection and test, the year (two digits) followed by the month (two digits) separated by a slash (i.e. "/"). Four digits may be used to indicate the year.

The above marks must appear consecutively in the sequence given.

5.2.7.9 For acetylene cylinders, with the agreement of the national authority, the date of the most recent periodic inspection and the stamp of the body performing the periodic inspection and test may be engraved on a ring held on the cylinder by the valve. The ring must be configured so that it can be removed only by disconnecting the valve from the cylinder.

5.2.8 Marking of non-refillable UN cylinders and closed cryogenic receptacles

5.2.8.1 Non-refillable UN cylinders and closed cryogenic receptacles must be marked clearly and legibly with certification and gas or cylinder and closed cryogenic receptacle specific marks. These marks must be permanently affixed (e.g. stencilled, stamped, engraved or etched) on the cylinder. Except when stencilled, the marks must be on the shoulder, top end or neck of the cylinder and closed cryogenic receptacle or on a permanently affixed component of the cylinder and closed cryogenic receptacle (e.g. welded collar). Except for the "UN" mark and the "DO NOT REFILL" mark, the minimum size of the marks must be 5 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to

140 mm and 2.5 mm and closed cryogenic receptacles for cylinders with a diameter less than 140 mm. The minimum size of the “UN” mark must be 10 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to 140 mm and 5 mm for cylinders and closed cryogenic receptacles with a diameter less than 140 mm. The minimum size of the “DO NOT REFILL” mark must be 5 mm.

5.2.8.2 The marks listed in 5.2.7.2 to 5.2.7.4 must be applied with the exception of g), h) and m). The serial number o) may be replaced by the batch number. In addition, the words “DO NOT REFILL” in letters of at least 5 mm in height are required.

UN Model Regulations, paragraph 6.2.2.8.3, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.8.3 The requirements of 5.2.7.5 must apply.

Note.— Non-refillable cylinders and closed cryogenic receptacles may, on account of their size, substitute ~~this marking by a label~~ a label for these permanent marks.

5.2.8.4 Other marks are allowed provided they are made in low stress areas other than the side wall and are not of a size and depth that will create harmful stress concentrations. Such marks must not conflict with required marks.

5.2.9 Marking of UN metal hydride storage systems

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5.2.9.3 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. Such marks must not conflict with required marks.

UN Model Regulations, paragraph 6.2.2.9.4, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

5.2.9.4 In addition to the preceding marks, each metal hydride storage system that meets the periodic inspection and test requirements of 5.2.4 must be marked indicating:

- a) the character(s) identifying the country authorizing the body performing the periodic inspection and test, as indicated by the distinguishing sign of motor vehicles in international traffic. This ~~marking mark~~ is not required if this body is approved by the appropriate national authority of the country approving manufacture;
- b) the registered mark of the body authorized by the appropriate national authority for performing periodic inspection and test;
- c) the date of the periodic inspection and test, the year (two digits), followed by the month (two digits) and separated by a slash (i.e. “/”). Four digits may be used to indicate the year.

The above marks must appear consecutively in the sequence given.

...

Chapter 6

PACKAGINGS FOR INFECTIOUS SUBSTANCES OF CATEGORY A

...

6.4 MARKING

UN Model Regulations, paragraph 6.3.4, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

Note 1.— ~~The marking marks~~ indicates that the packaging which bears ~~it~~ them corresponds to a successfully tested design type and that it complies with the provisions of this chapter which are related to the manufacture, but not to the use, of the packaging.

Note 2.— ~~The marking is~~ marks are intended to be of assistance to packaging manufacturers, reconditioners, packaging users, operators and appropriate authorities.

Note 3.— ~~The marking does~~ marks do not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, test reports or register of successfully tested packagings.

6.4.1 Each packaging intended for use according to these Instructions must bear ~~markings~~ marks which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. For packages with a gross mass of more than 30 kg the ~~markings~~ marks, or a duplicate thereof, must appear on the top or on a side of the packaging. Letters, numerals and symbols must be at least 12 mm high, except for packagings of 30 L or 30 kg capacity or less, when they must be at least 6 mm in height and for packagings of 5 L or 5 kg or less, when they must be of an appropriate size.

6.4.2 A packaging that meets the requirements of this section and of 6.5 shall be marked with:

- a) the United Nations packaging symbol; 

This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapters 1 to 6;

- b) the code designating the type of packaging according to the requirements of 6;1.2;
- c) the text "CLASS 6.2";
- d) the last two digits of the year of manufacture of the packaging;
- e) the State authorizing the allocation of the mark, indicated by the distinguishing sign for motor vehicles in international traffic;
- f) the name of the manufacturer or other identification of the packaging specified by the competent authority; and
- g) for packagings meeting the requirements of 6.5.1.6, the letter "U", inserted immediately following the ~~marking~~ mark required in b) above.

6.4.3 ~~Markings~~ Marks must be applied in the sequence of the sub-paragraphs in 6.4.2; each ~~element of the marking~~ mark required in these sub-paragraphs must be clearly separated, e.g. by a slash or space, so as to be easily identified. For an example see 6.4.4. Any additional markings authorized by a competent authority must still enable the ~~parts of the marking~~ marks required in 6.4.1 to be correctly identified ~~with reference to 6.4.1~~.

6.4.4 Example of a marking:

 4G/CLASS 6.2/06 as in 6.4.2 a), b), c) and d)
S/SP-9989-ERIKSSON as in 6.4.2 e) and f)

UN Model Regulations, paragraph 6.3.5, ST/SG/AC.10/42/Add.1 and DGP-WG/15-WP/16 (see paragraph 3.2.6.1 of this report)

6.5 TEST REQUIREMENTS FOR PACKAGINGS

6.5.1 Performance and frequency of tests

...

6.5.1.6 Primary receptacles of any type may be assembled within a secondary packaging and transported without testing in the rigid outer packaging under the following conditions:

- a) The rigid outer packaging combination must have been successfully tested in accordance with 6.5.2.2 with fragile (e.g. glass) primary receptacles.
- b) The total combined gross mass of primary receptacles must not exceed one-half the gross mass of primary receptacles used for the drop test in a) above.
- c) The thickness of cushioning between primary receptacles and between primary receptacles and the outside of the secondary packaging must not be reduced below the corresponding thicknesses in the originally tested packaging; and if a single primary receptacle was used in the original test, the thickness of cushioning between primary receptacles must not be less than the thickness of cushioning between the outside of the secondary packaging and the primary receptacle in the original test. When either fewer or smaller primary receptacles are used (as compared to the primary receptacles used in the drop test), sufficient additional cushioning material must be used to take up the void spaces.
- d) The rigid outer packaging must have successfully passed the stacking test in 4.6 while empty. The total mass of identical packages must be based on the combined mass of packagings used in the drop test in a) above.
- e) For primary receptacles containing liquids, an adequate quantity of absorbent material to absorb the entire liquid content of the primary receptacles must be present.
- f) If the rigid outer packaging is intended to contain primary receptacles for liquids and is not leakproof, or is intended to contain primary receptacles for solids and is not siftproof, a means of containing any liquid or solid contents in the event of leakage must be provided in the form of a leakproof liner, plastic bag or other equally effective means of containment.
- g) In addition to the ~~markings~~ **marks** prescribed in 6.4.2 a) to f), packagings must be marked in accordance with 6.4.2 g).

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Part 7

OPERATOR'S RESPONSIBILITIES

...

DGP-WG/14 Report (see paragraph 3.2.7.2 of DGP-WG/14-WP/32)

Chapter 1

ACCEPTANCE PROCEDURES

...

1.2 ACCEPTANCE OF DANGEROUS GOODS BY OPERATORS

1.2.1 An operator must not accept for transport aboard an aircraft a package or overpack containing dangerous goods or a freight container containing radioactive material or a unit load device ~~or other type of pallet~~ containing the dangerous goods as described in 1.4.1 b) and c) unless:

- a) it is accompanied by two copies of the dangerous goods transport document; or
- b) the information applicable to the consignment is provided in electronic form; or
- c) it is accompanied, where permitted, by alternative documentation.

...

1.3 THE ACCEPTANCE CHECK

1.3.1 Before a consignment consisting of a package or overpack containing dangerous goods, a freight container containing radioactive material or a unit load device ~~or other type of pallet~~ containing dangerous goods as described in 1.4 is first accepted for carriage by air, the operator must, by use of a checklist, verify the following:

...

Note 1.— Minor discrepancies, such as the omission of dots and commas in the proper shipping name appearing on the transport document or on package markings, or minor variations in hazard labels which do not affect the obvious meaning of the label, are not considered as errors if they do not compromise safety and should not be considered as reason for rejecting a consignment.

Note 2.— Where packages are contained in an overpack or freight container, as permitted by 1.4, the checklist should establish the correct marking and labelling of such an overpack ~~or other type of pallet~~ or freight container and not the individual packages contained in them. Where packages are contained in a unit load device, as permitted by 1.4.1, the checklist should not require the checking of packages individually for the correct marking and labelling.

...

DGP-WG/14 Report (see paragraph 3.2.7.2 of DGP-WG/14-WP/32) and DGP-WG/15-WP/31, Revision No. 2 (see paragraph 3.2.7.4 of this report)

1.4 ACCEPTANCE OF FREIGHT CONTAINERS AND UNIT LOAD DEVICES

1.4.1 An operator must not accept from a shipper a freight container or a unit load device containing dangerous goods other than:

- a) a freight container for radioactive material (see 6;7.1);

- b) a unit load device ~~or other type of pallet~~ containing consumer commodities prepared according to Packing Instruction Y963;
- c) a unit load device ~~or other type of pallet~~ containing dry ice used as a refrigerant for other than dangerous goods prepared according to Packing Instruction 954 provided that the unit load device does not contain dangerous goods other than UN 3373, Biological substance, Category B or ID 8000, Consumer commodity or goods not subject to these Instructions; or
- d) a unit load device ~~or other type of pallet~~ containing magnetized material.

1.4.2 When an operator accepts a unit load device ~~or other type of pallet~~ containing consumer commodities or dry ice as permitted by 1.4.1, the operator must attach an identification tag as required by 2.8.1 to the unit load device.

...

DGP-WG/14 Report (see paragraph 3.2.7.2 of DGP-WG/14-WP/32)

Chapter 2

STORAGE AND LOADING

...

2.11 LOADING OF DRY ICE

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2.11.2 Where dry ice is contained in a unit load device ~~or other type of pallet~~ prepared by a single shipper in accordance with Packing Instruction 954 and the operator, after acceptance, adds additional dry ice, then the operator must ensure that the information provided to the pilot-in-command reflects that revised quantity of dry ice.

Note.— For arrangements between the shipper and operator see Packing Instruction 954.

...

Chapter 4

PROVISION OF INFORMATION

...

4.1 INFORMATION TO THE PILOT-IN-COMMAND

4.1.1 As early as practicable before departure of the aircraft, but in no case later than when the aircraft moves under its own power, the operator of an aircraft in which dangerous goods are to be carried must:

...

4.1.1.1 Except as otherwise provided, the information required by 4.1.1 must include the following:

...

DGP-WG/15-WP/23 (see paragraph 3.2.7.3 of this report)

- f) the net quantity, or gross mass if applicable, of each package, except that this does not apply to radioactive material or other dangerous goods where the net quantity or gross mass is not required on the dangerous goods transport document (see 5;4.1.4) or, when applicable, alternative written documentation. For a consignment consisting of multiple packages containing dangerous goods bearing the same proper shipping name and UN number or ID number, only the total quantity and an indication of the quantity of the largest and smallest package at each loading location need to be provided. ~~For unit load devices or other types of pallets containing consumer commodities accepted from a single shipper, the number of packages and the average gross mass need to be provided. For consumer commodities, the information provided may be either the gross mass of each package or the average gross mass of the packages as shown on the dangerous goods transport document;~~

...

4.11 RETENTION OF DOCUMENTS OR INFORMATION

...

4.11.2 For each package or overpack containing danwgerous goods or freight container containing radioactive material or unit load device ~~or other type of pallet~~ containing dangerous goods as described in 1.4 that was not accepted by an operator due to an error or omission by the shipper in packaging, labelling, marking or documentation, a copy of the documentation as well as the acceptance checklist (when this is in a form which requires physical completion) should be retained for a minimum period of three months after the completion of the acceptance checklist.

Note.— Where the documents are kept electronically or in a computer system, they should be capable of being reproduced in a printed manner.

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DGP-WG/15-WP/24 (see paragraph 3.2.8.2 of this report) and DGP-WG/15-WP/36 (see paragraph 3.2.8.5 of report)

New Item 19) to be incorporated in 2015-2016 Edition by way of an addendum.

Part 8

PROVISIONS CONCERNING PASSENGERS AND CREW

...

Table 8-1. Provisions for dangerous goods carried by passengers or crew

Items or articles	Location			Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
	Checked baggage	Carry-on baggage	On the person			
...						
Medical necessities						
...						
8) Portable medical electronic devices (automated external defibrillators (AED), nebulizer, continuous positive airway pressure (CPAP), etc.) containing lithium metal or lithium ion cells or batteries						
Portable medical electronic devices containing lithium metal cells or batteries not exceeding 2 grams or lithium ion cells or batteries not exceeding 100 Wh	Yes	Yes	Yes	No	No	a) carried by passengers for medical use; and b) each installed or spare battery batteries or cells must be of a type which meets the requirements of each test in the UN <i>Manual of Tests and Criteria</i> , Part III, subsection 38.3; e) spare batteries must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch); and d) no more than two spare batteries exceeding 2 grams lithium content for lithium metal or a watt-hour rating exceeding 100 Wh for lithium ion may be carried by a passenger.

Items or articles	Location			Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
	Checked baggage	Carry-on baggage	On the person			
Spare batteries for portable medical electronic devices containing lithium metal cells or batteries not exceeding 2 grams or lithium ion cells or batteries not exceeding 100 Wh	No	Yes	Yes	No	No	<p><u>a) carried by passengers for medical use;</u></p> <p><u>b) batteries or cells must be of a type which meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3; and</u></p> <p><u>c) must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch).</u></p>
Portable medical electronic devices containing lithium metal batteries exceeding 2 grams but not exceeding 8 grams or lithium ion batteries exceeding 100 Wh but not exceeding 160 Wh	Yes	Yes	Yes	Yes	No	<p><u>a) carried by passengers for medical use; and</u></p> <p><u>b) batteries or cells must be of a type which meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3.</u></p>
Spare batteries for portable medical electronic devices containing lithium metal batteries exceeding 2 grams but not exceeding 8 grams or lithium ion batteries exceeding 100 Wh but not exceeding 160 Wh	No	Yes	Yes	Yes	No	<p><u>a) carried by passengers for medical use;</u></p> <p><u>b) batteries or cells must be of a type which meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3;</u></p> <p><u>c) must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch); and</u></p> <p><u>d) no more than two spare batteries exceeding 2 grams lithium content for lithium metal or a watt-hour rating exceeding 100 Wh for lithium ion may be carried</u></p>

Items or articles	Location			Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
	Checked baggage	Carry-on baggage	On the person			
Consumer articles						
...						
19) <u>Battery powered portable electronic smoking devices (e.g. e-cigarettes, e-cigs, e-cigars, e-pipes, personal vaporizers, electronic nicotine delivery systems)</u>	No	Yes	Yes	No	No	<p>a) <u>carried by passengers or crew for personal use;</u></p> <p>b) <u>spare batteries must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch);</u></p> <p>c) <u>each battery must not exceed the following:</u></p> <ul style="list-style-type: none"> — <u>for lithium metal batteries, a lithium content of not more than 2 grams; or</u> — <u>for lithium ion batteries, a Watt-hour rating of not more than 100 Wh;</u> <p>d) <u>each lithium battery must be of a type which meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3; and</u></p> <p>e) <u>recharging of the devices and/or batteries on board the aircraft is not permitted.</u></p>
19) Portable electronic devices (such as watches, calculating machines, cameras, cellular phones, laptop computers, camcorders)						
Portable electronic devices (including medical devices) containing lithium metal or lithium ion cells or batteries (articles containing lithium metal or lithium ion cells or batteries the primary purpose of which is to provide power to another device must be carried as spare batteries in accordance with the item below)	Yes	Yes	Yes	No	No	<p>a) carried by passengers or crew for personal use;</p> <p>b) should be carried as carry-on baggage;</p> <p>c) each battery must not exceed the following:</p> <ul style="list-style-type: none"> — for lithium metal batteries, a lithium content of not more than 2 grams; or — for lithium ion batteries, a Watt-hour rating of not more than 100 Wh; <p>d) if devices are carried in checked baggage, measures must be taken to prevent unintentional activation; and</p> <p>e) batteries and cells must be of a type which meets the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3.</p>

Items or articles	Location			Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
	Checked baggage	Carry-on baggage	On the person			
Spare batteries for portable electronic devices (including medical devices) containing lithium metal or lithium ion cells or batteries	No	Yes	Yes	No	No	<p>a) carried by passengers or crew for personal use;</p> <p>b) must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch);</p> <p>c) each battery must not exceed the following:</p> <ul style="list-style-type: none"> — for lithium metal batteries, a lithium content of not more than 2 grams; or — for lithium ion batteries, a Watt-hour rating of not more than 100 Wh; and <p>d) batteries and cells must be of a type which meets the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3.</p>
Portable electronic devices containing lithium ion batteries exceeding a Watt-hour rating of 100 Wh but not exceeding 160 Wh	Yes	Yes	Yes	Yes	No	<p>a) carried by passengers or crew for personal use;</p> <p>b) should be carried as carry-on baggage; and</p> <p>c) batteries and cells must be of a type which meets the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3.</p>
Spare batteries for portable electronic devices containing lithium ion batteries exceeding a Watt-hour rating of 100 Wh but not exceeding 160 Wh	No	Yes	Yes	Yes	No	<p>a) carried by passengers or crew for personal use;</p> <p>b) no more than two individually protected spare batteries per person;</p> <p>c) must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch); and</p> <p>d) batteries and cells must be of a type which meets the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3.</p>

...

ATTACHMENT A**PROPOSED AMENDMENTS TO TABLE 3-1 — UN NUMBER ORDER**

The format for displaying the amendments to Table 3-1 is as follows:

Modified entries

- both the original and the modified entry are printed;
- both modified and non-modified fields are printed;
- the original entry is printed in a shaded box with an asterisk in the left margin;
- check boxes are printed above the field(s) which have been modified;
- the modified entry is shown without shading below the original entry; and
- the “≠” symbol is printed in the left margin.

Deleted entries

- deleted entries are displayed in a shaded box with an asterisk in the left margin;
- check boxes are shown above each field; and
- the “>” symbol is displayed in the left margin below the shaded box to indicate that the entry will be deleted.

New entries

New entries are shown without shading with the “+” symbol in the left margin.

Table 3-1. Dangerous Goods List

Name 1	UN No. 2	Class or division 3	Subsidiary risk 4	Labels 5	State variations 6	Special provisions 7	UN packing group 8	Excepted quantity 9	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction 10	Max. net quantity per package 11	Packing instruction 12	Max. net quantity per package 13
+ Rocket motors †	0510	1.4C		Explosive 1.4				E0	FORBIDDEN		130	75 kg
* Argon, compressed	1006	2.2		Gas non-flammable		☑ A69		E1	200	75 kg	200	150 kg
≠ Argon, compressed	1006	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* Butadienes, stabilized	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	☑ A1		E0	FORBIDDEN		200	150 kg
≠ Butadienes, stabilized	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Butadienes and hydrocarbon mixture, stabilized, containing more than 40% butadienes	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	☑ A1		E0	FORBIDDEN		200	150 kg
≠ Butadienes and hydrocarbon mixture, stabilized, containing more than 40% butadienes	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Carbon dioxide	1013	2.2		Gas non-flammable		☑		E1	200	75 kg	200	150 kg
≠ Carbon dioxide	1013	2.2		Gas non-flammable		A202		E1	200	75 kg	200	150 kg
* Helium, compressed	1046	2.2		Gas non-flammable		☑ A69		E1	200	75 kg	200	150 kg
≠ Helium, compressed	1046	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* Hydrogen cyanide, stabilized containing less than 3% water	1051	6.1	3			☑			FORBIDDEN		FORBIDDEN	
≠ Hydrogen cyanide, stabilized containing less than 3% water	1051	6.1	3			A209			FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Krypton, compressed	1056	2.2		Gas non-flammable		☑ A69		E1	200	75 kg	200	150 kg
≠ Krypton, compressed	1056	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* Methylacetylene and propadiene mixture, stabilized †	1060	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	☑ A1		E0	FORBIDDEN		200	150 kg
≠ Methylacetylene and propadiene mixture, stabilized †	1060	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Neon, compressed	1065	2.2		Gas non-flammable		☑ A69		E1	200	75 kg	200	150 kg
≠ Neon, compressed	1065	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* Nitrogen, compressed	1066	2.2		Gas non-flammable		☑ A69		E1	200	75 kg	200	150 kg
≠ Nitrogen, compressed	1066	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* Tetrafluoroethylene, stabilized	1081	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	☑ A1		E0	FORBIDDEN		200	150 kg
≠ Tetrafluoroethylene, stabilized	1081	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Trifluorochloroethylene, stabilized	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A2			FORBIDDEN		FORBIDDEN	
≠ Trifluorochloroethylene, stabilized	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2 A209			FORBIDDEN		FORBIDDEN	
* Refrigerant gas R 1113	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A2			FORBIDDEN		FORBIDDEN	
≠ Refrigerant gas R 1113	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2 A209			FORBIDDEN		FORBIDDEN	
* Vinyl bromide, stabilized	1085	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A1		E0	FORBIDDEN		200	150 kg
≠ Vinyl bromide, stabilized	1085	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Vinyl chloride, stabilized	1086	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	<input checked="" type="checkbox"/> A1		E0	FORBIDDEN		200	150 kg
≠ Vinyl chloride, stabilized	1086	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A1 A209		E0	FORBIDDEN		200	150 kg

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Vinyl methyl ether, stabilized	1087	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A1			E0	FORBIDDEN	200	150 kg
≠ Vinyl methyl ether, stabilized	1087	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209			E0	FORBIDDEN	200	150 kg
* Acrolein, stabilized	1092	6.1	3			<input checked="" type="checkbox"/>				FORBIDDEN	FORBIDDEN	
≠ Acrolein, stabilized	1092	6.1	3			A209				FORBIDDEN	FORBIDDEN	
* Acrylonitrile, stabilized	1093	3	6.1	Liquid flammable & Toxic		<input checked="" type="checkbox"/>		I	E0	FORBIDDEN	361	30 L
≠ Acrylonitrile, stabilized	1093	3	6.1	Liquid flammable & Toxic		A209	I		E0	FORBIDDEN	361	30 L
* Crotonaldehyde, stabilized	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	<input checked="" type="checkbox"/> A2				FORBIDDEN	FORBIDDEN	
≠ Crotonaldehyde, stabilized	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2 A209				FORBIDDEN	FORBIDDEN	
* Crotonaldehyde	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	<input checked="" type="checkbox"/> A2				FORBIDDEN	FORBIDDEN	
≠ Crotonaldehyde	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2 A209				FORBIDDEN	FORBIDDEN	

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Divinyl ether, stabilized	1167	3		Liquid flammable		☑	I	E3	351	1 L	361	30 L
≠ Divinyl ether, stabilized	1167	3		Liquid flammable		A209	I	E3	351	1 L	361	30 L
* Ethyleneimine, stabilized	1185	6.1	3			☑			FORBIDDEN		FORBIDDEN	
≠ Ethyleneimine, stabilized	1185	6.1	3			A209			FORBIDDEN		FORBIDDEN	
* Isoprene, stabilized	1218	3		Liquid flammable		☑	I	E3	351	1 L	361	30 L
≠ Isoprene, stabilized	1218	3		Liquid flammable		A209	I	E3	351	1 L	361	30 L
* Methyl isopropenyl ketone, stabilized	1246	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Methyl isopropenyl ketone, stabilized	1246	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Methyl methacrylate monomer, stabilized	1247	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Methyl methacrylate monomer, stabilized	1247	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Methyl vinyl ketone, stabilized	1251	6.1	3 8			☑			FORBIDDEN		FORBIDDEN	
≠ Methyl vinyl ketone, stabilized	1251	6.1	3 8			A209			FORBIDDEN		FORBIDDEN	
* Vinyl acetate, stabilized	1301	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Vinyl acetate, stabilized	1301	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Vinyl ethyl ether, stabilized	1302	3		Liquid flammable		☑	I	E3	351	1 L	361	30 L
≠ Vinyl ethyl ether, stabilized	1302	3		Liquid flammable		A209	I	E3	351	1 L	361	30 L
* Vinylidene chloride, stabilized	1303	3		Liquid flammable		☑	I	E3	351	1 L	361	30 L
≠ Vinylidene chloride, stabilized	1303	3		Liquid flammable		A209	I	E3	351	1 L	361	30 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Vinyl isobutyl ether, stabilized	1304	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Vinyl isobutyl ether, stabilized	1304	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Allyl isothiocyanate, stabilized	1545	6.1	3	Toxic & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	☑ A1	II	E0	FORBIDDEN		661	60 L
≠ Allyl isothiocyanate, stabilized	1545	6.1	3	Toxic & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209	II	E0	FORBIDDEN		661	60 L
* Cyanogen chloride, stabilized	1589	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	☑ A2			FORBIDDEN		FORBIDDEN	
≠ Cyanogen chloride, stabilized	1589	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2 A209			FORBIDDEN		FORBIDDEN	
* Hydrogen cyanide, stabilized containing less than 3% water and absorbed in a porous inert material	1614	6.1				☑			FORBIDDEN		FORBIDDEN	
≠ Hydrogen cyanide, stabilized containing less than 3% water and absorbed in a porous inert material	1614	6.1				A209			FORBIDDEN		FORBIDDEN	
* Allyltrichlorosilane, stabilized	1724	8	3	Corrosive & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	☑ A1	II	E0	FORBIDDEN		876	30 L
≠ Allyltrichlorosilane, stabilized	1724	8	3	Corrosive & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209	II	E0	FORBIDDEN		876	30 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only		
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package	
									10	11	12	13	
* Sulphur trioxide, stabilized	1829	8			AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A2				FORBIDDEN		FORBIDDEN	
≠ Sulphur trioxide, stabilized	1829	8			AU 1 CA 7 IR 3 NL 1 US 3	A2 A209				FORBIDDEN		FORBIDDEN	
* Vinyl fluoride, stabilized	1860	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A1		E0		FORBIDDEN	200	150 kg	
≠ Vinyl fluoride, stabilized	1860	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0		FORBIDDEN	200	150 kg	
* Ethyl acrylate, stabilized	1917	3		Liquid flammable		<input checked="" type="checkbox"/>	II	E2	353 Y341	5 L 1 L	364	60 L	
≠ Ethyl acrylate, stabilized	1917	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L	
* Methyl acrylate, stabilized	1919	3		Liquid flammable		<input checked="" type="checkbox"/>	II	E2	353 Y341	5 L 1 L	364	60 L	
≠ Methyl acrylate, stabilized	1919	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L	
* Propyleneimine, stabilized	1921	3	6.1	Liquid flammable & Toxic	US 4	<input checked="" type="checkbox"/>	I	E0			FORBIDDEN	361	30 L
≠ Propyleneimine, stabilized	1921	3	6.1	Liquid flammable & Toxic	US 4		I	E0			FORBIDDEN	361	30 L
* Aerosols, non-flammable	1950	2.2		Gas non-flammable				E0	<input checked="" type="checkbox"/>	203 or 204 Y203 or Y204	75 kg 30 kg G	<input checked="" type="checkbox"/>	203 or 204 150 kg
≠ Aerosols, non-flammable	1950	2.2		Gas non-flammable				E0		203 Y203	75 kg 30 kg G		203 150 kg

Chapter 2

3-2-11

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only		
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package	
1	2	3	4	5	6	7	8	9	10	11	12	13	
* Aerosols, non-flammable (tear gas devices)	1950	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A145 A167			E0	FORBIDDEN	<input checked="" type="checkbox"/>	212	50 kg
≠ Aerosols, non-flammable (tear gas devices)	1950	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A145 A167			E0	FORBIDDEN		203	50 kg
* Compressed gas, n.o.s.*	1956	2.2		Gas non-flammable		<input checked="" type="checkbox"/>			E1	200	75 kg	200	150 kg
≠ Compressed gas, n.o.s.*	1956	2.2		Gas non-flammable		A202			E1	200	75 kg	200	150 kg
* Chloroprene, stabilized	1991	3	6.1	Liquid flammable & Toxic		<input checked="" type="checkbox"/>		I	E0	FORBIDDEN		361	30 L
≠ Chloroprene, stabilized	1991	3	6.1	Liquid flammable & Toxic		A209		I	E0	FORBIDDEN		361	30 L
* Celluloid, in blocks, rods, rolls, sheets, tubes, etc. (except scrap)	2000	4.1		Solid flammable		<input checked="" type="checkbox"/>		III	E1	456	25 kg	456	100 kg
≠ Celluloid, in blocks, rods, rolls, sheets, tubes, etc. (except scrap)	2000	4.1		Solid flammable		A3 A48 A205		III	E1	456	25 kg	456	100 kg
* Xenon	2036	2.2		Gas non-flammable		<input checked="" type="checkbox"/>			E1	200	75 kg	200	150 kg
≠ Xenon	2036	2.2		Gas non-flammable		A69 A202			E1	200	75 kg	200	150 kg
* Styrene monomer, stabilized	2055	3		Liquid flammable		<input checked="" type="checkbox"/>		III	E1	355 Y344	60 L 10 L	366	220 L
≠ Styrene monomer, stabilized	2055	3		Liquid flammable		A209		III	E1	355 Y344	60 L 10 L	366	220 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Propadiene, stabilized	2200	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
≠ Propadiene, stabilized	2200	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Polymeric beads, expandable, evolving flammable vapour †	2211	9		Miscellaneous		A38	III	E1	957	100 kg	957	200 kg
≠ Polymeric beads, expandable, evolving flammable vapour †	2211	9		Miscellaneous		A204	III	E1	957	100 kg	957	200 kg
* Paraformaldehyde	2213	4.1		Solid flammable			III	E1	446 Y443	25 kg 10 kg	449	100 kg
≠ Paraformaldehyde	2213	4.1		Solid flammable		A3	III	E1	446 Y443	25 kg 10 kg	449	100 kg
* Acrylic acid, stabilized	2218	8	3	Corrosive & Liquid flammable			II	E2	851 Y840	1 L 0.5 L	855	30 L
≠ Acrylic acid, stabilized	2218	8	3	Corrosive & Liquid flammable		A209	II	E2	851 Y840	1 L 0.5 L	855	30 L
* n-Butyl methacrylate, stabilized	2227	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
≠ n-Butyl methacrylate, stabilized	2227	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Bicyclo [2.2.1] hepta-2-5-diene, stabilized	2251	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠ Bicyclo [2.2.1] hepta-2-5-diene, stabilized	2251	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* 2,5-Norbornadiene, stabilized	2251	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠ 2,5-Norbornadiene, stabilized	2251	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Ethyl methacrylate, stabilized	2277	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Ethyl methacrylate, stabilized	2277	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Isobutyl methacrylate, stabilized	2283	3		Liquid flammable		☑	III	E1	355 Y344	60 L 10 L	366	220 L
≠ Isobutyl methacrylate, stabilized	2283	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Butyl acrylates, stabilized	2348	3		Liquid flammable		☑	III	E1	355 Y344	60 L 10 L	366	220 L
≠ Butyl acrylates, stabilized	2348	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Butyl vinyl ether, stabilized	2352	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Butyl vinyl ether, stabilized	2352	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Dipropylamine	2383	3	8	Liquid flammable & Corrosive		☑	II	E2	352 Y340	1 L 0.5 L	363	5 L
≠ Dipropylamine	2383	3	8	Liquid flammable & Corrosive		A209	II	E2	352 Y340	1 L 0.5 L	363	5 L
* Methacrylaldehyde, stabilized	2396	3	6.1	Liquid flammable & Toxic		☑	II	E2	352 Y341	1 L 1 L	364	60 L
≠ Methacrylaldehyde, stabilized	2396	3	6.1	Liquid flammable & Toxic		A209	II	E2	352 Y341	1 L 1 L	364	60 L
* Ethylacetylene, stabilized	2452	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	☑ A1		E0	FORBIDDEN		200	150 kg
≠ Ethylacetylene, stabilized	2452	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Diketene, stabilized	2521	6.1	3			✓			FORBIDDEN		FORBIDDEN	
≠ Diketene, stabilized	2521	6.1	3			A209			FORBIDDEN		FORBIDDEN	
* Isobutyl acrylate, stabilized	2527	3		Liquid flammable		✓	III	E1	355 Y344	60 L 10 L	366	220 L
≠ Isobutyl acrylate, stabilized	2527	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Methacrylic acid, stabilized	2531	8		Corrosive		✓	II	E2	851 Y840	1 L 0.5 L	855	30 L
≠ Methacrylic acid, stabilized	2531	8		Corrosive		A209	II	E2	851 Y840	1 L 0.5 L	855	30 L
* Acrolein dimer, stabilized	2607	3		Liquid flammable		✓	III	E1	355 Y344	60 L 10 L	366	220 L
≠ Acrolein dimer, stabilized	2607	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Vinyltoluenes, stabilized	2618	3		Liquid flammable		✓	III	E1	355 Y344	60 L 10 L	366	220 L
≠ Vinyltoluenes, stabilized	2618	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* N-Aminoethylpiperazine	2815	8	✓	Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
≠ N-Aminoethylpiperazine	2815	8	6.1	Corrosive & Toxic			III	E1	852 Y841	5 L 1 L	856	60 L
* Vinyl butyrate, stabilized	2838	3		Liquid flammable		✓	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Vinyl butyrate, stabilized	2838	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Radioactive material, uranium hexafluoride, fissile	2977	7	✓	Radioactive & Corrosive					See Part 2;7 and Part 4;9			
≠ Radioactive material, uranium hexafluoride, fissile	2977	7	6.1 8	Radioactive & Toxic & Corrosive					See Part 2;7 and Part 4;9			

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Radioactive material, uranium hexafluoride, non-fissile or fissile excepted	2978	7	8	Radioactive & Corrosive	CA 1	A139			See Part 2;7	and Part 4;9		
≠ Radioactive material, uranium hexafluoride, non-fissile or fissile excepted	2978	7	6.1 8	Radioactive & Toxic & Corrosive	CA 1	A139			See Part 2;7	and Part 4;9		
* 1,2-Butylene oxide, stabilized	3022	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠ 1,2-Butylene oxide, stabilized	3022	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Vinylpyridines, stabilized	3073	6.1	3 8	Toxic & Liquid flammable & Corrosive			II	E4	653 Y640	1 L 0.5 L	660	30 L
≠ Vinylpyridines, stabilized	3073	6.1	3 8	Toxic & Liquid flammable & Corrosive		A209	II	E4	653 Y640	1 L 0.5 L	660	30 L
* Methacrylonitrile, stabilized	3079	6.1	3								FORBIDDEN	FORBIDDEN
≠ Methacrylonitrile, stabilized	3079	6.1	3			A209					FORBIDDEN	FORBIDDEN
* Lithium metal batteries (including lithium alloy batteries) †	3090	9		Miscellaneous	US 2 US 3	A88 A99 A154 A164 A183 A201		E0			FORBIDDEN	See 968
≠ Lithium metal batteries (including lithium alloy batteries) †	3090	9		Miscellaneous	US 2 US 3	A88 A99 A154 A164 A183 A201 A206		E0			FORBIDDEN	See 968

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Lithium metal batteries contained in equipment (including lithium alloy batteries) †	3091	9		Miscellaneous	US 2 US 3	<input checked="" type="checkbox"/> A48 A99 A154 A164 A181 A185		E0	970	5 kg	970	35 kg
≠ Lithium metal batteries contained in equipment (including lithium alloy batteries) †	3091	9		Miscellaneous	US 2 US 3	A48 A88 A99 A154 A164 A181 A185 A206		E0	970	5 kg	970	35 kg
* Lithium metal batteries packed with equipment (including lithium alloy batteries) †	3091	9		Miscellaneous	US 2 US 3	<input checked="" type="checkbox"/> A99 A154 A164 A181 A185		E0	969	5 kg	969	35 kg
≠ Lithium metal batteries packed with equipment (including lithium alloy batteries) †	3091	9		Miscellaneous	US 2 US 3	A88 A99 A154 A164 A181 A185 A206		E0	969	5 kg	969	35 kg
<input checked="" type="checkbox"/> * Polyhalogenated biphenyls, liquid	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
≠ Polyhalogenated biphenyls, liquids	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
<input checked="" type="checkbox"/> * Polyhalogenated terphenyls, liquid	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
≠ Polyhalogenated terphenyls, liquids	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
+ Halogenated monomethyldiphenylmethanes, liquids	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
<input checked="" type="checkbox"/>												
* Polyhalogenated biphenyls, solid	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
≠ Polyhalogenated biphenyls, solids	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
<input checked="" type="checkbox"/>												
* Polyhalogenated terphenyls, solid	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
≠ Polyhalogenated terphenyls, solids	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
+ Halogenated monomethyldiphenylmethanes, solids	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
<input checked="" type="checkbox"/>												
* Vehicle, flammable gas powered	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134		E0	FORBIDDEN		951	No limit
≠ Vehicle, flammable gas powered	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134 A203 A207		E0	FORBIDDEN		951	No limit
<input checked="" type="checkbox"/>												
* Vehicle, flammable liquid powered	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134		E0	950	No limit	950	No limit
≠ Vehicle, flammable liquid powered	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134 A203 A207		E0	950	No limit	950	No limit

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Vehicle, fuel cell, flammable gas powered †	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A176		E0	FORBIDDEN		951	No limit
≠ Vehicle, fuel cell, flammable gas powered †	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134 A176 A203 A207		E0	FORBIDDEN		951	No limit
* Vehicle, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A176		E0	950	No limit	950	No limit
≠ Vehicle, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134 A176 A203 A207		E0	950	No limit	950	No limit
<input checked="" type="checkbox"/> * Polyester resin kit †	3269	3		Liquid flammable		A66 A163	II III	E0 E0	370 Y370 370 Y370	5 kg 1 kg 10 kg 5 kg	370 370	5 kg 10 kg
≠ Polyester resin kit , liquid base material †	3269	3		Liquid flammable		A66 A163	II III	E0 E0	370 Y370 370 Y370	5 kg 1 kg 10 kg 5 kg	370 370	5 kg 10 kg

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous	US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A183			E0	See 965		See 965
≠ Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous	US 3	A88 A99 A154 A164 A183 A206			E0	See 965		See 965
* Lithium ion batteries contained in equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous	US 3	<input checked="" type="checkbox"/> A48 A99 A154 A164 A181 A185			E0	967	5 kg	967 35 kg
≠ Lithium ion batteries contained in equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous	US 3	A48 A88 A99 A154 A164 A181 A185 A206			E0	967	5 kg	967 35 kg
* Lithium ion batteries packed with equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous	US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A181 A185			E0	966	5 kg	966 35 kg
≠ Lithium ion batteries packed with equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous	US 3	A88 A99 A154 A164 A181 A185 A206			E0	966	5 kg	966 35 kg

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Uranium hexafluoride, radioactive material, excepted package, less than 0.1 kg per package, non-fissile or fissile-excepted	3507	8	7	Corrosive		A139 A194	I	E0	See 877		See 877	
≠ Uranium hexafluoride, radioactive material, excepted package, less than 0.1 kg per package, non-fissile or fissile-excepted	3507	6.1	7 8	Toxic & Corrosive		A139 A194	I	E0	See 603		See 603	
+ Polyester resin kit, solid base material	3527	4.1		Solid flammable		A66 A163	II III	E0 E0	450 Y450 450 Y450	5 kg 1 kg 10 kg 5 kg	450 450	5 kg 10 kg
* Engine, internal combustion, flammable liquid powered	3166	9		Miscellaneous		A67 A70 A87 A134		E0	950	No limit	950	No limit
≠ Engine, internal combustion, flammable liquid powered	3528	3		Liquid flammable		[A208]		E0	378	No limit	378	No limit
* Engine, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		A67 A70 A87 A134 A176		E0	950	No limit	950	No limit
≠ Engine, fuel cell, flammable liquid powered †	3528	3		Liquid flammable		[A176] [A134] [A87] [A70] [A67] [A208]		E0	378	No limit	378	No limit
+ Machinery, internal combustion, flammable liquid powered	3528	3		Liquid flammable		[A208] [A134] [A87] [A70] [A67]		E0	[378]	[No limit]	[378]	[No limit]
+ Machinery, fuel cell, flammable liquid powered	3528	3		Liquid flammable		[A208] [A176] [A134] [A87] [A70] [A67]		E0	[378]	[No limit]	[378]	[No limit]

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
* Engine, internal combustion, flammable gas powered	3166	9		Miscellaneous		A67 A70 A87 A134		E0	FORBIDDEN		951	No limit
≠ Engine, internal combustion, flammable gas powered	3529	2.1		Gas flammable		[A176] [A208]		E0	FORBIDDEN		220	No limit
* Engine, fuel cell, flammable gas powered †	3166	9		Miscellaneous		A67 A70 A87 A134 A176		E0	FORBIDDEN		951	No limit
≠ Engine, fuel cell, flammable gas powered †	3529	2.1		Gas flammable		[A176] [A208]		E0	FORBIDDEN		220	No limit
+ Machinery, internal combustion, flammable gas powered	3529	2.1		Gas flammable		[A208]		E0	FORBIDDEN		220	No limit
+ Machinery, fuel cell, flammable gas powered	3529	2.1		Gas flammable		[A208]		E0	FORBIDDEN		220	No limit
+ Engine, internal combustion	3530	9		Miscellaneous		[A208]		E0	972	[No limit]	972	[No limit]
+ Machinery, internal combustion	3530	9		Miscellaneous		[A208]		E0	972	[No limit]	972	[No limit]
+ Polymerizing substance, solid, stabilized, n.o.s.*	3531	4.1		Solid flammable		A209	III	E0	446 Y443	25 kg 10 kg	449	100 kg
+ Polymerizing substance, liquid, stabilized, n.o.s.*	3532	4.1		Solid flammable		A209	III	E0	446 Y443	25 kg 10 kg	449	100 kg
+ Polymerizing substance, solid, temperature controlled, n.o.s.*	3533	4.1				A209		E0	FORBIDDEN		FORBIDDEN	
+ Polymerizing substance, liquid, temperature controlled, n.o.s.*	3534	4.1				A209		E0	FORBIDDEN		FORBIDDEN	

ATTACHMENT B**PROPOSED AMENDMENTS TO TABLE 3-1 — ALPHABETICAL ORDER**

The format for displaying the amendments to Table 3-1 is as follows:

Modified entries

- both the original and the modified entry are printed;
- both modified and non-modified fields are printed;
- the original entry is printed in a shaded box with an asterisk in the left margin;
- check boxes are printed above the field(s) which have been modified;
- the modified entry is shown without shading below the original entry; and
- the “≠” symbol is printed in the left margin.

Deleted entries

- deleted entries are displayed in a shaded box with an asterisk in the left margin;
- check boxes are shown above each field; and
- the “>” symbol is displayed in the left margin below the shaded box to indicate that the entry will be deleted.

New entries

New entries are shown without shading with the “+” symbol in the left margin.

Table 3-1. Dangerous Goods List

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Acrolein dimer, stabilized	2607	3		Liquid flammable		☑	III	E1	355 Y344	60 L 10 L	366	220 L
≠ Acrolein dimer, stabilized	2607	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Acrolein, stabilized	1092	6.1	3			☑			FORBIDDEN		FORBIDDEN	
≠ Acrolein, stabilized	1092	6.1	3			A209			FORBIDDEN		FORBIDDEN	
* Acrylic acid, stabilized	2218	8	3	Corrosive & Liquid flammable		☑	II	E2	851 Y840	1 L 0.5 L	855	30 L
≠ Acrylic acid, stabilized	2218	8	3	Corrosive & Liquid flammable		A209	II	E2	851 Y840	1 L 0.5 L	855	30 L
* Acrylonitrile, stabilized	1093	3	6.1	Liquid flammable & Toxic		☑	I	E0	FORBIDDEN		361	30 L
≠ Acrylonitrile, stabilized	1093	3	6.1	Liquid flammable & Toxic		A209	I	E0	FORBIDDEN		361	30 L
* Aerosols, non-flammable	1950	2.2		Gas non-flammable		A98 A145 A167		E0	☑ 203 or 204 Y203 or Y204	75 kg 30 kg G	☑ 203 or 204	150 kg
≠ Aerosols, non-flammable	1950	2.2		Gas non-flammable		A98 A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
* Aerosols, non-flammable (tear gas devices)	1950	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A145 A167		E0	FORBIDDEN		☑ 212	50 kg
≠ Aerosols, non-flammable (tear gas devices)	1950	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 IR 3 NL 1 US 3	A1 A145 A167		E0	FORBIDDEN		203	50 kg

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Allyl isothiocyanate, stabilized	1545	6.1	3	Toxic & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A1	II	E0	FORBIDDEN		661	60 L
≠ Allyl isothiocyanate, stabilized	1545	6.1	3	Toxic & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209	II	E0	FORBIDDEN		661	60 L
* Allyltrichlorosilane, stabilized	1724	8	3	Corrosive & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A1	II	E0	FORBIDDEN		876	30 L
≠ Allyltrichlorosilane, stabilized	1724	8	3	Corrosive & Liquid flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209	II	E0	FORBIDDEN		876	30 L
* N-Aminoethylpiperazine	2815	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Corrosive			III	E1	852 Y841	5 L 1 L	856	60 L
≠ N-Aminoethylpiperazine	2815	8	6.1	Corrosive & Toxic			III	E1	852 Y841	5 L 1 L	856	60 L
* Argon, compressed	1006	2.2		Gas non-flammable		<input checked="" type="checkbox"/> A69		E1	200	75 kg	200	150 kg
≠ Argon, compressed	1006	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* Bicyclo [2.2.1] hepta-2-5-diene, stabilized	2251	3		Liquid flammable		<input checked="" type="checkbox"/>	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Bicyclo [2.2.1] hepta-2-5-diene, stabilized	2251	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Butadienes and hydrocarbon mixture, stabilized, containing more than 40% butadienes	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
≠ Butadienes and hydrocarbon mixture, stabilized, containing more than 40% butadienes	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Butadienes, stabilized	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
≠ Butadienes, stabilized	1010	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Butyl acrylates, stabilized	2348	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
≠ Butyl acrylates, stabilized	2348	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* 1,2-Butylene oxide, stabilized	3022	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠ 1,2-Butylene oxide, stabilized	3022	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* n-Butyl methacrylate, stabilized	2227	3		Liquid flammable			III	E1	355 Y344	60 L 10 L	366	220 L
≠ n-Butyl methacrylate, stabilized	2227	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Butyl vinyl ether, stabilized	2352	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠ Butyl vinyl ether, stabilized	2352	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L

Chapter 2

3-2-7

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Carbon dioxide	1013	2.2		Gas non-flammable		☑		E1	200	75 kg	200	150 kg
≠ Carbon dioxide	1013	2.2		Gas non-flammable		A202		E1	200	75 kg	200	150 kg
* Celluloid, in blocks, rods, rolls, sheets, tubes, etc. (except scrap)	2000	4.1		Solid flammable		☑ A3 A48	III	E1	456	25 kg	456	100 kg
≠ Celluloid, in blocks, rods, rolls, sheets, tubes, etc. (except scrap)	2000	4.1		Solid flammable		A3 A48 A205	III	E1	456	25 kg	456	100 kg
* Chloroprene, stabilized	1991	3	6.1	Liquid flammable & Toxic		☑	I	E0	FORBIDDEN		361	30 L
≠ Chloroprene, stabilized	1991	3	6.1	Liquid flammable & Toxic		A209	I	E0	FORBIDDEN		361	30 L
* Compressed gas, n.o.s.*	1956	2.2		Gas non-flammable		☑		E1	200	75 kg	200	150 kg
≠ Compressed gas, n.o.s.*	1956	2.2		Gas non-flammable		A202		E1	200	75 kg	200	150 kg
* Crotonaldehyde	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	☑ A2			FORBIDDEN		FORBIDDEN	
≠ Crotonaldehyde	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2 A209			FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Crotonaldehyde, stabilized	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	<input checked="" type="checkbox"/> A2			FORBIDDEN		FORBIDDEN	
≠ Crotonaldehyde, stabilized	1143	6.1	3		AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2 A209			FORBIDDEN		FORBIDDEN	
* Cyanogen chloride, stabilized	1589	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A2			FORBIDDEN		FORBIDDEN	
≠ Cyanogen chloride, stabilized	1589	2.3	8		AU 1 CA 7 IR 3 NL 1 US 3	A2 A209			FORBIDDEN		FORBIDDEN	
* Diketene, stabilized	2521	6.1	3			<input checked="" type="checkbox"/>			FORBIDDEN		FORBIDDEN	
≠ Diketene, stabilized	2521	6.1	3			A209			FORBIDDEN		FORBIDDEN	
* Dipropylamine	2383	3	8	Liquid flammable & Corrosive		<input checked="" type="checkbox"/>	II	E2	352 Y340	1 L 0.5 L	363	5 L
≠ Dipropylamine	2383	3	8	Liquid flammable & Corrosive		A209	II	E2	352 Y340	1 L 0.5 L	363	5 L
* Divinyl ether, stabilized	1167	3		Liquid flammable		<input checked="" type="checkbox"/>	I	E3	351	1 L	361	30 L
≠ Divinyl ether, stabilized	1167	3		Liquid flammable		A209	I	E3	351	1 L	361	30 L
* Engine, fuel cell, flammable gas powered †	<input checked="" type="checkbox"/> 3166	<input checked="" type="checkbox"/> 9		<input checked="" type="checkbox"/> Miscellaneous		<input checked="" type="checkbox"/>		E0	FORBIDDEN		<input checked="" type="checkbox"/> 951	No limit
≠ Engine, fuel cell, flammable gas powered †	3529	2.1		Gas flammable		[A176] [A208]		E0	FORBIDDEN		220	No limit

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Engine, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		A67 A70 A87 A134 A176		E0	950	No limit	950	No limit
≠ Engine, fuel cell, flammable liquid powered †	3528	3		Liquid flammable		[A176] [A134] [A87] [A70] [A67] [A208]		E0	378	No limit	378	No limit
+ Engine, internal combustion	3530	9		Miscellaneous		[A208]		E0	972	[No limit]	972	[No limit]
* Engine, internal combustion, flammable gas powered	3166	9		Miscellaneous		A67 A70 A87 A134		E0	FORBIDDEN		951	No limit
≠ Engine, internal combustion, flammable gas powered	3529	2.1		Gas flammable		[A176] [A208]		E0	FORBIDDEN		220	No limit
* Engine, internal combustion, flammable liquid powered	3166	9		Miscellaneous		A67 A70 A87 A134		E0	950	No limit	950	No limit
≠ Engine, internal combustion, flammable liquid powered	3528	3		Liquid flammable		[A208]		E0	378	No limit	378	No limit
* Ethylacetylene, stabilized	2452	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	FORBIDDEN		200	150 kg
≠ Ethylacetylene, stabilized	2452	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Ethyl acrylate, stabilized	1917	3		Liquid flammable			II	E2	353 Y341	5 L 1 L	364	60 L
≠ Ethyl acrylate, stabilized	1917	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Ethyleneimine, stabilized	1185	6.1	3			✓				FORBIDDEN	FORBIDDEN	
≠ Ethyleneimine, stabilized	1185	6.1	3			A209				FORBIDDEN	FORBIDDEN	
* Ethyl methacrylate, stabilized	2277	3		Liquid flammable		✓	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Ethyl methacrylate, stabilized	2277	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
+ Halogenated monomethyldiphenylmethanes, liquids	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
+ Halogenated monomethyldiphenylmethanes, solids	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
* Helium, compressed	1046	2.2		Gas non-flammable		✓		E1	200	75 kg	200	150 kg
≠ Helium, compressed	1046	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* Hydrogen cyanide, stabilized containing less than 3% water	1051	6.1	3			✓				FORBIDDEN	FORBIDDEN	
≠ Hydrogen cyanide, stabilized containing less than 3% water	1051	6.1	3			A209				FORBIDDEN	FORBIDDEN	
* Hydrogen cyanide, stabilized containing less than 3% water and absorbed in a porous inert material	1614	6.1				✓				FORBIDDEN	FORBIDDEN	
≠ Hydrogen cyanide, stabilized containing less than 3% water and absorbed in a porous inert material	1614	6.1				A209				FORBIDDEN	FORBIDDEN	
* Isobutyl acrylate, stabilized	2527	3		Liquid flammable		✓	III	E1	355 Y344	60 L 10 L	366	220 L
≠ Isobutyl acrylate, stabilized	2527	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Isobutyl methacrylate, stabilized	2283	3		Liquid flammable		✓	III	E1	355 Y344	60 L 10 L	366	220 L
≠ Isobutyl methacrylate, stabilized	2283	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Isoprene, stabilized	1218	3		Liquid flammable		✓	I	E3	351	1 L	361	30 L
≠ Isoprene, stabilized	1218	3		Liquid flammable		A209	I	E3	351	1 L	361	30 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Krypton, compressed	1056	2.2		Gas non-flammable		<input checked="" type="checkbox"/> A69		E1	200	75 kg	200	150 kg
≠ Krypton, compressed	1056	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous	US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A183		E0	See 965		See 965	
≠ Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous	US 3	A88 A99 A154 A164 A183 A206		E0	See 965		See 965	
* Lithium ion batteries contained in equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous	US 3	<input checked="" type="checkbox"/> A48 A99 A154 A164 A181 A185		E0	967	5 kg	967	35 kg
≠ Lithium ion batteries contained in equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous	US 3	A48 A88 A99 A154 A164 A181 A185 A206		E0	967	5 kg	967	35 kg
* Lithium ion batteries packed with equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous	US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A181 A185		E0	966	5 kg	966	35 kg
≠ Lithium ion batteries packed with equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous	US 3	A88 A99 A154 A164 A181 A185 A206		E0	966	5 kg	966	35 kg

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only		
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package	
1	2	3	4	5	6	7	8	9	10	11	12	13	
* Lithium metal batteries (including lithium alloy batteries) †	3090	9		Miscellaneous	US 2 US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A183 A201			E0	FORBIDDEN	See 968		
≠ Lithium metal batteries (including lithium alloy batteries) †	3090	9		Miscellaneous	US 2 US 3	A88 A99 A154 A164 A183 A201 A206			E0	FORBIDDEN	See 968		
* Lithium metal batteries contained in equipment (including lithium alloy batteries) †	3091	9		Miscellaneous	US 2 US 3	<input checked="" type="checkbox"/> A48 A99 A154 A164 A181 A185			E0	970	5 kg	970	35 kg
≠ Lithium metal batteries contained in equipment (including lithium alloy batteries) †	3091	9		Miscellaneous	US 2 US 3	A48 A88 A99 A154 A164 A181 A185 A206			E0	970	5 kg	970	35 kg
* Lithium metal batteries packed with equipment (including lithium alloy batteries) †	3091	9		Miscellaneous	US 2 US 3	<input checked="" type="checkbox"/> A99 A154 A164 A181 A185			E0	969	5 kg	969	35 kg
≠ Lithium metal batteries packed with equipment (including lithium alloy batteries) †	3091	9		Miscellaneous	US 2 US 3	A88 A99 A154 A164 A181 A185 A206			E0	969	5 kg	969	35 kg
+ Machinery, fuel cell, flammable gas powered	3529	2.1		Gas flammable		[A208]			E0	FORBIDDEN	220	No limit	

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
+ Machinery, fuel cell, flammable liquid powered	3528	3		Liquid flammable		[A208] [A176] [A134] [A87] [A70] [A67]		E0	[378]	[No limit]	[378]	[No limit]
+ Machinery, internal combustion	3530	9		Miscellaneous		[A208]		E0	972	[No limit]	972	[No limit]
+ Machinery, internal combustion, flammable gas powered	3529	2.1		Gas flammable		[A208]		E0	FORBIDDEN		220	No limit
+ Machinery, internal combustion, flammable liquid powered	3528	3		Liquid flammable		[A208] [A134] [A87] [A70] [A67]		E0	[378]	[No limit]	[378]	[No limit]
* Methacrylaldehyde, stabilized	2396	3	6.1	Liquid flammable & Toxic		<input checked="" type="checkbox"/>	II	E2	352 Y341	1 L 1 L	364	60 L
≠ Methacrylaldehyde, stabilized	2396	3	6.1	Liquid flammable & Toxic		A209	II	E2	352 Y341	1 L 1 L	364	60 L
* Methacrylic acid, stabilized	2531	8		Corrosive		<input checked="" type="checkbox"/>	II	E2	851 Y840	1 L 0.5 L	855	30 L
≠ Methacrylic acid, stabilized	2531	8		Corrosive		A209	II	E2	851 Y840	1 L 0.5 L	855	30 L
* Methacrylonitrile, stabilized	3079	6.1	3			<input checked="" type="checkbox"/>			FORBIDDEN		FORBIDDEN	
≠ Methacrylonitrile, stabilized	3079	6.1	3			A209			FORBIDDEN		FORBIDDEN	
* Methylacetylene and propadiene mixture, stabilized †	1060	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A1		E0	FORBIDDEN		200	150 kg
≠ Methylacetylene and propadiene mixture, stabilized †	1060	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Methyl acrylate, stabilized	1919	3		Liquid flammable		<input checked="" type="checkbox"/>	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Methyl acrylate, stabilized	1919	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Methyl isopropenyl ketone, stabilized	1246	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Methyl isopropenyl ketone, stabilized	1246	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Methyl methacrylate monomer, stabilized	1247	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Methyl methacrylate monomer, stabilized	1247	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Methyl vinyl ketone, stabilized	1251	6.1	3 8			☑			FORBIDDEN		FORBIDDEN	
≠ Methyl vinyl ketone, stabilized	1251	6.1	3 8			A209			FORBIDDEN		FORBIDDEN	
* Neon, compressed	1065	2.2		Gas non-flammable		☑		E1	200	75 kg	200	150 kg
≠ Neon, compressed	1065	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* Nitrogen, compressed	1066	2.2		Gas non-flammable		☑		E1	200	75 kg	200	150 kg
≠ Nitrogen, compressed	1066	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg
* 2,5-Norbornadiene, stabilized	2251	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ 2,5-Norbornadiene, stabilized	2251	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Paraformaldehyde	2213	4.1		Solid flammable		☑	III	E1	446 Y443	25 kg 10 kg	449	100 kg
≠ Paraformaldehyde	2213	4.1		Solid flammable		A3	III	E1	446 Y443	25 kg 10 kg	449	100 kg

Name 1	UN No. 2	Class or division 3	Subsidiary risk 4	Labels 5	State variations 6	Special provisions 7	UN packing group 8	Excepted quantity 9	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction 10	Max. net quantity per package 11	Packing instruction 12	Max. net quantity per package 13
<input checked="" type="checkbox"/> * Polyester resin kit †	3269	3		Liquid flammable		A66 A163	II III	E0 E0	370 Y370 370 Y370	5 kg 1 kg 10 kg 5 kg	370 370	5 kg 10 kg
≠ Polyester resin kit , liquid base material †	3269	3		Liquid flammable		A66 A163	II III	E0 E0	370 Y370 370 Y370	5 kg 1 kg 10 kg 5 kg	370 370	5 kg 10 kg
+ Polyester resin kit, solid base material	3527	4.1		Solid flammable		A66 A163	II III	E0 E0	450 Y450 450 Y450	5 kg 1 kg 10 kg 5 kg	450 450	5 kg 10 kg
<input checked="" type="checkbox"/> * Polyhalogenated biphenyls, liquid	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
≠ Polyhalogenated biphenyls, liquids	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
<input checked="" type="checkbox"/> * Polyhalogenated biphenyls, solid	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
≠ Polyhalogenated biphenyls, solids	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
<input checked="" type="checkbox"/> * Polyhalogenated terphenyls, liquid	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
≠ Polyhalogenated terphenyls, liquids	3151	9		Miscellaneous		A11 A95	II	E2	964	100 L	964	220 L
<input checked="" type="checkbox"/> * Polyhalogenated terphenyls, solid	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
≠ Polyhalogenated terphenyls, solids	3152	9		Miscellaneous		A11 A95	II	E2	956	100 kg	956	200 kg
<input checked="" type="checkbox"/> * Polymeric beads, expandable, evolving flammable vapour †	2211	9		Miscellaneous		A38	III	E1	957	100 kg	957	200 kg
≠ Polymeric beads, expandable, evolving flammable vapour †	2211	9		Miscellaneous		A204	III	E1	957	100 kg	957	200 kg
+ Polymerizing substance, liquid, stabilized, n.o.s.*	3532	4.1		Solid flammable		A209	III	E0	446 Y443	25 kg 10 kg	449	100 kg
+ Polymerizing substance, liquid, temperature controlled, n.o.s.*	3534	4.1				A209		E0	FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
+ Polymerizing substance, solid, stabilized, n.o.s.*	3531	4.1		Solid flammable		A209	III	E0	446 Y443	25 kg 10 kg	449	100 kg
+ Polymerizing substance, solid, temperature controlled, n.o.s.*	3533	4.1				A209		E0	FORBIDDEN		FORBIDDEN	
* Propadiene, stabilized	2200	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A1		E0	FORBIDDEN		200	150 kg
≠ Propadiene, stabilized	2200	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Propyleneimine, stabilized	1921	3	6.1	Liquid flammable & Toxic	US 4	<input checked="" type="checkbox"/>	I	E0	FORBIDDEN		361	30 L
≠ Propyleneimine, stabilized	1921	3	6.1	Liquid flammable & Toxic	US 4	A209	I	E0	FORBIDDEN		361	30 L
* Radioactive material, uranium hexafluoride, non-fissile or fissile excepted	2978	7	<input checked="" type="checkbox"/> 8	<input checked="" type="checkbox"/> Radioactive & Corrosive	CA 1	A139					See Part 2;7 and Part 4;9	
≠ Radioactive material, uranium hexafluoride, non-fissile or fissile excepted	2978	7	6.1 8	Radioactive & Toxic & Corrosive	CA 1	A139					See Part 2;7 and Part 4;9	
* Radioactive material, uranium hexafluoride, fissile	2977	7	<input checked="" type="checkbox"/> 8	<input checked="" type="checkbox"/> Radioactive & Corrosive							See Part 2;7 and Part 4;9	
≠ Radioactive material, uranium hexafluoride, fissile	2977	7	6.1 8	Radioactive & Toxic & Corrosive							See Part 2;7 and Part 4;9	
* Refrigerant gas R 1113	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A2					FORBIDDEN	FORBIDDEN
≠ Refrigerant gas R 1113	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2 A209					FORBIDDEN	FORBIDDEN

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
+ Rocket motors †	0510	1.4C		Explosive 1.4					E0	FORBIDDEN	130	75 kg
* Styrene monomer, stabilized	2055	3		Liquid flammable		☑	III		E1	355 Y344	60 L 10 L	366 220 L
≠ Styrene monomer, stabilized	2055	3		Liquid flammable		A209	III		E1	355 Y344	60 L 10 L	366 220 L
* Sulphur trioxide, stabilized	1829	8			AU 1 CA 7 IR 3 NL 1 US 3	☑ A2				FORBIDDEN	FORBIDDEN	
≠ Sulphur trioxide, stabilized	1829	8			AU 1 CA 7 IR 3 NL 1 US 3	A2 A209				FORBIDDEN	FORBIDDEN	
* Tetrafluoroethylene, stabilized	1081	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	☑ A1			E0	FORBIDDEN	200	150 kg
≠ Tetrafluoroethylene, stabilized	1081	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209			E0	FORBIDDEN	200	150 kg
* Trifluorochloroethylene, stabilized	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	☑ A2				FORBIDDEN	FORBIDDEN	
≠ Trifluorochloroethylene, stabilized	1082	2.3	2.1		AU 1 CA 7 IR 3 NL 1 US 3	A2 A209				FORBIDDEN	FORBIDDEN	

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Uranium hexafluoride, radioactive material, excepted package, less than 0.1 kg per package, non-fissile or fissile-excepted	3507	8	7	Corrosive		A139 A194	I	E0	See 877		See 877	
≠ Uranium hexafluoride, radioactive material, excepted package, less than 0.1 kg per package, non-fissile or fissile-excepted	3507	6.1	7 8	Toxic & Corrosive		A139 A194	I	E0	See 603		See 603	
* Vehicle, flammable gas powered	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134		E0	FORBIDDEN		951	No limit
≠ Vehicle, flammable gas powered	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134 A203 A207		E0	FORBIDDEN		951	No limit
* Vehicle, flammable liquid powered	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134		E0	950	No limit	950	No limit
≠ Vehicle, flammable liquid powered	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134 A203 A207		E0	950	No limit	950	No limit

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Vehicle, fuel cell, flammable gas powered †	3166	9		Miscellaneous		☑ A67 A70 A87 A118 A120 A134 A176		E0	FORBIDDEN		951	No limit
≠ Vehicle, fuel cell, flammable gas powered †	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134 A176 A203 A207		E0	FORBIDDEN		951	No limit
* Vehicle, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		☑ A67 A70 A87 A118 A120 A134 A176		E0	950	No limit	950	No limit
≠ Vehicle, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		A67 A70 A87 A118 A120 A134 A176 A203 A207		E0	950	No limit	950	No limit
* Vinyl acetate, stabilized	1301	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Vinyl acetate, stabilized	1301	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Vinyl bromide, stabilized	1085	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A1			E0	FORBIDDEN	200	150 kg
≠ Vinyl bromide, stabilized	1085	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209			E0	FORBIDDEN	200	150 kg
* Vinyl butyrate, stabilized	2838	3		Liquid flammable		<input checked="" type="checkbox"/>		II	E2	353 Y341	5 L 1 L	364 60 L
≠ Vinyl butyrate, stabilized	2838	3		Liquid flammable		A209		II	E2	353 Y341	5 L 1 L	364 60 L
* Vinyl chloride, stabilized	1086	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	<input checked="" type="checkbox"/> A1			E0	FORBIDDEN	200	150 kg
≠ Vinyl chloride, stabilized	1086	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A1 A209			E0	FORBIDDEN	200	150 kg
* Vinyl ethyl ether, stabilized	1302	3		Liquid flammable		<input checked="" type="checkbox"/>		I	E3	351	1 L	361 30 L
≠ Vinyl ethyl ether, stabilized	1302	3		Liquid flammable		A209		I	E3	351	1 L	361 30 L
* Vinyl fluoride, stabilized	1860	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	<input checked="" type="checkbox"/> A1			E0	FORBIDDEN	200	150 kg
≠ Vinyl fluoride, stabilized	1860	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209			E0	FORBIDDEN	200	150 kg

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Vinylidene chloride, stabilized	1303	3		Liquid flammable		☑	I	E3	351	1 L	361	30 L
≠ Vinylidene chloride, stabilized	1303	3		Liquid flammable		A209	I	E3	351	1 L	361	30 L
* Vinyl isobutyl ether, stabilized	1304	3		Liquid flammable		☑	II	E2	353 Y341	5 L 1 L	364	60 L
≠ Vinyl isobutyl ether, stabilized	1304	3		Liquid flammable		A209	II	E2	353 Y341	5 L 1 L	364	60 L
* Vinyl methyl ether, stabilized	1087	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	☑ A1		E0	FORBIDDEN		200	150 kg
≠ Vinyl methyl ether, stabilized	1087	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A209		E0	FORBIDDEN		200	150 kg
* Vinylpyridines, stabilized	3073	6.1	3 8	Toxic & Liquid flammable & Corrosive		☑	II	E4	653 Y640	1 L 0.5 L	660	30 L
≠ Vinylpyridines, stabilized	3073	6.1	3 8	Toxic & Liquid flammable & Corrosive		A209	II	E4	653 Y640	1 L 0.5 L	660	30 L
* Vinyltoluenes, stabilized	2618	3		Liquid flammable		☑	III	E1	355 Y344	60 L 10 L	366	220 L
≠ Vinyltoluenes, stabilized	2618	3		Liquid flammable		A209	III	E1	355 Y344	60 L 10 L	366	220 L
* Xenon	2036	2.2		Gas non-flammable		☑ A69		E1	200	75 kg	200	150 kg
≠ Xenon	2036	2.2		Gas non-flammable		A69 A202		E1	200	75 kg	200	150 kg