

CHAPTER 3.3

SPECIAL PROVISIONS APPLICABLE TO CERTAIN ARTICLES OR SUBSTANCES

3.3.1 When Column 6 of the Dangerous Goods List of Chapter 3.2 indicates that a special provision is relevant to a substance or article, the meaning and requirements of that special provision are as set forth below.

- 16 Samples of new or existing explosive substances or articles may be transported as directed by the competent authorities for purposes including: testing, classification, research and development, quality control, or as a commercial sample. Explosive samples which are not wetted or desensitized shall be limited to 10 kg in small packages as specified by the competent authorities. Explosive samples which are wetted or desensitized shall be limited to 25 kg.
- 23 Even though this substance has a flammability hazard, it only exhibits such hazard under extreme fire conditions in confined areas.
- 26 This substance is not permitted for transport in portable tanks, or intermediate bulk containers with a capacity exceeding 450 litres, due to potential initiation of explosion when transported in large volumes.
- 28 This substance may be transported under the provisions of Division 4.1 only if it is so packed that the percentage of diluent will not fall below that stated, at any time during transport (see 2.4.2.4).
- 29 This substance is exempt from labelling, but shall be marked with the appropriate class or division.
- 32 This substance is not subject to these Regulations when in any other form.
- 37 This substance is not subject to these Regulations when coated.
- 38 This substance is not subject to these Regulations when it contains not more than 0.1% calcium carbide.
- 39 This substance is not subject to these Regulations when it contains less than 30% or not less than 90% silicon.
- 43 When offered for carriage as pesticides, these substances shall be carried under the relevant pesticide entry and in accordance with the relevant pesticide provisions (see 2.6.2.3 and 2.6.2.4).
- 45 Antimony sulphides and oxides which contain not more than 0.5% of arsenic calculated on the total mass are not subject to these Regulations.
- 47 Ferricyanides and ferrocyanides are not subject to these Regulations.
- 48 The transport of this substance, when it contains more than 20% hydrocyanic acid, is prohibited except with special authorization granted by the competent authorities.
- 59 These substances are not subject to these Regulations when they contain not more than 50% magnesium.

- 60 If the concentration is more than 72%, the transport of this substance is prohibited except with special authorization granted by the competent authorities.
- 61 The technical name which shall supplement the proper shipping name shall be the ISO common name, other name listed in the WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification or the name of the active substance (see also 3.1.2.8.1.1).
- 62 This substance is not subject to these Regulations when it contains not more than 4% sodium hydroxide.
- 63 The division of Class 2 and the subsidiary risks depend on the nature of the contents of the aerosol dispenser. The following provisions shall apply:
- (a) Division 2.1 applies if the contents include 85% by mass or more flammable components and the chemical heat of combustion is 30 kJ/g or more;
 - (b) Division 2.2 applies if the contents contain 1% by mass or less flammable components and the heat of combustion is less than 20 kJ/g;
 - (c) Otherwise the product shall be classified as tested by the tests described in the *Manual of Tests and Criteria*, Part III, section 31. Extremely flammable and flammable aerosols shall be classified in Division 2.1; non-flammable in Division 2.2;
 - (d) Gases of Division 2.3 shall not be used as a propellant in an aerosol dispenser;
 - (e) Where the contents other than the propellant of aerosol dispensers to be ejected are classified as Division 6.1 packing groups II or III or Class 8 packing groups II or III, the aerosol shall have a subsidiary risk of Division 6.1 or Class 8;
 - (f) Aerosols with contents meeting the criteria for packing group I for toxicity or corrosivity shall be prohibited from transport;
 - (g) Subsidiary risk labels may be required for air transport.

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

- 65 Hydrogen peroxide aqueous solutions with less than 8% hydrogen peroxide are not subject to these Regulations.
- 66 Mercurous chloride and cinnabar are not subject to these Regulations.
- 103 Ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt are prohibited.
- 105 Nitrocellulose meeting the descriptions of UN 2556 or UN 2557 may be classified in Division 4.1.
- 106 Subject to these Regulations only when transported by air.

- 113 The carriage of chemically unstable mixtures is prohibited.
- 117 Subject to these Regulations only when transported by sea.
- 119 Refrigerating machines include machines or other appliances which have been designed for the specific purpose of keeping food or other items at a low temperature in an internal compartment, and air conditioning units. Refrigerating machines and refrigerating machine components are not subject to these Regulations if they contain less than 12 kg of gas in Division 2.2 or less than 12 litres ammonia solution (UN 2672).
- 122 The subsidiary risks, control and emergency temperatures if any, and the generic entry number for each of the currently assigned organic peroxide formulations are given in 2.5.3.2.4.
- 127 Other inert material or inert material mixture may be used at the discretion of the competent authority, provided this inert material has identical phlegmatizing properties.
- 131 The phlegmatized substance shall be significantly less sensitive than dry PETN.
- 132 During the course of transport, this substance shall be protected from direct sunshine and stored (or kept) in a cool and well-ventilated place, away from all sources of heat.
- 133 If over-confined in packagings, this substance may exhibit explosive behaviour. Packagings authorized under packing instruction P409 are intended to prevent over-confinement. When a packaging other than those prescribed under packing instruction P409 is authorized by the competent authority of the country of origin in accordance with 4.1.3.7, the package shall bear an "EXPLOSIVE" subsidiary risk label (Model No 1, see 5.2.2.2.2) unless the competent authority of the country of origin has permitted this label to be dispensed with for the specific packaging employed because test data have proved that the substance in this packaging does not exhibit explosive behaviour (see 5.4.1.5.5.1). The provisions of 7.1.3.1 shall also be then considered.
- 135 The dihydrated sodium salt of dichloroisocyanuric acid is not subject to these Model Regulations.
- 138 p-Bromobenzyl cyanide is not subject to these Regulations.
- 141 Products which have undergone sufficient heat treatment so that they present no hazard during transport are not subject to these Regulations.
- 142 Solvent extracted soya bean meal containing not more than 1.5% oil and 11% moisture, which is substantially free of flammable solvent, is not subject to these Regulations.
- 144 An aqueous solution containing not more than 24% alcohol by volume is not subject to these Regulations.
- 145 Other than for air transport, alcoholic beverages of packing group III, when carried in receptacles of 250 litres or less, are not subject to these Regulations.
- 146 Other than for air and sea transport, alcoholic beverages of packing group II, when carried in receptacles of 5 litres or less, are not subject to these Regulations.
- 152 The classification of this substance will vary with particle size and packaging, but borderlines have not been experimentally determined. Appropriate classifications shall be made as required by 2.1.3.

- 153 This entry applies only if it is demonstrated, on the basis of tests, that the substances when in contact with water are not combustible nor show a tendency to auto-ignition and that the mixture of gases evolved is not flammable.
- 163 A substance specifically listed by name in the **Dangerous Goods List of Chapter 3.2** shall not be transported under this entry. Materials transported under this entry may contain 20% or less nitrocellulose provided the nitrocellulose contains not more than 12.6% nitrogen (by dry mass).
- 168 Asbestos which is immersed or fixed in a natural or artificial binder (such as cement, plastics, asphalt, resins or mineral ore) in such a way that no escape of hazardous quantities of respirable asbestos fibres can occur during transport is not subject to these Regulations. Manufactured articles containing asbestos and not meeting this provision are nevertheless not subject to these Regulations when packed so that no escape of hazardous quantities of respirable asbestos fibres can occur during transport.
- 169 Phthalic anhydride in the solid state and tetrahydrophthalic anhydrides, with not more than 0.05% maleic anhydride, are not subject to these Regulations. Phthalic anhydride molten at a temperature above its flash point, with not more than 0.05% maleic anhydride, shall be classified under UN 3256.
- 172 Radioactive material with a subsidiary risk shall:
- (a) be labelled with subsidiary risk labels corresponding to each subsidiary risk exhibited by the material; corresponding placards shall be affixed to transport units in accordance with the relevant provisions of 5.3.1;
 - (b) be allocated to packing groups I, II or III, as and if appropriate, by application of the grouping criteria provided in Part 2 corresponding to the nature of the predominant subsidiary risk.
- The description required in 5.4.1.5.7.1 (b) shall include a description of these subsidiary risks (e.g. “Subsidiary risk: 3, 6.1”), the name of the constituents which most predominantly contribute to this (these) subsidiary risk(s), and where applicable, the packing group.
- 177 Barium sulphate is not subject to these Regulations.
- 178 This designation shall be used only when no other appropriate designation exists in the **Dangerous Goods List of Chapter 3.2**, and only with the approval of the competent authority of the country of origin.
- 179 This designation shall be used for substances and mixtures which are dangerous to the aquatic environment or which are marine pollutants that do not meet the classification criteria of any other class or another substance within Class 9. This designation may also be used for wastes not otherwise subject to these Regulations but which are covered under the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* and for substances designated to be environmentally hazardous substances by the competent authority of the country of origin, transit or destination which do not meet the criteria for an environmentally hazardous substance according to these Regulations or for any other hazard Class.
- 181 Packages containing this type of substance shall bear the “EXPLOSIVE” subsidiary risk label (Model No 1, see 5.2.2.2.2) unless the competent authority of the country of origin has permitted this label to be dispensed with for the specific packaging employed because

test data have proved that the substance in this packaging does not exhibit explosive behaviour (see 5.4.1.5.5.1). The provisions of 7.1.3.1 shall also be considered.

182 The group of alkali metals includes lithium, sodium, potassium, rubidium and caesium.

183 The group of alkaline earth metals includes magnesium, calcium, strontium and barium.

186 In determining the ammonium nitrate content, all nitrate ions for which a molecular equivalent of ammonium ions is present in the mixture shall be calculated as ammonium nitrate.

188 **Cells** and batteries offered for transport are not subject to other provisions of these Regulations if they meet the following:

(a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium-ion cell, the **Watt-hour rating is not more than 20 Wh;**

(b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium-ion battery, the **Watt-hour rating is not more than 100 Wh. Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case;**

(c) Each cell or battery is of the type proved to meet the requirements of each test in the Manual of Tests and Criteria, Part III, sub-section 38.3;

(d) **Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit. The inner packagings shall be packed in strong outer packagings which conform to the provisions of 4.1.1.1, 4.1.1.2, and 4.1.1.5;**

(e) **Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. When lithium batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;**

(f) **Except for packages containing no more than four cells installed in equipment or no more than two batteries installed in equipment, each package shall be marked with the following:**

(i) **an indication that the package contains "lithium metal" or "lithium ion" cells or batteries, as appropriate;**

(ii) **an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;**

(iii) **an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and**

(iv) **a telephone number for additional information;**

- (g) Each consignment of one or more packages marked in accordance with paragraph (f) shall be accompanied with a document including the following:
- (i) an indication that the package contains “lithium metal” or “lithium ion” cells or batteries, as appropriate;
 - (ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;
 - (iii) an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - (iv) a telephone number for additional information;
- (h) Except when lithium batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and
- (i) Except when lithium batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass.

As used above and elsewhere in these Regulations, “lithium content” means the mass of lithium in the anode of a lithium metal or lithium alloy cell.

Separate entries exist for lithium metal batteries and lithium ion batteries to facilitate the transport of these batteries for specific modes of transport and to enable the application of different emergency response actions.

- 190 Aerosol dispensers shall be provided with protection against inadvertent discharge. Aerosols with a capacity not exceeding 50 ml containing only non-toxic constituents are not subject to these Regulations.
- 191 Receptacles, small, containing gas are not fitted with a release device. Receptacles with a capacity not exceeding 50 ml containing only non-toxic constituents are not subject to these Regulations.
- 193 This entry may only be used for uniform ammonium nitrate based fertilizer mixtures of the nitrogen, phosphate or potash type, containing not more than 70% ammonium nitrate and not more than 0.4% total combustible/organic material calculated as carbon or with not more than 45% ammonium nitrate and unrestricted combustible material. Fertilizers within these composition limits are only subject to these Regulations when transported by air or sea and are not subject to these Regulations if shown by a Trough Test (see *Manual of Tests and Criteria*, Part III, sub-section 38.2) not to be liable to self-sustaining decomposition.
- 194 The control and emergency temperatures, if any, and the generic entry number for each of the currently assigned self-reactive substances are given in 2.4.2.3.2.3.
- 195 For certain organic peroxides types B or C, a smaller packaging than that allowed by packing methods OP5 or OP6 respectively has to be used (see 4.1.7 and 2.5.3.2.4).
- 196 Formulations which in laboratory testing neither detonate in the cavitated state nor deflagrate, which show no effect when heated under confinement and which exhibit no explosive power may be transported under this entry. The formulation must also be

thermally stable (i.e. the SADT is 60 °C or higher for a 50 kg package). Formulations not meeting these criteria shall be transported under the provisions of Division 5.2; see 2.5.3.2.4.

- 198 Nitrocellulose solutions containing not more than 20% nitrocellulose may be transported as paint or printing ink, as applicable. See UN Nos. 1210, 1263, 3066, 3469 and 3470.
- 199 Lead compounds which, when mixed in a ratio of 1:1000 with 0.07M hydrochloric acid and stirred for one hour at a temperature of 23 °C ± 2 °C, exhibit a solubility of 5% or less (see ISO 3711:1990 "*Lead chromate pigments and lead chromate-molybdate pigments – Specifications and methods of test*") are considered insoluble and are not subject to these Regulations unless they meet the criteria for inclusion in another hazard class or division.
- 201 Lighters and lighter refills shall comply with the provisions of the country in which they were filled. They shall be provided with protection against inadvertent discharge. The liquid portion of the gas shall not exceed 85% of the capacity of the receptacle at 15 °C. The receptacles, including the closures, shall be capable of withstanding an internal pressure of twice the pressure of the liquefied petroleum gas at 55 °C. The valve mechanisms and ignition devices shall be securely sealed, taped or otherwise fastened or designed to prevent operation or leakage of the contents during transport. Lighters shall not contain more than 10 g of liquefied petroleum gas. Lighter refills shall not contain more than 65 g of liquefied petroleum gas.
- 203 This entry shall not be used for polychlorinated biphenyls, UN 2315.
- 204 Articles containing smoke-producing substance(s) corrosive according to the criteria for Class 8 shall be labelled with a "CORROSIVE" subsidiary risk label (Model No 8, see 5.2.2.2.2).
- 205 This entry shall not be used for UN 3155 PENTACHLOROPHENOL.
- 206 This entry is not intended to include ammonium permanganate, the transport of which is prohibited except with special authorization granted by the competent authorities.
- 207 Polymeric beads and moulding compounds may be made from polystyrene, poly (methyl methacrylate) or other polymeric material.
- 208 The commercial grade of calcium nitrate fertilizer, when consisting mainly of a double salt (calcium nitrate and ammonium nitrate) containing not more than 10% ammonium nitrate and at least 12% water of crystallization, is not subject to these Regulations.
- 209 The gas shall be at a pressure corresponding to ambient atmospheric pressure at the time the containment system is closed and this shall not exceed 105 kPa absolute.
- 210 Toxins from plant, animal or bacterial sources which contain infectious substances, or toxins that are contained in infectious substances, shall be classified in Division 6.2.
- 215 This entry only applies to the technically pure substance or to formulations derived from it having an SADT higher than 75 °C and therefore does not apply to formulations which are self-reactive substances. (For self-reactive substances, see 2.4.2.3.2.3). Homogeneous mixtures containing not more than 35% by mass of azodicarbonamide and at least 65% of inert substance are not subject to these Regulations unless criteria of other classes or divisions are met.

- 216 Mixtures of solids which are not subject to these Regulations and flammable liquids may be transported under this entry without first applying the classification criteria of Division 4.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or transport unit is closed. Each transport unit shall be leakproof when used as a bulk packaging. Sealed packets and articles containing less than 10 ml of a packing group II or III flammable liquid absorbed into a solid material are not subject to these Regulations provided there is no free liquid in the packet or article.
- 217 Mixtures of solids which are not subject to these Regulations and toxic liquids may be transported under this entry without first applying the classification criteria of Division 6.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or transport unit is closed. Each transport unit shall be leakproof when used as a bulk packaging. This entry shall not be used for solids containing a packing group I liquid.
- 218 Mixtures of solids which are not subject to these Regulations and corrosive liquids may be transported under this entry without first applying the classification criteria of Class 8, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or transport unit is closed. Each transport unit shall be leakproof when used as a bulk packaging.
- 219 Genetically modified microorganisms and genetically modified organisms which meet the definition of an infectious substance and the criteria for inclusion in Division 6.2 in accordance with Chapter 2.6 shall be transported as UN 2814, UN 2900 or UN 3373, as appropriate.
- 220 The technical name of the flammable liquid component only of this solution or mixture shall be shown in parentheses immediately following the proper shipping name.
- 221 Substances included under this entry shall not be of packing group I.
- 223 If the chemical or physical properties of a substance covered by this description are such that when tested it does not meet the established defining criteria for the class or division listed in Column 3 of the Dangerous Goods List of Chapter 3.2, or any other class or division, it is not subject to these Regulations.
- 224 Unless it can be demonstrated by testing that the sensitivity of the substance in its frozen state is no greater than in its liquid state, the substance shall remain liquid during normal transport conditions. It shall not freeze at temperatures above -15 °C.
- 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 g per extinguishing unit.
- 226 Formulations of these substances containing not less than 30% non-volatile, non-flammable phlegmatizer are not subject to these Regulations.
- 227 When phlegmatized with water and inorganic inert material the content of urea nitrate may not exceed 75% by mass and the mixture shall not be capable of being detonated by the Series 1, type (a), test in the *Manual of Tests and Criteria*, Part I.
- 228 Mixtures not meeting the criteria for flammable gases (Division 2.1) shall be transported under UN 3163.

- 230 This entry applies to cells and batteries containing lithium in any form, including lithium polymer and lithium ion cells and batteries. Lithium cells and batteries may be transported under this entry if they meet the following provisions:
- (a) Each cell or battery is of the type proved to meet the requirements of each test of the *Manual of Tests and Criteria*, Part III, sub-section 38.3;
 - (b) Each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under conditions normally incident to transport;
 - (c) Each cell and battery is equipped with an effective means of preventing external short circuits;
 - (d) Each battery containing cells or series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g., diodes, fuses, etc.).
- 232 This designation shall only be used when the substance does not meet the criteria of any other class. Transport in cargo transport units other than in multimodal tanks shall be in accordance with standards specified by the competent authorities of the country of origin.
- 235 This entry applies to articles which contain Class 1 explosive substances and which may also contain dangerous goods of other classes. These articles are used as life-saving vehicle air-bag inflators or air-bag modules or seat-belt pretensioners.
- 236 Polyester resin kits consist of two components: a base material (Class 3, packing group II or III) and an activator (organic peroxide). The organic peroxide shall be type D, E or F, not requiring temperature control. Packing group shall be II or III, according to the criteria for Class 3, applied to the base material. The quantity limit shown in Column 7a of the Dangerous Goods List of Chapter 3.2 applies to the base material.
- 237 The membrane filters, including paper separators, coating or backing materials, etc., that are present in transport, shall not be liable to propagate a detonation as tested by one of the tests described in the *Manual of Tests and Criteria*, Part I, Test series 1(a).

In addition, the competent authority may determine, on the basis of the results of suitable burning rate tests taking account of the standard tests in the *Manual of Tests and Criteria*, Part III, sub-section 33.2.1, that nitrocellulose membrane filters in the form in which they are to be transported are not subject to the provisions of these Regulations applicable to flammable solids in Division 4.1.

- 238 (a) Batteries can be considered as non-spillable provided that they are capable of withstanding the vibration and pressure differential tests given below, without leakage of battery fluid.

Vibration test: The battery is rigidly clamped to the platform of a vibration machine and a simple harmonic motion having an amplitude of 0.8 mm (1.6 mm maximum total excursion) is applied. The frequency is varied at the rate of 1 Hz/min between the limits of 10 Hz and 55 Hz. The entire range of frequencies and return is traversed in 95 ± 5 minutes for each mounting position (direction of vibration) of the battery. The battery is tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for equal time periods.

Pressure differential test: Following the vibration test, the battery is stored for six hours at $24\text{ }^{\circ}\text{C} \pm 4\text{ }^{\circ}\text{C}$ while subjected to a pressure differential of at least 88 kPa. The battery is tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for at least six hours in each position.

NOTE: Non-spillable type batteries which are an integral part of and necessary for the operation of mechanical or electronic equipment, shall be securely fastened in the battery holder on the equipment and protected in such a manner as to prevent damage and short circuits.

- (b) Non-spillable batteries are not subject to these Regulations if, at a temperature of $55\text{ }^{\circ}\text{C}$, the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow and if, when packaged for transport, the terminals are protected from short circuit.

- 239 Batteries or cells shall not contain dangerous goods other than sodium, sulphur and/or polysulphides. Batteries or cells shall not be offered for transport at a temperature such that liquid elemental sodium is present in the battery or cell unless approved and under the conditions established by the competent authority.

Cells shall consist of hermetically sealed metal casings which fully enclose the dangerous goods and which are so constructed and closed as to prevent the release of the dangerous goods under normal conditions of transport.

Batteries shall consist of cells secured within and fully enclosed by a metal casing so constructed and closed as to prevent the release of the dangerous goods under normal conditions of transport.

Except for air transport, batteries installed in vehicles (UN 3171) are not subject to these Regulations.

- 240 This entry only applies to vehicles and equipment powered by wet batteries, sodium batteries or lithium batteries and transported with these batteries installed. Examples of such vehicles and equipment are electrically-powered cars, lawnmowers, wheelchairs and other mobility aids. Hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries or lithium batteries, transported with the battery(ies) installed shall be consigned under the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate.
- 241 The formulation shall be prepared so that it remains homogeneous and does not separate during transport. Formulations with low nitrocellulose contents and not showing dangerous properties when tested for their liability to detonate, deflagrate or explode when heated under defined confinement by tests of Test series 1 (a), 2 (b) and 2 (c) respectively in the *Manual of Tests and Criteria*, Part I and not being a flammable solid when tested in accordance with test N.1 in the *Manual of Tests and Criteria*, Part III, sub-section 33.2.1.4 (chips, if necessary, crushed and sieved to a particle size of less than 1.25 mm) are not subject to these Regulations.
- 242 Sulphur is not subject to these Regulations when it has been formed to a specific shape (e.g. prills, granules, pellets, pastilles or flakes).
- 243 Gasoline, motor spirit and petrol for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) shall be assigned to this entry regardless of variations in volatility.

- 244 This entry includes e.g. aluminium dross, aluminium skimmings, spent cathodes, spent potliner, and aluminium salt slags.
- 246 This substance shall be packed in accordance with packing method OP6 (see applicable packing instruction). During transport, it shall be protected from direct sunshine and stored (or kept) in a cool and well-ventilated place, away from all sources of heat.
- 247 Alcoholic beverages containing more than 24% alcohol but not more than 70% by volume, when transported as part of the manufacturing process, may be transported in wooden barrels with a capacity of more than 250 litres and not more than 500 litres meeting the general requirements of 4.1.1, as appropriate, on the following conditions:
- (a) The wooden barrels shall be checked and tightened before filling;
 - (b) Sufficient ullage (not less than 3%) shall be left to allow for the expansion of the liquid;
 - (c) The wooden barrels shall be transported with the bungholes pointing upwards;
 - (d) The wooden barrels shall be transported in containers meeting the requirements of the International Convention for Safe Containers (CSC), 1972, as amended. Each wooden barrel shall be secured in custom-made cradles and be wedged by appropriate means to prevent it from being displaced in any way during transport.
- 249 Ferrocium, stabilized against corrosion, with a minimum iron content of 10% is not subject to these Regulations.
- 250 This entry may only be used for samples of chemicals taken for analysis in connection with the implementation of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. The transport of substances under this entry shall be in accordance with the chain of custody and security procedures specified by the Organisation for the Prohibition of Chemical Weapons.

The chemical sample may only be transported providing prior approval has been granted by the competent authority or the Director General of the Organisation for the Prohibition of Chemical Weapons and providing the sample complies with the following provisions:

- (a) It shall be packed according to Packing Instruction 623 in the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air; and
 - (b) During transport it shall be accompanied by a copy of the document of approval for transport, showing the quantity limitations and the packing provisions.
- 251 The entry CHEMICAL KIT or FIRST AID KIT is intended to apply to boxes, cases etc. containing small quantities of various dangerous goods which are used for example for medical, analytical or testing or repair purposes. Such kits may not contain dangerous goods for which the quantity "0" has been indicated in column 7a of the Dangerous Goods List of Chapter 3.2.

Components shall not react dangerously (see 4.1.1.6). The total quantity of dangerous goods in any one kit shall not exceed either 1 L or 1 kg. The packing group assigned to the kit as a whole shall be the most stringent packing group assigned to any individual substance in the kit.

Kits which are carried on board vehicles for first-aid or operating purposes are not subject to these Regulations.

Chemical kits and first aid kits containing dangerous goods in inner packagings which do not exceed the quantity limits for limited quantities applicable to individual substances as specified in Column 7a of the Dangerous Goods List of Chapter 3.2 may be transported in accordance with Chapter 3.4.

- 252 Provided the ammonium nitrate remains in solution under all conditions of transport, aqueous solutions of ammonium nitrate, with not more than 0.2% combustible material, in a concentration not exceeding 80%, are not subject to these Regulations.
- 266 This substance, when containing less alcohol, water or phlegmatizer than specified, shall not be transported unless specifically authorized by the competent authority.
- 267 Any explosives, blasting, type C containing chlorates shall be segregated from explosives containing ammonium nitrate or other ammonium salts.
- 270 Aqueous solutions of Division 5.1 inorganic solid nitrate substances are considered as not meeting the criteria of Division 5.1 if the concentration of the substances in solution at the minimum temperature encountered in transport is not greater than 80% of the saturation limit.
- 271 Lactose or glucose or similar materials, may be used as a phlegmatizer provided that the substance contains not less than 90%, by mass, of phlegmatizer. The competent authority may authorize these mixtures to be classified in Division 4.1 on the basis of a test Series 6(c) of Section 16 of Part I of the *Manual of Tests and Criteria* on at least three packages as prepared for transport. Mixtures containing at least 98%, by mass, of phlegmatizer are not subject to these Regulations. Packages containing mixtures with not less than 90%, by mass, of phlegmatizer need not bear a TOXIC subsidiary risk label.
- 272 This substance shall not be transported under the provisions of Division 4.1 unless specifically authorized by the competent authority (see UN 0143).
- 273 Maneb and maneb preparations stabilized against self-heating need not be classified in Division 4.2 when it can be demonstrated by testing that a cubic volume of 1 m³ of substance does not self-ignite and that the temperature at the centre of the sample does not exceed 200 °C, when the sample is maintained at a temperature of not less than 75 °C ± 2 °C for a period of 24 hours.
- 274 For the purposes of documentation and package marking, the proper shipping name shall be supplemented with the technical name (see 3.1.2.8).
- 276 This includes any substance which is not covered by any of the other classes but which has narcotic, noxious or other properties such that, in the event of spillage or leakage on an aircraft, annoyance or discomfort could be caused to crew members so as to prevent the correct performance of assigned duties.
- 277 For aerosols or receptacles containing toxic substances the limited quantity value is 120 ml. For all other aerosols or receptacles the limited quantity value is 1000 ml.
- 278 These substances shall not be classified and transported unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6(c) test of Part I of the *Manual of Tests and Criteria* on packages as prepared for transport

(see 2.1.3.1). The competent authority shall assign the packing group on the basis of the Chapter 2.3 criteria and the package type used for the Series 6(c) test.

279 The substance is assigned to this classification or packing group based on human experience rather than the strict application of classification criteria set out in these regulations.

280 This entry applies to articles which are used as life-saving vehicle air bag inflators, or air bag modules or seat-belt pretensioners and which contain dangerous goods of Class 1 or dangerous goods of other classes and when transported as component parts and when these articles as presented for transport have been tested in accordance with Test series 6 (c) of Part I of the *Manual of Tests and Criteria*, with no explosion of the device, no fragmentation of device casing or pressure vessel, and no projection hazard nor thermal effect which would significantly hinder fire-fighting or other emergency response efforts in the immediate vicinity.

281 The transport by sea of hay, straw or bhusa, wet, damp or contaminated with oil shall be prohibited. Transport by other modes is also prohibited except with special authorization by the competent authorities.

Hay, straw and bhusa, when not wet, damp or contaminated with oil, are subject to these Regulations only when transported by sea.

283 Articles, containing gas, intended to function as shock absorbers, including impact energy-absorbing devices, or pneumatic springs are not subject to these Regulations provided each article:

(a) Each article has a gas space capacity not exceeding 1.6 litres and a charge pressure not exceeding 280 bar where the product of the capacity (litres) and charge pressure (bars) does not exceed 80 (i.e. 0.5 litre gas space and 160 bar charge pressure, 1 litre gas space and 80 bar charge pressure, 1.6 litre gas space and 50 bar charge pressure, 0.28 litre gas space and 280 bar charge pressure);

(b) Each article has a minimum burst pressure of 4 times the charge pressure at 20°C for products not exceeding 0.5 litre gas space capacity and 5 times charge pressure for products greater than 0.5 litre gas space capacity;

(c) Each article is manufactured from material which will not fragment upon rupture;

(d) Each article is manufactured in accordance with a quality assurance standard acceptable to the competent authority; and

(e) The design type has been subjected to a fire test demonstrating that pressure in the article is relieved by means of a fire degradable seal or other pressure relief device, such that the article will not fragment and that the article does not rocket.

284 An oxygen generator, chemical, containing oxidizing substances shall meet the following conditions:

(a) The generator when containing an explosive actuating device shall only be transported under this entry when excluded from Class 1 in accordance with 2.1.1.1 (b) of these Regulations;

- (b) The generator, without its packaging, shall be capable of withstanding a 1.8 m drop test onto a rigid, non-resilient, flat and horizontal surface, in the position most likely to cause damage, without loss of its contents and without actuation; and
 - (c) When a generator is equipped with an actuating device, it shall have at least two positive means of preventing unintentional actuation.
- 286 Nitrocellulose membrane filters covered by this entry, each with a mass not exceeding 0.5 g, are not subject to these Regulations when contained individually in an article or a sealed packet.
- 288 These substances shall not be classified and transported unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6(c) test of the *Manual of Tests and Criteria* on packages as prepared for transport (see 2.1.3.1).
- 289 Air bag inflators, air bag modules or seat-belt pretensioners installed in conveyances or in completed conveyance components such as steering columns, door panels, seats etc. are not subject to these Regulations.
- 290 When this material meets the definitions and criteria of other classes or divisions as defined in Part 2, it shall be classified in accordance with the predominant subsidiary risk. Such material shall be declared under the proper shipping name and UN number appropriate for the material in that predominant Class or Division, with the addition of the name applicable to this material according to Column 2 in the Dangerous Goods List of Chapter 3.2, and shall be transported in accordance with the provisions applicable to that UN number. In addition, all other requirements specified in 1.5.1.5.1 shall apply, except 5.2.1.5.2.
- 291 Flammable liquefied gases shall be contained within refrigerating machine components. These components shall be designed and tested to at least three times the working pressure of the machinery. The refrigerating machines shall be designed and constructed to contain the liquefied gas and preclude the risk of bursting or cracking of the pressure retaining components during normal conditions of transport. Refrigerating machines and refrigerating-machine components are considered not subject to these Regulations if they contain less than 12 kg of gas.
- 292 Mixtures containing not more than 23.5% oxygen by volume may be transported under this entry when no other oxidizing gases are present. A Division 5.1 subsidiary risk label is not required for any concentrations within this limit.
- 293 The following definitions apply to matches:
- (a) Fusee matches are matches the heads of which are prepared with a friction-sensitive igniter composition and a pyrotechnic composition which burns with little or no flame, but with intense heat;
 - (b) Safety matches are combined with or attached to the box, book or card that can be ignited by friction only on a prepared surface;
 - (c) Strike anywhere matches are matches that can be ignited by friction on a solid surface;
 - (d) Wax Vesta matches are matches that can be ignited by friction either on a prepared surface or on a solid surface.

- 294 Safety matches and wax “Vesta” matches in outer packagings not exceeding 25 kg net mass are not subject to any other requirement (except marking) of these Regulations when packaged in accordance with packing instruction P407.
- 295 Batteries need not be individually marked and labelled if the pallet bears the appropriate mark and label.
- 296 These entries apply for life-saving appliances such as life rafts, personal flotation devices and self-inflating slides. UN 2990 applies for self-inflating appliances and UN 3072 applies for life-saving appliances that are not self-inflating. Life-saving appliances may contain:
- (a) Signal devices (Class 1) which may include smoke and illumination signal flares packed in packagings that prevent them from being inadvertently activated;
 - (b) For UN 2990 only, cartridges, power device of Division 1.4, compatibility group S, may be contained for purposes of the self-inflating mechanism and provided that the quantity of explosives per appliance does not exceed 3.2 g;
 - (c) Division 2.2 compressed gases;
 - (d) Electric storage batteries (Class 8) and lithium batteries (Class 9);
 - (e) First aid kits or repair kits containing small quantities of dangerous goods (e.g.: Class 3, Division 4.1, Division 5.2, Class 8 or Class 9 substances); or
 - (f) “Strike anywhere” matches packed in packagings that prevent them from being inadvertently activated.
- 297 For air transport, arrangements between consignor and operator(s) shall be made for each consignment, to ensure that ventilation safety procedures are followed.

Transport units containing solid carbon dioxide, when transported on board ocean vessels, shall be conspicuously marked on two sides “WARNING CO₂ SOLID (DRY ICE)”. Other packagings containing solid carbon dioxide, when transported on board ocean vessels, shall be marked “CARBON DIOXIDE, SOLID-DO NOT STOW BELOW DECK”.

Carbon dioxide, solid (dry ice) is excepted from the shipping paper requirements if the package is marked “Carbon dioxide, solid” or “Dry ice” and is marked with an indication that the substance being refrigerated is used for diagnostic or treatment purposes (e.g., frozen medical specimens).

- 299 Consignments of COTTON, DRY having a density not less than 360 kg/m³ according to ISO 8115:1986 “Cotton bales – Dimensions and density” are not subject to these Regulations when transported in closed transport units.
- 300 Fish meal or fish scrap shall not be transported if the temperature at the time of loading exceeds 35 °C or 5 °C above the ambient temperature whichever is higher.
- 301 This entry only applies to machinery or apparatus containing dangerous substances as a residue or an integral element of the machinery or apparatus. It shall not be used for machinery or apparatus for which a proper shipping name already exists in the Dangerous Goods List of Chapter 3.2. Machinery and apparatus transported under this entry shall only contain dangerous goods which are authorized to be transported in accordance with the provisions of Chapter 3.4 (Limited quantities). The quantity of dangerous goods in

machinery or apparatus shall not exceed the quantity specified in Column 7a of the Dangerous Goods List of Chapter 3.2 for each item of dangerous goods contained. If the machinery or apparatus contains more than one item of dangerous goods, the individual substances shall not be capable of reacting dangerously with one another (see 4.1.1.6). When it is required to ensure liquid dangerous goods remain in their intended orientation, package orientation labels meeting the specifications of ISO 780:1997 shall be affixed on at least two opposite vertical sides with the arrows pointing in the correct direction.

The competent authority may exempt from regulation machinery or apparatus which would otherwise be transported under this entry. The transport of dangerous goods in machinery or apparatus where the quantity of dangerous goods exceeds the quantity specified in Column 7a of the Dangerous Goods List of Chapter 3.2 is authorized when approved by the competent authority.

302 In the proper shipping name, the word "UNIT" means:

a road freight vehicle;
a railway freight wagon;
a freight container;
a road tank vehicle;
a railway tank wagon; or
a portable tank.

Except when transported by sea, fumigated units are only subject to the provisions of 5.5.2.

303 Receptacles shall be assigned to the division and, if any, subsidiary hazard of the gas or mixture of gases contained therein determined in accordance with the provisions of Chapter 2.2.

304 Batteries, dry, containing corrosive electrolyte which will not flow out of the battery if the battery case is cracked are not subject to these Regulations provided the batteries are securely packed and protected against short-circuits. Examples of such batteries are: alkali-manganese, zinc-carbon, nickel-metal hydride and nickel-cadmium batteries.

305 These substances are not subject to these Regulations when in concentrations of not more than 50 mg/kg.

306 This entry may only be used for substances that do not exhibit explosive properties of Class 1 when tested in accordance to Test Series 1 and 2 of Class 1 (see *Manual of Tests and Criteria*, Part I).

307 This entry may only be used for uniform mixtures containing ammonium nitrate as the main ingredient within the following composition limits:

- (a) Not less than 90% ammonium nitrate with not more than 0.2% total combustible/organic material calculated as carbon and with added matter, if any, which is inorganic and inert towards ammonium nitrate; or
- (b) Less than 90% but more than 70% ammonium nitrate with other inorganic materials or more than 80% but less than 90% ammonium nitrate mixed with calcium carbonate and/or dolomite and/or mineral calcium sulphate and not more than 0.4% total combustible/organic material calculated as carbon; or

- (c) Nitrogen type ammonium nitrate based fertilizers containing mixtures of ammonium nitrate and ammonium sulphate with more than 45% but less than 70% ammonium nitrate and not more than 0.4% total combustible/organic material calculated as carbon such that the sum of the percentage compositions of ammonium nitrate and ammonium sulphate exceeds 70%.

308 Fish scrap or fish meal shall contain at least 100 ppm of antioxidant (ethoxyquin) at the time of consignment.

309 This entry applies to non sensitized emulsions, suspensions and gels consisting primarily of a mixture of ammonium nitrate and fuel, intended to produce a Type E blasting explosive only after further processing prior to use.

The mixture for emulsions typically has the following composition: 60-85% ammonium nitrate; 5-30% water; 2-8% fuel; 0.5-4% emulsifier agent; 0-10% soluble flame suppressants and trace additives. Other inorganic nitrate salts may replace part of the ammonium nitrate.

The mixture for suspensions and gels typically has the following composition: 60-85% ammonium nitrate, 0-5% sodium or potassium perchlorate, 0-17% hexamine nitrate or monomethylamine nitrate, 5-30% water, 2-15% fuel, 0.5-4% thickening agent, 0-10% soluble flame suppressants, and trace additives. Other inorganic nitrate salts may replace part of the ammonium nitrate.

Substances shall satisfactorily pass Test Series 8 of the *Manual of Tests and Criteria*, Part I, Section 18 and be approved by the competent authority.

310 The testing requirements in Chapter 38.3 of the *Manual of Tests and Criteria* do not apply to production runs consisting of not more than 100 cells and batteries, or to pre-production prototypes of lithium cells and batteries when these prototypes are transported for testing, if:

- (a) the cells and batteries are transported in an outer packaging that is a metal, plastics or plywood drum or a metal, plastics or wooden box and that meets the criteria for packing group I packagings; and
- (b) each cell and battery is individually packed in an inner packaging inside an outer packaging and is surrounded by cushioning material that is non-combustible, and non-conductive.

311 Substances shall not be transported under this entry unless approved by the competent authority on the basis of the results of appropriate tests according to Part I of the *Manual of Tests and Criteria*. Packaging shall ensure that the percentage of diluent does not fall below that stated in the competent authority approval, at any time during transport.

312 Vehicles which contain an internal combustion engine shall be consigned under the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries or lithium batteries, transported with the battery(ies) installed.

313 Substances and mixtures meeting the criteria for Class 8 shall be labelled with a "CORROSIVE" subsidiary risk label (Model No 8, see 5.2.2.2.2).

- 314 a) These substances are liable to exothermic decomposition at elevated temperatures. Decomposition can be initiated by heat or by impurities (e.g. powdered metals (iron, manganese, cobalt, magnesium) and their compounds);
- b) During the course of transport, these substances shall be shaded from direct sunlight and all sources of heat and be placed in adequately ventilated areas.
- 315 This entry shall not be used for Division 6.1 substances which meet the inhalation toxicity criteria for packing group I described in 2.6.2.2.4.3.
- 316 This entry applies only to calcium hypochlorite, dry, when transported in non friable tablet form.
- 317 “Fissile-excepted” applies only to those packages complying with 6.4.11.2.
- 318 For the purposes of documentation, the proper shipping name shall be supplemented with the technical name (see 3.1.2.8). Technical names need not be shown on the package. When the infectious substances to be transported are unknown, but suspected of meeting the criteria for inclusion in category A and assignment to UN 2814 or UN 2900, the words “suspected category A infectious substance” shall be shown, in parentheses, following the proper shipping name on the transport document, but not on the outer packagings.
- 319 Substances packed and marked in accordance with packing instruction P650 are not subject to any other requirements in these Regulations.
- 320 *Deleted.*
- 321 These storage systems shall always be considered as containing hydrogen.
- 322 When transported in non-friable tablet form, these goods are assigned to packing group III.
- 323 The label conforming to the model prescribed in the 13th revised edition of the UN Recommendations on the Transport of Dangerous Goods, Model Regulations, may be used until 31 December 2010.
- 324 This substance needs to be stabilized when in concentrations of not more than 99%.
- 325 In the case of non-fissile or fissile excepted uranium hexafluoride, the material shall be classified under UN 2978.
- 326 In the case of fissile uranium hexafluoride, the material shall be classified under UN 2977.
- 327 Waste aerosols consigned in accordance with 5.4.1.4.3 (c) may be transported under this entry for the purposes of reprocessing or disposal. They need not be protected against inadvertent discharge provided that measures to prevent dangerous build up of pressure and dangerous atmospheres are addressed. Waste aerosols, other than those leaking or severely deformed, shall be packed in accordance with packing instruction P003 and special provision PP87, or packing instruction LP02 and special packing provision L2. Leaking or severely deformed aerosols shall be transported in salvage packagings provided appropriate measures are taken to ensure there is no dangerous build up of pressure. Waste aerosols shall not be transported in closed freight containers.
- 328 This entry applies to fuel cell cartridges including when contained in equipment or packed with equipment. Fuel cell cartridges installed in or integral to a fuel cell system are regarded as contained in equipment. Fuel cell cartridge means an article that stores fuel for discharge into the fuel cell through a valve(s) that controls the discharge of fuel into the fuel cell. Fuel cell cartridges, including when contained in equipment, shall be designed and constructed to prevent fuel leakage under normal conditions of transport.

Fuel cell cartridge design types using liquids as fuels shall pass an internal pressure test at a pressure of 100 kPa (gauge) without leakage.

Except for fuel cell cartridges containing hydrogen in metal hydride which shall be in compliance with special provision 339, each fuel cell cartridge design type shall be shown to pass a 1.2 meter drop test onto an unyielding surface in the orientation most likely to result in failure of the containment system with no loss of contents.

Fuel cell cartridges containing hydrogen in a metal hydride transported under this entry shall have a water capacity less than or equal to 120 ml.

329 Where substances have a flash point of 60 °C or less, the package(s) shall bear a "FLAMMABLE LIQUID" subsidiary risk label (Model No.3, see 5.2.2.2.2) in addition to the hazard label(s) required by these Regulations.

330 *Deleted.*

331 For environmentally hazardous substances meeting the criteria of 2.9.3, an additional mark as specified in 5.2.1.6 and 5.3.2.3 shall be applied.

332 Magnesium nitrate hexahydrate is not subject to these Regulations.

333 Ethanol and gasoline, motor spirit or petrol mixtures for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) shall be assigned to this entry regardless of variations in volatility.

334 A fuel cell cartridge may contain an activator provided it is fitted with two independent means of preventing unintended mixing with the fuel during transport.

335 Mixtures of solids which are not subject to these Regulations and environmentally hazardous liquids or solids shall be classified as UN 3077 and may be transported under this entry, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or transport unit is closed. Each transport unit shall be leakproof when used as a bulk packaging. Sealed packets and articles containing less than 10 ml of an environmentally hazardous liquid, absorbed into a solid material but with no free liquid in the packet or article, or containing less than 10 g of an environmentally hazardous solid, are not subject to these Regulations.

336 A single package of non-combustible solid LSA-II or LSA-III material, if carried by air, shall not contain an activity greater than 3000 A₂.

337 Type B(U) and Type B(M) packages, if transported by air, shall not contain activities greater than the following:

(a) For low dispersible radioactive material: as authorized for the package design as specified in the certificate of approval;

(b) For special form radioactive material: 3 000 A₁ or 100 000 A₂, whichever is the lower; or

(c) For all other radioactive material: 3 000 A₂.

338 Each fuel cell cartridge transported under this entry and designed to contain a liquefied flammable gas shall:

- (a) Be capable of withstanding, without leakage or bursting, a pressure of at least two times the equilibrium pressure of the contents at 55 °C;
- (b) Not contain more than 200 ml of liquefied flammable gas with a vapour pressure not exceeding 1 000 kPa at 55 °C; and
- (c) Pass the hot water bath test prescribed in 6.2.4.1.

339 Fuel cell cartridges containing hydrogen in a metal hydride transported under this entry shall have a water capacity less than or equal to 120 ml.

The pressure in the fuel cell cartridge shall not exceed 5 MPa at 55 °C. The design type shall withstand, without leaking or bursting, a pressure of two times the design pressure of the cartridge at 55 °C or 200 kPa more than the design pressure of the cartridge at 55 °C, whichever is greater. The pressure at which this test is conducted is referred to in the Drop Test and the Hydrogen Cycling Test as the “minimum shell burst pressure”.

Fuel cell cartridges shall be filled in accordance with procedures provided by the manufacturer. The manufacturer shall provide the following information with each fuel cell cartridge:

- (a) Inspection procedures to be carried out before initial filling and before refilling of the fuel cell cartridge;
- (b) Safety precautions and potential hazards to be aware of;
- (c) Method for determining when the rated capacity has been achieved;
- (d) Minimum and maximum pressure range;
- (e) Minimum and maximum temperature range; and
- (f) Any other requirements to be met for initial filling and refilling including the type of equipment to be used for initial filling and refilling.

The fuel cell cartridges shall be designed and constructed to prevent fuel leakage under normal conditions of transport. Each cartridge design type, including cartridges integral to a fuel cell, shall be subjected to and shall pass the following tests:

Drop test

A 1.8 metre drop test onto an unyielding surface in four different orientations:

- (a) Vertically, on the end containing the shut-off valve assembly;
- (b) Vertically, on the end opposite to the shut-off valve assembly;
- (c) Horizontally, onto a steel apex with a diameter of 38 mm, with the steel apex in the upward position; and
- (d) At a 45° angle on the end containing the shut-off valve assembly.

There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations, when the cartridge is charged to its rated charging pressure. The fuel cell cartridge shall then be hydrostatically pressurized to destruction. The recorded burst pressure shall exceed 85% of the minimum shell burst pressure.

Fire test

A fuel cell cartridge filled to rated capacity with hydrogen shall be subjected to a fire engulfment test. The cartridge design, which may include a vent feature integral to it, is deemed to have passed the fire test if :

- (a) The internal pressure vents to zero gauge pressure without rupture of the cartridge;
or
- (b) The cartridge withstands the fire for a minimum of 20 minutes without rupture.

Hydrogen cycling test

This test is intended to ensure that fuel cell cartridge design stress limits are not exceeded during use.

The fuel cell cartridge shall be cycled from not more than 5% rated hydrogen capacity to not less than 95% rated hydrogen capacity and back to not more than 5% rated hydrogen capacity. The rated charging pressure shall be used for charging and temperatures shall be held within the operating temperature range. The cycling shall be continued for at least 100 cycles.

Following the cycling test, the fuel cell cartridge shall be charged and the water volume displaced by the cartridge shall be measured. The cartridge design is deemed to have passed the hydrogen cycling test if the water volume displaced by the cycled cartridge does not exceed the water volume displaced by an uncycled cartridge charged to 95% rated capacity and pressurized to 75% of its minimum shell burst pressure.

Production leak test

Each fuel cell cartridge shall be tested for leaks at $15\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, while pressurized to its rated charging pressure. There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations.

Each fuel cell cartridge shall be permanently marked with the following information:

- (a) The rated charging pressure in megapascals (MPa);
- (b) The manufacturer's serial number of the fuel cell cartridges or unique identification number; and
- (c) The date of expiry based on the maximum service life (year in four digits; month in two digits).

340 Chemical kits, first aid kits and polyester resin kits containing dangerous substances in inner packagings which do not exceed the quantity limits for excepted quantities applicable to individual substances as specified in column 7b of the Dangerous Goods List of Chapter 3.2 may be transported in accordance with Chapter 3.5. Division 5.2 substances, although not individually authorized as excepted quantities in the Dangerous Goods List of Chapter 3.2, are authorized in such kits and are assigned Code E2 (see 3.5.1.2).

341 Bulk transport of infectious substances in BK1 and BK2 bulk containers is only permitted for infectious substances contained in animal material as defined in 1.2.1 (see 4.3.2.4.1).

CHAPTER 3.4

DANGEROUS GOODS PACKED IN LIMITED QUANTITIES

3.4.1 This Chapter provides the provisions applicable to the transport of dangerous goods of certain classes packed in limited quantities. The applicable quantity limit for the inner packaging or article is specified for each substance in Column 7a of the Dangerous Goods List in Chapter 3.2. In addition, the quantity “0” has been indicated in Column 7a of the Dangerous Goods List in Chapter 3.2 for each entry not permitted to be transported in accordance with this Chapter. The provisions of Chapter 1.4 and section 7.2.4 do not apply to the transport of dangerous goods packed in limited quantities. All other provisions and requirements of these Regulations apply to the transport of limited quantities except as specifically provided in this Chapter.

3.4.2 Dangerous goods shall be packed only in inner packagings placed in suitable outer packagings. However, the use of inner packagings is not necessary for the transport of articles such as aerosols or “receptacles, small, containing gas”. The packagings shall meet the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 and be so designed that they meet the construction requirements of 6.1.4. The total gross mass of the package shall not exceed 30 kg.

3.4.3 Shrink-wrapped or stretch-wrapped trays meeting the conditions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 are acceptable as outer packagings for articles or inner packagings containing dangerous goods transported in accordance with this Chapter, except that inner packagings that are liable to break or be easily punctured such as those made of glass, porcelain, stoneware or certain plastics, materials, etc, shall not be transported in such packagings. The total gross mass of the package shall not exceed 20 kg.

3.4.4 Liquid goods of Class 8, packing group II in glass, porcelain or stoneware inner packagings shall be enclosed in a compatible and rigid intermediate packaging.

3.4.5 Different dangerous goods packed in limited quantities may be placed in the same outer packaging provided they will not interact dangerously in the event of leakage.

3.4.6 Packages of dangerous goods transported according to this Chapter need not be labelled. Any segregation provisions for dangerous goods need not apply within a vehicle or freight container.

3.4.7 In addition to the provisions for documentation specified in 5.4.1, the words “limited quantity” or “LTD QTY” shall be included with the description of the consignment (see 5.4.1.5.2).

3.4.8 Packages containing dangerous goods in limited quantities need not be marked with the proper shipping name of the contents, but shall be marked with the UN number of the contents (preceded by the letters “UN”) placed within a diamond. The width of line forming the diamond shall be at least 2 mm; the number shall be at least 6 mm high. Where more than one substance is included in the package and the substances are assigned to different UN numbers, then the diamond shall be large enough to include each relevant UN number.

3.4.9 Limited quantities of dangerous goods for personal or household use, that are packaged and distributed in a form intended or suitable for sale through retail agencies, may furthermore be exempted from marking of the UN number on the packaging and from the requirements for a dangerous goods transport document.

CHAPTER 3.5

DANGEROUS GOODS PACKED IN EXCEPTED QUANTITIES

3.5.1 Excepted quantities

3.5.1.1 Excepted quantities of dangerous goods of certain classes, other than articles, meeting the provisions of this Chapter are not subject to any other provisions of these Regulations except for:

- (a) The training requirements in Chapter 1.3;
- (b) The classification procedures and packing group criteria in Part 2;
- (c) The packaging requirements of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.4.1 and 4.1.1.6.

NOTE: In the case of radioactive material, the requirements for radioactive material in excepted packages in 1.5.1.5 apply.

3.5.1.2 Dangerous goods which may be carried as excepted quantities in accordance with the provisions of this Chapter are shown in column 7b of the dangerous goods list of Chapter 3.2 by means of an alphanumeric code as follows:

Code	Maximum quantity per inner packaging	Maximum quantity per outer packaging
E0	Not permitted as Excepted Quantity	
E1	30g/30ml	1kg/1L
E2	30g/30ml	500g/500ml
E3	30g/30ml	300g/300ml
E4	1g/1ml	500g/500ml
E5	1g/1ml	300g/300ml

For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer package.

3.5.1.3 Where dangerous goods in excepted quantities for which different codes are assigned are packaged together the total quantity per outer packaging shall be limited to that corresponding to the most restrictive code.

3.5.2 Packagings

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

- (a) There shall be an inner packaging and each inner packaging shall be constructed of plastic (when used for liquid dangerous goods it shall have a thickness of not less than 0.2 mm), or of glass, porcelain, stoneware, earthenware or metal (see also 4.1.1.2) and the closure of each inner packaging shall be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads shall have a leak proof threaded type cap. The closure shall be resistant to the contents;

- (b) Each inner packaging shall be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of transport, it cannot break, be punctured or leak its contents. The intermediate packaging shall completely contain the contents in case of breakage or leakage, regardless of package orientation. For liquid dangerous goods, the intermediate packaging shall contain sufficient absorbent material to absorb the entire contents of the inner packaging. In such cases, the absorbent material may be the cushioning material. Dangerous goods shall not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials;
- (c) The intermediate packaging shall be securely packed in a strong, rigid outer packaging (wooden, fibreboard or other equally strong material);
- (d) Each package type shall be in compliance with the provisions in 3.5.3;
- (e) Each package shall be of such a size that there is adequate space to apply all necessary markings; and
- (f) Overpacks may be used and may also contain packages of dangerous goods or goods not subject to these Regulations.

3.5.3 Tests for packages

3.5.3.1 The complete package as prepared for transport, with inner packagings filled to not less than 95% of their capacity for solids or 98% for liquids, shall be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

- (a) Drops onto a rigid, non-resilient, flat and horizontal surface from a height of 1.8 m:
 - (i) Where the sample is in the shape of a box, it shall be dropped in each of the following orientations:
 - flat on the base;
 - flat on the top;
 - flat on the longest side;
 - flat on the shortest side;
 - on a corner;
 - (ii) Where the sample is in the shape of a drum, it shall be dropped in each of the following orientations:
 - diagonally on the top chime, with the centre of gravity directly above the point of impact;
 - diagonally on the base chime;
 - flat on the side.

NOTE: Each of the above drops may be performed on different but identical packages.

- (b) A force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the drop sample).

3.5.3.2 For the purposes of testing, the substances to be transported in the packaging may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used, it must have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. In the drop tests for liquids, when another substance is used, its relative density (specific gravity) and viscosity should be similar to those of the substance to be transported.

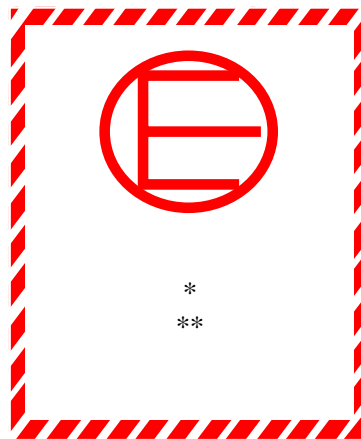
3.5.4 Marking of packages

3.5.4.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this Chapter shall be durably and legibly marked with the mark shown in Figure 3.5.1. The primary hazard class or, when assigned, the division of each of the dangerous goods contained in the package shall be shown in the mark. Where the name of the consignor or consignee is not shown elsewhere on the package this information shall be included within the mark.

3.5.4.2 The dimensions of the mark shall be a minimum of 100 mm × 100 mm.

3.5.4.3 An overpack containing dangerous goods in excepted quantities shall display the markings required by 3.5.4.1, unless such markings on packages within the overpack are clearly visible.

Figure 3.5.1



Excepted quantities mark

Hatching and symbol of the same colour, black or red,
on white or suitable contrasting background

* The Class or, when assigned, the Division number(s) shall be shown in this location.

** The name of the consignor or of the consignee shall be shown in this location if not shown elsewhere on the package.

3.5.5 Maximum number of packages in any freight vehicle, railway freight wagon or multimodal freight container

The number of packages in any freight vehicle, railway freight wagon or multimodal freight container shall not exceed 1 000.

3.5.6 Documentation

If a document (such as a bill of lading or air waybill) accompanies dangerous goods in excepted quantities, it shall include the statement "Dangerous Goods in Excepted Quantities" and indicate the number of packages.

