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### CHAPTER 3.3

#### SPECIAL PROVISIONS APPLICABLE TO CERTAIN ARTICLES OR SUBSTANCES

3.3.1

When Column (6) of Table A of Chapter 3.2 indicates that a special provision is relevant to a substance or article, the meaning and requirements of that special provision are as set forth below. Where a special provision includes a requirement for package marking, the provisions of 5.2.1.2 (a) and (b) shall be met. If the required mark is in the form of specific wording indicated in quotation marks, ~~such as "LITHIUM BATTERIES FOR DISPOSAL"~~ such as "~~Damaged Lithium Batteries~~", the size of the mark shall be at least 12 mm, unless otherwise indicated in the special provision or elsewhere in ADR.

16 Samples of new or existing explosive substances or articles may be carried as directed by the competent authorities (see 2.2.1.1.3) for purposes including: testing, classification, research and development, quality control, or as a commercial sample. Explosive samples which are not wetted or desensitized shall be limited to 10 kg in small packages as specified by the competent authorities. Explosive samples which are wetted or desensitized shall be limited to 25 kg.

23 Even though this substance has a flammability hazard, it only exhibits such hazard under extreme fire conditions in confined areas.

32 This substance is not subject to the requirements of ADR when in any other form.

37 This substance is not subject to the requirements of ADR when coated.

38 This substance is not subject to the requirements of ADR when it contains not more than 0.1% calcium carbide.

39 This substance is not subject to the requirements of ADR when it contains less than 30% or not less than 90% silicon.

43 When offered for carriage as pesticides, these substances shall be carried under the relevant pesticide entry and in accordance with the relevant pesticide provisions (see 2.2.61.1.10 to 2.2.61.1.11.2).

45 Antimony sulphides and oxides which contain not more than 0.5% of arsenic calculated on the total mass are not subject to the requirements of ADR.

47 Ferricyanides and ferrocyanides are not subject to the requirements of ADR.

48 The carriage of this substance, when it contains more than 20% hydrocyanic acid, is prohibited.

59 These substances are not subject to the requirements of ADR when they contain not more than 50% magnesium.

60 If the concentration is more than 72%, the carriage of this substance is prohibited.

61 The technical name which shall supplement the proper shipping name shall be the ISO common name (see also ISO 1750:1981 "*Pesticides and other agrochemicals - common names*", as amended), other name listed in the WHO "*Recommended Classification of Pesticides by Hazard and Guidelines to Classification*" or the name of the active substance (see also 3.1.2.8.1 and 3.1.2.8.1.1).

62 This substance is not subject to the requirements of ADR when it contains not more than 4% sodium hydroxide.

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- 65 Hydrogen peroxide aqueous solutions with less than 8% hydrogen peroxide are not subject to the requirements of ADR.
- 66 Cinnabar is not subject to the requirements of ADR.
- 103 The carriage of ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt is prohibited.
- 105 Nitrocellulose meeting the descriptions of UN No. 2556 or UN No. 2557 may be classified in Class 4.1.
- 113 The carriage of chemically unstable mixtures is prohibited.
- 119 Refrigerating machines include machines or other appliances which have been designed for the specific purpose of keeping food or other items at a low temperature in an internal compartment, and air conditioning units. Refrigerating machines and refrigerating machine components are not subject to the provisions of ADR if they contain less than 12 kg of gas in Class 2, group A or O according to 2.2.2.1.3, or if they contain less than 12 litres ammonia solution (UN No. 2672).
- 122 The subsidiary **risks/hazards**, control and emergency temperatures if any, and the UN number (generic entry) for each of the currently assigned organic peroxide formulations are given in 2.2.52.4, 4.1.4.2 packing instruction IBC520 and 4.2.5.2.6 portable tank instruction T23.
- 123 *(Reserved)*
- 127 Other inert material or inert material mixture may be used, provided this inert material has identical phlegmatizing properties.
- 131 The phlegmatized substance shall be significantly less sensitive than dry PETN.
- 135 The dihydrated sodium salt of dichloroisocyanuric acid does not meet the criteria for inclusion in Class 5.1 and is not subject to ADR unless meeting the criteria for inclusion in another Class.
- 138 p-Bromobenzyl cyanide is not subject to the requirements of ADR.
- 141 Products which have undergone sufficient heat treatment so that they present no hazard during carriage are not subject to the requirements of ADR.
- 142 Solvent extracted soya bean meal containing not more than 1.5% oil and 11% moisture, which is substantially free of flammable solvent, is not subject to the requirements of ADR.
- 144 An aqueous solution containing not more than 24% alcohol by volume is not subject to the requirements of ADR.
- 145 Alcoholic beverages of packing group III, when carried in receptacles of 250 litres or less, are not subject to the requirements of ADR.
- 152 The classification of this substance will vary with particle size and packaging, but borderlines have not been experimentally determined. Appropriate classifications shall be made in accordance with 2.2.1.
- 153 This entry applies only if it is demonstrated, on the basis of tests, that the substances when in contact with water are not combustible nor show a tendency to auto-ignition and that the mixture of gases evolved is not flammable.
- 162 *(Deleted)*
- 163 A substance mentioned by name in Table A of Chapter 3.2 shall not be carried under this entry. Substances carried under this entry may contain 20% or less nitrocellulose provided the nitrocellulose contains not more than 12.6% nitrogen (by dry mass).
- 168 Asbestos which is immersed or fixed in a natural or artificial binder (such as cement, plastics, asphalt, resins or mineral ore) in such a way that no escape of hazardous quantities of

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respirable asbestos fibres can occur during carriage is not subject to the requirements of ADR. Manufactured articles containing asbestos and not meeting this provision are nevertheless not subject to the requirements of ADR when packed so that no escape of hazardous quantities of respirable asbestos fibres can occur during carriage.

- 169 Phthalic anhydride in the solid state and tetrahydrophthalic anhydrides, with not more than 0.05% maleic anhydride, are not subject to the requirements of ADR. Phthalic anhydride molten at a temperature above its flash-point, with not more than 0.05% maleic anhydride, shall be classified under UN No. 3256.
- 172 Where a radioactive material has (a) subsidiary ~~risk~~hazard(s):
- (a) The substance shall be allocated to packing group I, II or III, if appropriate, by application of the packing group criteria provided in Part 2 corresponding to the nature of the predominant subsidiary ~~risk~~hazard;
  - (b) Packages shall be labelled with subsidiary ~~risk-hazard~~ labels corresponding to each subsidiary risk exhibited by the material; corresponding placards shall be affixed to cargo transport units in accordance with the relevant provisions of 5.3.1;
  - (c) For the purposes of documentation and package marking, the proper shipping name shall be supplemented with the name of the constituents which most predominantly contribute to this (these) subsidiary ~~risk~~hazard(s) and which shall be enclosed in parenthesis;
  - (d) The dangerous goods transport document shall indicate the label model number(s) corresponding to each subsidiary ~~risk-hazard~~ in parenthesis after the Class number "7" and, where assigned the packing group as required by 5.4.1.1.1 (d).

For packing, see also 4.1.9.1.5.

- 177 Barium sulphate is not subject to the requirements of ADR.
- 178 This designation shall be used only when no other appropriate designation exists in Table A of Chapter 3.2, and only with the approval of the competent authority of the country of origin (see 2.2.1.1.3).
- 181 Packages containing this type of substance shall bear a label conforming to model No. 1 (see 5.2.2.2.2) unless the competent authority of the country of origin has permitted this label to be dispensed with for the specific packaging employed because test data have proved that the substance in this packaging does not exhibit explosive behaviour (see 5.2.2.1.9).
- 182 The group of alkali metals includes lithium, sodium, potassium, rubidium and 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. (Deleted)~~
- 188 Cells and batteries offered for carriage are not subject to other provisions of ADR 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;

*NOTE: When lithium batteries in conformity with 2.2.9.1.7 (f) are carried in accordance with this special provision, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh (see special provision 387).*

- (b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium ion 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, except those manufactured before 1 January 2009;

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*NOTE:* *When lithium batteries in conformity with 2.2.9.1.7 (f) are carried in accordance with this special provision, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh (see special provision 387).*

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- (c) Each cell or battery meets the provisions of 2.2.9.1.7 (a), (e), (f) if applicable and (g) 2.2.9.1.7 (a) and (b);

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- (d) Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with electrically conductive material~~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;

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- (e) Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. This requirement does not apply to devices which are intentionally active in carriage (radio frequency identification (RFID) transmitters, watches, sensors, etc.) and which are not capable of generating a dangerous evolution of heat. When batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;

- (f) Each package shall be marked with the appropriate lithium battery mark, as illustrated in 5.2.1.9;

This requirement does not apply to:

- (i) Packages containing only button cell batteries installed in equipment (including circuit boards); and
- (ii) Packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment;

When packages are placed in an overpack, the lithium battery mark shall either be clearly visible or be reproduced on the outside of the overpack and the overpack shall be marked with the word "OVERPACK". The lettering of the "OVERPACK" mark shall be at least 12 mm high.

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*NOTE:* *Packages containing lithium batteries packed in conformity with the provisions of Part 4, Chapter 11, packing instructions 965 or 968, Section IB of the ICAO Technical Instructions that bear the mark as shown in 5.2.1.9 (lithium battery mark) and the label shown in 5.2.2.2.2, model No. 9A shall be deemed to meet the provisions of this special provision.*

- (g) Except when 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

- (h) Except when batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass.

As used above and elsewhere in ADR, "lithium content" means the mass of lithium in the anode of a lithium metal or lithium alloy cell. As used in this special provision "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

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

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the *Manual of Tests and Criteria* is considered a "cell" and shall be carried according to the requirements for "cells" for the purpose of this special provision.

- 190 Aerosol dispensers shall be provided with protection against inadvertent discharge. Aerosols with a capacity not exceeding 50 ml containing only non-toxic constituents are not subject to the requirements of ADR.
- 191 Receptacles, small, with a capacity not exceeding 50 ml, containing only non-toxic constituents are not subject to the requirements of ADR.

193 This entry may only be used for ammonium nitrate based compound fertilizers. They shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39. Fertilizers meeting the criteria for this UN number are not subject to the requirements of ADR.

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194 The control and emergency temperatures, if any, and the UN number (generic entry) for each of the currently assigned self-reactive substances are given in 2.2.41.4.

196 Formulations which in laboratory testing neither detonate in the cavitated state nor deflagrate, which show no effect when heated under confinement and which exhibit no explosive power may be carried under this entry. The formulation must also be thermally stable (i.e. the SADT is 60 °C or higher for a 50 kg package). Formulations not meeting these criteria shall be carried under the provisions of Class 5.2, (see 2.2.52.4).

198 Nitrocellulose solutions containing not more than 20% nitrocellulose may be carried as paint, perfumery products or printing ink, as applicable (see UN Nos. 1210, 1263, 1266, 3066, 3469 and 3470).

199 Lead compounds which, when mixed in a ratio of 1:1000 with 0.07M hydrochloric acid and stirred for one hour at a temperature of 23 °C ± 2 °C, exhibit a solubility of 5% or less (see ISO 3711:1990 "*Lead chromate pigments and lead chromate -molybdate pigments – Specifications and methods of test*") are considered insoluble and are not subject to the requirements of ADR unless they meet the criteria for inclusion in another class.

201 Lighters and lighter refills shall comply with the provisions of the country in which they were filled. They shall be provided with protection against inadvertent discharge. The liquid portion of the gas shall not exceed 85% of the capacity of the receptacle at 15 °C. The receptacles, including the closures, shall be capable of withstanding an internal pressure of twice the pressure of the liquefied petroleum gas at 55 °C. The valve mechanisms and ignition devices shall be securely sealed, taped or otherwise fastened or designed to prevent operation or leakage of the contents during carriage. Lighters shall not contain more than 10 g of liquefied petroleum gas. Lighter refills shall not contain more than 65 g of liquefied petroleum gas.

**NOTE:** For waste lighters collected separately see Chapter 3.3, special provision 654.

203 This entry shall not be used for polychlorinated biphenyls, liquid, UN No. 2315 and polychlorinated biphenyls, solid, UN No.3432.

204 (Deleted)

205 This entry shall not be used for UN No. 3155 PENTACHLOROPHENOL.

207 Plastics moulding compounds may be made from polystyrene, poly(methyl methacrylate) or other polymeric material.

208 The commercial grade of calcium nitrate fertilizer, when consisting mainly of a double salt (calcium nitrate and ammonium nitrate) containing not more than 10% ammonium nitrate and at least 12% water of crystallization, is not subject to the requirements of ADR.

210 Toxins from plant, animal or bacterial sources which contain infectious substances, or toxins that are contained in infectious substances, shall be classified in Class 6.2.

- 215 This entry only applies to the technically pure substance or to formulations derived from it having an SADT higher than 75 °C and therefore does not apply to formulations which are self-reactive substances (for self-reactive substances, see 2.2.41.4). Homogeneous mixtures containing not more than 35% by mass of azodicarbonamide and at least 65% of inert substance are not subject to the requirements of ADR unless criteria of other classes are met.
- 216 Mixtures of solids which are not subject to the requirements of ADR and flammable liquids may be carried under this entry without first applying the classification criteria of Class 4.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. Sealed packets and articles containing less than 10 ml of a packing group II or III flammable liquid absorbed into a solid material are not subject to ADR provided there is no free liquid in the packet or article.
- 217 Mixtures of solids which are not subject to the requirements of ADR and toxic liquids may be carried under this entry without first applying the classification criteria of Class 6.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. This entry shall not be used for solids containing a packing group I liquid.
- 218 Mixtures of solids which are not subject to the requirements of ADR and corrosive liquids may be carried under this entry without first applying the classification criteria of Class 8, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed.
- 219 Genetically modified microorganisms (GMMOs) and genetically modified organisms (GMOs) packed and marked in accordance with packing instruction P904 of 4.1.4.1 are not subject to any other requirements of ADR.
- If GMMOs or GMOs meet the criteria for inclusion in Class 6.1 or 6.2 (see 2.2.61.1 and 2.2.62.1) the requirements in ADR for the carriage of toxic substances or infectious substances apply.
- 220 Only the technical name of the flammable liquid component of this solution or mixture shall be shown in parentheses immediately following the proper shipping name.
- 221 Substances included under this entry shall not be of packing group I.
- 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 classification code 1.4C or 1.4S), without changing the classification of Class 2, group A or O according to 2.2.2.1.3 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per extinguishing unit. Fire extinguishers shall be manufactured, tested, approved and labelled according to the provisions applied in the country of manufacture.

**NOTE:** *"Provisions applied in the country of manufacture" means the provisions applicable in the country of manufacture or those applicable in the country of use.*

Fire extinguishers under this entry include:

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

**NOTE:** Pressure receptacles which contain gases for use in the above-mentioned fire extinguishers or for use in stationary fire-fighting installations shall meet the requirements of Chapter 6.2 and all requirements applicable to the relevant dangerous goods when these pressure receptacles are carried separately.

- 226 Formulations of this substance containing not less than 30% non-volatile, non-flammable phlegmatizer are not subject to the requirements of ADR.
- 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 1.
- 228 Mixtures not meeting the criteria for flammable gases (see 2.2.2.1.5) shall be carried under UN No. 3163.
- 230 Lithium cells and batteries may be carried under this entry if they meet the provisions of 2.2.9.1.7.
- 235 This entry applies to articles which contain Class 1 explosive substances and which may also contain dangerous goods of other classes. These articles are used to enhance safety in vehicles, vessels or aircraft – e.g. air bag inflators, air bag modules, seat-belt pretensioners, and pyromechanical devices.
- 236 Polyester resin kits consist of two components: a base material (either Class 3 or Class 4.1, packing group II or III) and an activator (organic peroxide). The organic peroxide shall be type D, E, or F, not requiring temperature control. The packing group shall be II or III, according to the criteria of either Class 3 or Class 4.1, as appropriate, applied to the base material. The quantity limit shown in column (7a) of Table A of Chapter 3.2 applies to the base material.
- 237 The membrane filters, including paper separators, coating or backing materials, etc., that are present in carriage, shall not be liable to propagate a detonation as tested by one of the tests described in the *Manual of Tests and Criteria*, Part I, Test series 1 (a).

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

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

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

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

- (b) Non-spillable batteries are not subject to the requirements of ADR if, at a temperature of  $55 \text{ }^\circ\text{C}$ , the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow and if, as packaged for carriage, the terminals are protected from short circuit.
- 239 Batteries or cells shall not contain dangerous substances other than sodium, sulphur or sodium compounds (e.g. sodium polysulphides and sodium tetrachloroaluminate). Batteries or cells shall not be offered for carriage at a temperature such that liquid elemental sodium is present in the battery or cell unless approved and under the conditions established by the competent

authority of the country of origin. If the country of origin is not a Contracting Party to ADR, the approval and conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADR reached by the consignment.

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

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

- 240 ~~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 carried with these batteries installed. Lithium batteries shall meet the requirements of 2.2.9.1.7, except as otherwise provided for in special provision 667.~~

~~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, 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), wheel chairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. This includes vehicles carried in a packaging. In this case some parts of the vehicle may be detached from its frame to fit into the packaging.~~

~~Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries shall be assigned to the entries UN 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or UN 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT or UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or UN 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, as appropriate. Hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed shall be assigned to the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. Vehicles which contain a fuel cell shall be assigned to the entries UN 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate.~~

~~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 ADR. *(Deleted)*~~

- 241 The formulation shall be prepared so that it remains homogeneous and does not separate during carriage. Formulations with low nitrocellulose contents and not showing dangerous properties when tested for their liability to detonate, deflagrate or explode when heated under defined confinement by tests of Test series 1 (a), 2 (b) and 2 (c) respectively in the *Manual of Tests and Criteria*, Part I and not being a flammable solid when tested in accordance with test No. 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 the requirements of ADR.
- 242 Sulphur is not subject to the requirements of ADR 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.

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247 Alcoholic beverages containing more than 24% alcohol but not more than 70% by volume, when carried as part of the manufacturing process, may be carried in wooden barrels with a capacity of more than 250 litres and not more than 500 litres meeting the general requirements of 4.1.1, as appropriate, on the following conditions:

- (a) The wooden barrels shall be checked and tightened before filling;
- (b) Sufficient ullage (not less than 3%) shall be left to allow for the expansion of the liquid;
- (c) The wooden barrels shall be carried with the bungholes pointing upwards;
- (d) The wooden barrels shall be carried in containers meeting the requirements of the CSC. Each wooden barrel shall be secured in custom-made cradles and be wedged by appropriate means to prevent it from being displaced in any way during carriage.

249 Ferrocerium, stabilized against corrosion, with a minimum iron content of 10% is not subject to the requirements of ADR.

250 This entry may only be used for samples of chemicals taken for analysis in connection with the implementation of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. The carriage of substances under this entry shall be in accordance with the chain of custody and security procedures specified by the Organisation for the Prohibition of Chemical Weapons.

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

- (a) It shall be packed according to packing instruction 623 in the ICAO Technical Instructions ~~(see S 3 8 of the Supplement); and~~
- (b) During carriage, a copy of the document of approval for transport, showing the quantity limitations and the packing provisions shall be attached to the transport document.

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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 Table A of Chapter 3.2. Such kits shall only contain dangerous goods that are permitted as:~~

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- (a) ~~Excepted quantities not exceeding the quantity indicated by the code in column (7b) of Table A of Chapter 3.2, provided that the net quantity per inner packaging and net quantity per package are as prescribed in 3.5.1.2 and 3.5.1.3; or~~
- (b) ~~Limited quantities as indicated in column (7a) of Table A of Chapter 3.2, provided that the net quantity per inner packaging does not exceed 250 ml or 250 g.~~

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Components shall not react dangerously (see "dangerous reaction" in 1.2.1). The total quantity of dangerous goods in any one kit shall not exceed either 1 l or 1 kg. ~~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.~~

~~For the purposes of completion of the transport document as set out in 5.4.1.1.1, the packing group shown on the document shall be the most stringent packing group assigned to any individual substance in the kit. Where the kit contains only dangerous goods to which no packing group is assigned, no packing group need be indicated on the dangerous goods transport document.~~

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Kits which are carried on board vehicles for first-aid or operating purposes are not subject to the requirements of ADR.

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

- 252 Provided the ammonium nitrate remains in solution under all conditions of carriage, aqueous solutions of ammonium nitrate, with not more than 0.2% combustible material, in a concentration not exceeding 80%, are not subject to the requirements of ADR.
- 266 This substance, when containing less alcohol, water or phlegmatizer than specified, shall not be carried unless specifically authorized by the competent authority (see 2.2.1.1).
- 267 Any explosives, blasting, type C containing chlorates shall be segregated from explosives containing ammonium nitrate or other ammonium salts.
- 270 Aqueous solutions of Class 5.1 inorganic solid nitrate substances are considered as not meeting the criteria of Class 5.1 if the concentration of the substances in solution at the minimum temperature encountered during carriage is not greater than 80% of the saturation limit.
- 271 Lactose or glucose or similar materials, may be used as a phlegmatizer provided that the substance contains not less than 90%, by mass, of phlegmatizer. The competent authority may authorize these mixtures to be classified in Class 4.1 on the basis of a test Series 6(c) of Section 16 of Part I of the *Manual of Tests and Criteria* on at least three packages as prepared for carriage. Mixtures containing at least 98%, by mass, of phlegmatizer are not subject to the requirements of ADR. Packages containing mixtures with not less than 90%, by mass, of phlegmatizer need not bear a label conforming to model No. 6.1.
- 272 This substance shall not be carried under the provisions of Class 4.1 unless specifically authorized by the competent authority (see UN No. 0143 or UN No. 0150 as appropriate).
- 273 Maneb and manebe preparations stabilized against self-heating need not be classified in Class 4.2 when it can be demonstrated by testing that a cubic volume of 1 m<sup>3</sup> of substance does not self-ignite and that the temperature at the centre of the sample does not exceed 200 °C, when the sample is maintained at a temperature of not less than 75 °C ± 2 °C for a period of 24 hours.
- 274 The provisions of 3.1.2.8 apply.
- 278 These substances shall not be classified and carried unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6(c) test of Part I of the *Manual of Tests and Criteria* on packages as prepared for carriage (see 2.2.1.1). The competent authority shall assign the packing group on the basis of 2.2.3 criteria and the package type used for the Series 6(c) test.
- 279 The substance is assigned to this classification or packing group based on human experience rather than the strict application of classification criteria set out in ADR.
- 280 This entry applies to safety devices for vehicles, vessels or aircraft, e.g. air bag inflators, air bag modules, seat-belt pretensioners, and pyromechanical devices, which contain dangerous goods of Class 1 or of other classes, when carried as component parts and if these articles as presented for carriage have been tested in accordance with Test Series 6(c) of Part I of the Manual of Tests and Criteria, with no explosion of the device, no fragmentation of device casing or pressure receptacle, and no projection hazard nor thermal effect which would significantly hinder fire-fighting or emergency response efforts in the immediate vicinity. This entry does not apply to life saving appliances described in special provision 296 (UN Nos. 2990 and 3072).
- 282 *(Deleted)*
- 283 Articles, containing gas, intended to function as shock absorbers, including impact energy-absorbing devices, or pneumatic springs are not subject to the requirements of ADR provided:
- (a) Each article has a gas space capacity not exceeding 1.6 litres and a charge pressure not exceeding 280 bar where the product of the capacity (litres) and charge pressure (bars) does not exceed 80 (i.e. 0.5 litres gas space and 160 bar charge pressure, 1 litre gas space and 80 bar charge pressure, 1.6 litres gas space and 50 bar charge pressure, 0.28 litres gas space and 280 bar charge pressure);

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- (b) Each article has a minimum burst pressure of 4 times the charge pressure at 20 °C for products not exceeding 0.5 litres gas space capacity and 5 times charge pressure for products greater than 0.5 litres gas space capacity;
- (c) Each article is manufactured from material which will not fragment upon rupture;
- (d) Each article is manufactured in accordance with a quality assurance standard acceptable to the competent authority; and
- (e) The design type has been subjected to a fire test demonstrating that the article relieves its pressure by means of a fire degradable seal or other pressure relief device, such that the article will not fragment and that the article does not rocket.

See also 1.1.3.2 (d) for equipment used for the operation of the vehicle.

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

- (a) The generator when containing an explosive actuating device shall only be carried under this entry when excluded from Class 1 in accordance with the NOTE under paragraph 2.2.1.1.1 (b);
- (b) The generator, without its packaging, shall be capable of withstanding a 1.8 m drop test onto a rigid, non-resilient, flat and horizontal surface, in the position most likely to cause damage, without loss of its contents and without actuation;
- (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 the requirements of ADR when contained individually in an article or a sealed packet.

288 These substances shall not be classified and carried unless authorized by the competent authority on the basis of results from Series 2 tests and a Series 6(c) test of Part I of the *Manual of tests and Criteria* on packages as prepared for carriage (see 2.2.1.1).

289 Safety devices, electrically initiated and safety devices, pyrotechnic installed in vehicles, wagons, vessels or aircraft or in completed components such as steering columns, door panels, seats, etc. are not subject to ADR.

290 When this radioactive material meets the definitions and criteria of other classes as defined in Part 2, it shall be classified in accordance with the following:

- (a) Where the substance meets the criteria for dangerous goods in excepted quantities as set out in Chapter 3.5, the packagings shall be in accordance with 3.5.2 and meet the testing requirements of 3.5.3. All other requirements applicable to radioactive material, excepted packages as set out in 1.7.1.5 shall apply without reference to the other class;
- (b) Where the quantity exceeds the limits specified in 3.5.1.2 the substance shall be classified in accordance with the predominant subsidiary **fishazard**. The transport document shall describe the substance with the UN number and proper shipping name applicable to the other class supplemented with the name applicable to the radioactive excepted package according to Column (2) of Table A of Chapter 3.2, and the substance shall be carried in accordance with the provisions applicable to that UN number. An example of the information shown on the transport document is:

"UN 1993, Flammable liquid, n.o.s. (ethanol and toluene mixture), Radioactive material, excepted package – limited quantity of material, 3, PG II".

In addition, the requirements of 2.2.7.2.4.1 shall apply;

- (c) The provisions of Chapter 3.4 for the carriage of dangerous goods packed in limited quantities shall not apply to substances classified in accordance with sub-paragraph (b);

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- (d) When the substance meets a special provision that exempts this substance from all dangerous goods provisions of the other classes it shall be classified in accordance with the applicable UN number of Class 7 and all requirements specified in 1.7.1.5 shall apply.

291 Flammable liquefied gases shall be contained within refrigerating machine components. These components shall be designed and tested to at least three times the working pressure of the machinery. The refrigerating machines shall be designed and constructed to contain the liquefied gas and preclude the risk of bursting or cracking of the pressure retaining components during normal conditions of carriage. Refrigerating machines and refrigerating-machine components are not subject to the requirements of ADR if they contain less than 12 kg of gas.

292 *(Deleted)*

293 The following definitions apply to matches:

- (a) Fusee matches are matches the heads of which are prepared with a friction-sensitive igniter composition and a pyrotechnic composition which burns with little or no flame, but with intense heat;
- (b) Safety matches are matches ~~which that~~ are combined with or attached to the box, book or card that can be ignited by friction only on a prepared surface;
- (c) Strike anywhere matches are matches that can be ignited by friction on a solid surface;
- (d) Wax Vesta matches are matches that can be ignited by friction either on a prepared surface or on a solid surface.

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295 Batteries need not be individually marked and labelled if the pallet bears the appropriate mark and label.

296 These entries apply to life-saving appliances such as life rafts, personal flotation devices and self-inflating slides. UN No. 2990 applies to self-inflating appliances and UN No. 3072 applies to life-saving appliances that are not self-inflating. Life-saving appliances may contain:

- (a) Signal devices (Class 1) which may include smoke and illumination signal flares packed in packagings that prevent them from being inadvertently activated;
- (b) For UN No. 2990 only, cartridges, power device of Division 1.4, compatibility group S, may be contained for purposes of the self-inflating mechanism and provided that the quantity of explosives per appliance does not exceed 3.2 g;
- (c) Class 2 compressed or liquefied gases, group A or O, according to 2.2.2.1.3;
- (d) Electric storage batteries (Class 8) and lithium batteries (Class 9);
- (e) First aid kits or repair kits containing small quantities of dangerous goods (e.g.: substances of Class 3, 4.1, 5.2, 8 or 9); or
- (f) "Strike anywhere" matches packed in packagings that prevent them from being inadvertently activated.

Life-saving appliances packed in strong rigid outer packagings with a total maximum gross mass of 40 kg, containing no dangerous goods other than compressed or liquefied gases of Class 2, group A or group O, in receptacles with a capacity not exceeding 120 ml, installed solely for the purpose of the activation of the appliance, are not subject to the requirements of ADR.

298 *(Deleted)*

300 Fish meal, fish scrap and krill meal shall not be loaded if the temperature at the time of loading exceeds 35 °C or 5 °C above the ambient temperature whichever is higher.

301 ~~This entry only applies to machinery or apparatus containing dangerous goods 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 Table A of Chapter 3.2.~~

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Machinery and apparatus carried under this entry shall only contain dangerous goods which are authorized to be carried in accordance with the provisions of Chapter 3.4 (Limited quantities). The quantity of dangerous goods in machinery or apparatus shall not exceed the quantity specified in Column (7a) of Table A of Chapter 3.2 for each item of dangerous goods contained. If the machinery or apparatus contains more than one item of dangerous goods, the individual dangerous goods shall be enclosed to prevent them reacting dangerously with one another during carriage (see 4.1.1.6). When it is required to ensure liquid dangerous goods remain in their intended orientation, orientation arrows shall be displayed on at least two opposite vertical sides with the arrows pointing in the correct direction in accordance with 5.2.1.10.

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**NOTE:** In this special provision the reference to "a proper shipping name which already exists" excludes specific n.o.s. entries for UN Nos. 3537 to 3548.

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- 302 Fumigated cargo transport units containing no other dangerous goods are only subject to the provisions of 5.5.2.
- 303 Receptacles shall be assigned to the classification code of the gas or mixture of gases contained therein determined in accordance with the provisions of section 2.2.2.
- 304 This entry may only be used for the transport of non-activated batteries which contain dry potassium hydroxide and which are intended to be activated prior to use by addition of an appropriate amount of water to the individual cells.
- 305 These substances are not subject to the requirements of ADR when in concentrations of not more than 50 mg/kg.
- 306 This entry may only be used for substances that are too insensitive for acceptance into Class 1 when tested in accordance with Test Series 2 (see *Manual of Tests and Criteria*, Part I).

~~307 This entry may only be used for ammonium nitrate based fertilizers. They shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39 subject to the restrictions of 2.2.51.2.2, thirteenth and fourteenth indents. When used in the said Section 39, the term "competent authority" means the competent authority of the country of origin. If the country of origin is not a Contracting Party to ADR, the classification and conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADR reached by the consignment. 307 This entry may only be used for uniform mixtures containing ammonium nitrate as the main ingredient within the following composition limits:~~

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- ~~(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%.~~

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- 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 Tests 8 (a), (b) and (c) of 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 the Manual of Tests and Criteria, part III sub-section 38.3 do not apply to production runs, consisting of not more than 100 cells ~~and-or~~ batteries, or to pre-production prototypes of cells ~~and-or~~ batteries when these prototypes are carried for testing when packaged in accordance with packing instruction P910 of 4.1.4.1 ~~or LP905 of 4.1.4.3, as applicable.~~

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The transport document shall include the following statement: "Carriage in accordance with special provision 310".

Damaged or defective cells, batteries, or cells and batteries contained in equipment shall be carried in accordance with special provision 376 and packaged in accordance with packing instructions P908 of 4.1.4.1 or LP904 of 4.1.4.3, as applicable.

Cells, batteries or cells and batteries contained in equipment carried for disposal or recycling may be packaged in accordance with special provision 377 and packing instruction P909 of 4.1.4.1.

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

- 312 ~~Vehicles powered by a fuel cell engine shall be assigned to UN No. 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or UN No. 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed.~~

- ~~Other vehicles which contain an internal combustion engine shall be assigned to the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed.~~

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~~Lithium batteries shall meet the requirements of 2.2.9.1.7, except as otherwise provided for in special provision 667. (Deleted)~~

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- 314 (a) These substances are liable to exothermic decomposition at elevated temperatures. Decomposition can be initiated by heat or by impurities (e.g. powdered metals (iron, manganese, cobalt, magnesium) and their compounds);
- (b) During the course of carriage, these substances shall be shaded from direct sunlight and all sources of heat and be placed in adequately ventilated areas.

- 315 This entry shall not be used for Class 6.1 substances which meet the inhalation toxicity criteria for packing group I described in 2.2.61.1.8.

- 316 This entry applies only to calcium hypochlorite, dry, when carried in non friable tablet form.

- 317 "Fissile-excepted" applies only to those fissile material and packages containing fissile material which are excepted in accordance with 2.2.7.2.3.5.

- 318 For the purposes of documentation, the proper shipping name shall be supplemented with the technical name (see 3.1.2.8). When the infectious substances to be carried are unknown, but suspected of meeting the criteria for inclusion in Category A and assignment to UN No. 2814 or 2900, the words "suspected Category A infectious substance" shall be shown, in parentheses, following the proper shipping name on the transport document.
- 319 Substances packed and packages which are marked in accordance with packing instruction P650 are not subject to any other requirements of ADR.
- 320 *(Deleted)*
- 321 These storage systems shall always be considered as containing hydrogen.
- 322 When carried in non-friable tablet form, these goods are assigned to packing group III.
- 323 *(Reserved)*
- 324 This substance needs to be stabilized when in concentrations of not more than 99%.
- 325 In the case of non-fissile or fissile excepted uranium hexafluoride, the material shall be classified under UN No. 2978.
- 326 In the case of fissile uranium hexafluoride, the material shall be classified under UN No. 2977.
- 327 Waste aerosols consigned in accordance with 5.4.1.1.3 may be carried under this entry for the purposes of reprocessing or disposal. They need not be protected against movement and 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 P207 and special provision PP87, or packing instruction LP200 and special packing provision L2. Leaking or severely deformed aerosols shall be carried in salvage packagings provided appropriate measures are taken to ensure there is no dangerous build up of pressure.
- NOTE: For maritime carriage, waste aerosols shall not be carried in closed 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 control(s) the discharge of fuel into the fuel cell. Fuel cell cartridges, including when contained in equipment, shall be designed and constructed to prevent fuel leakage under normal conditions of carriage.
- Fuel cell cartridge design types using liquids as fuels shall pass an internal pressure test at a pressure of 100 kPa (gauge) without leakage.
- Except for fuel cell cartridges containing hydrogen in metal hydride which shall be in compliance with special provision 339, each fuel cell cartridge design type shall be shown to pass a 1.2 meter drop test onto an unyielding surface in the orientation most likely to result in failure of the containment system with no loss of contents.
- When lithium metal or lithium ion batteries are contained in the fuel cell system, the consignment shall be consigned under this entry and under the appropriate entries for UN 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT.
- 329 *(Reserved)*
- 330 *(Deleted)*
- 331 *(Reserved)*
- 332 Magnesium nitrate hexahydrate is not subject to the requirements of ADR.

- 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 carriage.
- 335 Mixtures of solids which are not subject to the requirements of ADR and environmentally hazardous liquids or solids shall be classified as UN 3077 and may be carried under this entry provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or cargo transport unit is closed. Each cargo transport unit shall be leakproof when used for carriage in bulk. If free liquid is visible at the time the mixture is loaded or at the time the packaging or cargo transport unit is closed, the mixture shall be classified as UN 3082. Sealed packets and articles containing less than 10 ml of an environmentally hazardous liquid, absorbed into a solid material but with no free liquid in the packet or article, or containing less than 10 g of an environmentally hazardous solid, are not subject to the requirements of ADR.
- 336 A single package of non-combustible solid LSA-II or LSA-III material, if carried by air, shall not contain an activity greater than 3 000 A<sub>2</sub>.
- 337 Type B(U) and Type B(M) packages, if carried by air, shall not contain activities greater than the following:
- (a) For low dispersible radioactive material: as authorized for the package design as specified in the certificate of approval;
  - (b) For special form radioactive material: 3 000 A<sub>1</sub> or 100 000 A<sub>2</sub>, whichever is the lower; or
  - (c) For all other radioactive material: 3 000 A<sub>2</sub>.
- 338 Each fuel cell cartridge carried under this entry and designed to contain a liquefied flammable gas shall:
- (a) Be capable of withstanding, without leakage or bursting, a pressure of at least two times the equilibrium pressure of the contents at 55 °C;
  - (b) Not contain more than 200 ml liquefied flammable gas, the vapour pressure of which shall not exceed 1 000 kPa at 55 °C; and
  - (c) Pass the hot water bath test prescribed in 6.2.6.3.1.
- 339 Fuel cell cartridges containing hydrogen in a metal hydride carried under this entry shall have a water capacity less than or equal to 120 ml.
- The pressure in the fuel cell cartridge shall not exceed 5 MPa at 55 °C. The design type shall withstand, without leaking or bursting, a pressure of twice the design pressure of the cartridge at 55 °C or 200 kPa more than the design pressure of the cartridge at 55 °C, whichever is greater. The pressure at which this test is conducted is referred to in the drop test and the hydrogen cycling test as the "minimum shell burst pressure".
- Fuel cell cartridges shall be filled in accordance with procedures provided by the manufacturer. The manufacturer shall provide the following information with each fuel cell cartridge:
- (a) Inspection procedures to be carried out before initial filling and before refilling of the fuel cell cartridge;
  - (b) Safety precautions and potential hazards to be aware of;
  - (c) Method for determining when the rated capacity has been achieved;
  - (d) Minimum and maximum pressure range;
  - (e) Minimum and maximum temperature range; and

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- (f) Any other requirements to be met for initial filling and refilling including the type of equipment to be used for initial filling and refilling.

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

#### **Drop test**

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

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

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

#### **Fire test**

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

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

#### **Hydrogen cycling test**

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

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

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

#### **Production leak test**

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

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

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

- 340 Chemical kits, first aid kits and polyester resin kits containing dangerous substances in inner packagings which do not exceed the quantity limits for excepted quantities applicable to individual substances as specified in column (7b) of Table A of Chapter 3.2, may be carried in accordance with Chapter 3.5. Class 5.2 substances, although not individually authorized as excepted quantities in column (7b) of Table A of Chapter 3.2, are authorized in such kits and are assigned Code E2 (see 3.5.1.2).
- 341 *(Reserved)*
- 342 Glass inner receptacles (such as ampoules or capsules) intended only for use in sterilization devices, when containing less than 30 ml of ethylene oxide per inner packaging with not more than 300 ml per outer packaging, may be carried in accordance with the provisions in Chapter 3.5, irrespective of the indication of "E0" in column (7b) of Table A of Chapter 3.2 provided that:
- (a) After filling, each glass inner receptacle has been determined to be leak-tight by placing the glass inner receptacle in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55 °C is achieved. Any glass inner receptacle showing evidence of leakage, distortion or other defect under this test shall not be carried under the terms of this special provision;
  - (b) In addition to the packaging required by 3.5.2, each glass inner receptacle is placed in a sealed plastics bag compatible with ethylene oxide and capable of containing the contents in the event of breakage or leakage of the glass inner receptacle; and
  - (c) Each glass inner receptacle is protected by a means of preventing puncture of the plastics bag (e.g. sleeves or cushioning) in the event of damage to the packaging (e.g. by crushing).
- 343 This entry applies to crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard. The packing group assigned shall be determined by the flammability hazard and inhalation hazard, in accordance with the degree of danger presented.
- 344 The provisions of 6.2.6 shall be met.
- 345 This gas contained in open cryogenic receptacles with a maximum capacity of 1 litre constructed with glass double walls having the space between the inner and outer wall evacuated (vacuum insulated) is not subject to ADR provided each receptacle is carried in an outer packaging with suitable cushioning or absorbent materials to protect it from impact damage.
- 346 Open cryogenic receptacles conforming to the requirements of packing instruction P203 of 4.1.4.1 and containing no dangerous goods except for UN No. 1977 nitrogen, refrigerated liquid, which is fully absorbed in a porous material are not subject to any other requirements of ADR.
- 347 This entry shall only be used if the results of Test series 6 (d) of Part I of the Manual of Tests and Criteria have demonstrated that any hazardous effects arising from functioning are confined within the package.
- 348 Batteries manufactured after 31 December 2011 shall be marked with the Watt-hour rating on the outside case.
- 349 Mixtures of a hypochlorite with an ammonium salt are not to be accepted for carriage. UN No. 1791 hypochlorite solution is a substance of Class 8.
- 350 Ammonium bromate and its aqueous solutions and mixtures of a bromate with an ammonium salt are not to be accepted for carriage.
- 351 Ammonium chlorate and its aqueous solutions and mixtures of a chlorate with an ammonium salt are not to be accepted for carriage.

- 352 Ammonium chlorite and its aqueous solutions and mixtures of a chlorite with an ammonium salt are not to be accepted for carriage.
- 353 Ammonium permanganate and its aqueous solutions and mixtures of a permanganate with an ammonium salt are not to be accepted for carriage.
- 354 This substance is toxic by inhalation.
- 355 Oxygen cylinders for emergency use carried under this entry may include installed actuating cartridges (cartridges, power device of Division 1.4, Compatibility Group C or S), without changing the classification in Class 2 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per oxygen cylinder. The cylinders with the installed actuating cartridges as prepared for carriage shall have an effective means of preventing inadvertent activation.
- 356 Metal hydride storage systems intended to be installed in vehicles, wagons, vessels or aircraft shall be approved by the competent authority of the country of manufacture<sup>1</sup> before acceptance for carriage. The transport document shall include an indication that the package was approved by the competent authority of the country of manufacture<sup>1</sup> or a copy of the competent authority of the country of manufacture<sup>1</sup> approval shall accompany each consignment.
- 357 Petroleum crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard shall be consigned under the entry UN 3494 PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC.
- 358 Nitroglycerin solution in alcohol with more than 1% but not more than 5% nitroglycerin may be classified in Class 3 and assigned to UN No. 3064 provided all the requirements of packing instruction P300 of 4.1.4.1 are complied with.
- 359 Nitroglycerin solution in alcohol with more than 1% but not more than 5% nitroglycerin shall be classified in Class 1 and assigned to UN No. 0144 if not all the requirements of packing instruction P300 of 4.1.4.1 are complied with.
- 360 Vehicles only powered by lithium metal batteries or lithium ion batteries shall be classified under the entry UN 3171 battery-powered vehicle.
- 361 This entry applies to electric double layer capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to ADR. Energy storage capacity means the energy held by a capacitor, as calculated using the nominal voltage and capacitance. All capacitors to which this entry applies, including capacitors containing an electrolyte that does not meet the classification criteria of any class of dangerous goods, shall meet the following conditions:
- (a) Capacitors not installed in equipment shall be carried in an uncharged state. Capacitors installed in equipment shall be carried either in an uncharged state or protected against short circuit;
  - (b) Each capacitor shall be protected against a potential short circuit hazard in carriage as follows:
    - (i) When a capacitor's energy storage capacity is less than or equal to 10Wh or when the energy storage capacity of each capacitor in a module is less than or equal to 10 Wh-, the capacitor or module shall be protected against short circuit or be fitted with a metal strap connecting the terminals; and
    - (ii) When the energy storage capacity of a capacitor or a capacitor in a module is more than 10 Wh, the capacitor or module shall be fitted with a metal strap connecting the terminals;
  - (c) Capacitors containing dangerous goods shall be designed to withstand a 95 kPa pressure differential;

<sup>1</sup> If the country of manufacture is not a Contracting Party to ADR, the approval shall be recognized by the competent authority of a Contracting Party to ADR.

- (d) Capacitors shall be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid which is released upon venting shall be contained by the packaging or by the equipment in which a capacitor is installed; and
- (e) Capacitors shall be marked with the energy storage capacity in Wh.

Capacitors containing an electrolyte not meeting the classification criteria of any class of dangerous goods, including when installed in equipment, are not subject to other provisions of ADR.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods, with an energy storage capacity of 10 Wh or less are not subject to other provisions of ADR when they are capable of withstanding a 1.2 metre drop test unpackaged on an unyielding surface without loss of contents.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods that are not installed in equipment and with an energy storage capacity of more than 10 Wh are subject to ADR.

Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class of dangerous goods, are not subject to other provisions of ADR provided the equipment is packaged in a strong outer packaging constructed of suitable material, and of adequate strength and design in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during carriage. Large robust equipment containing capacitors may be offered for carriage unpackaged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained.

*NOTE: Capacitors which by design maintain a terminal voltage (e.g. asymmetrical capacitors) do not belong to this entry.*

362 (Reserved)

363 ~~This entry may only be used when the conditions of this special provision are met. No other requirements of ADR apply.~~

- (a) This entry applies to engines or machinery, powered by fuels classified as dangerous goods via internal combustion systems or fuel cells (e.g. combustion engines, generators, compressors, turbines, heating units, etc.), ~~in quantities above those specified in column (7a) of Table A of Chapter 3.2,~~ except vehicle equipment assigned to UN No. 3166 referred to in special provision 666.

*NOTE: This entry does not apply to equipment referred to in 1.1.3.2 (a), (d) and (e), 1.1.3.3 and 1.1.3.7.*

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

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

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

- (c) Engines and machinery containing fuels meeting the classification criteria of Class 3, shall be assigned to the entries UN No. 3528 ENGINE, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or UN No. 3528 ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or UN No. 3528 MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or UN No. 3528 MACHINERY, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate.

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- (d) Engines and machinery containing fuels meeting the classification criteria of flammable gases of Class 2, shall be assigned to the entries UN No. 3529 ENGINE, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or UN No. 3529 ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or UN No. 3529 MACHINERY, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or UN No. 3529 MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED, as appropriate.

Engines and machinery powered by both a flammable gas and a flammable liquid shall be assigned to the appropriate UN No. 3529 entry.

- (e) Engines and machinery containing liquid fuels meeting the classification criteria of 2.2.9.1.10 for environmentally hazardous substances and not meeting the classification criteria of any other class shall be assigned to the entries UN No. 3530 ENGINE, INTERNAL COMBUSTION or UN No. 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 ADR. However, lithium batteries shall meet the ~~requirements-provisions~~ of 2.2.9.1.7, except as provided for in special provision 667.

- ~~(g) The engines or machinery are not subject to any other requirements of ADR if the following requirements are met:~~

- (ig) The engine or machinery, including the means of containment containing dangerous goods, shall be in compliance with the construction requirements specified by the competent authority of the country of manufacture<sup>2</sup>;

- (iij) Any valves or openings (e.g. venting devices) shall be closed during carriage;

- (iii) The engines or machinery shall be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during carriage which would change the orientation or cause them to be damaged;

- (ivj) For UN No. 3528 and UN No. 3530:

Where the engine or machinery contains more than 60 l of liquid fuel and has a capacity of more than 450 l but not more than 3 000 l, it shall be labelled on two opposite sides in accordance with 5.2.2.

Where the engine or machinery contains more than 60 l of liquid fuel and has a capacity of more than 3 000 l, it shall be placarded on two opposite sides. Placards shall correspond to the labels required in Column (5) of Table A of Chapter 3.2 and shall conform to the specifications given in 5.3.1.7. Placards shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line.

- (vk) For UN No. 3529:

Where the fuel tank of the engine or machinery has a water capacity of more than 450 l but not more than 1 000 l, it shall be labelled on two opposite sides in accordance with 5.2.2.

Where the fuel tank of the engine or machinery has a water capacity of more than 1 000 l, it shall be placarded on two opposite sides. Placards shall correspond to the labels required in Column (5) of Table A of Chapter 3.2 and shall conform to the specifications

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<sup>2</sup> For example, compliance with the relevant provisions of Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (Official Journal of the European Union No. L 157 of 9 June 2006, pp. 0024-0086).

given in 5.3.1.7. Placards shall be displayed on a background of contrasting colour, or shall have either a dotted or solid outer boundary line.

~~(vi) When the engine or machinery contains more than 1 000 l of liquid fuels, for UN No. 3528 and UN No. 3530, or the fuel tank has a water capacity of more than 1 000 l, for UN No. 3529:~~

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~~- A transport document in accordance with 5.4.1 is required. This transport document shall contain the following additional statement "Transport in accordance with special provision 363":~~

~~c. When the carriage is known beforehand to pass through a tunnel with restrictions for carriage of dangerous goods, the transport unit shall display orange-coloured plates according to 5.3.2 and the tunnel restrictions according to 8.6.4 apply. A transport document in accordance with 5.4.1 is required only when the engine or machinery contains more than 1 000 l of liquid fuels, for UN 3528 and UN 3530, or the fuel tank has a water capacity of more than 1 000 l, for UN 3529.~~

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~~- This transport document shall contain the following additional statement "Transport in accordance with special provision 363":~~

~~(m) The requirements specified in packing instruction P005 of 4.1.4.1 shall be met.~~

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364 This article may only be carried under the provisions of Chapter 3.4 if, as presented for carriage, the package is capable of passing the test in accordance with Test Series 6(d) of Part I of the Manual of Tests and Criteria as determined by the competent authority.

365 For manufactured instruments and articles containing mercury, see UN No. 3506.

366 Manufactured instruments and articles containing not more than 1 kg of mercury are not subject to ADR.

367 For the purposes of documentation:

The proper shipping name "Paint related material" may be used for consignments of packages containing "Paint" and "Paint related material" in the same package;

The proper shipping name "Paint related material, corrosive, flammable" may be used for consignments of packages containing "Paint, corrosive, flammable" and "Paint related material, corrosive, flammable" in the same package;

The proper shipping name "Paint related material, flammable, corrosive" may be used for consignments of packages containing "Paint, flammable, corrosive" and "Paint related material, flammable, corrosive" in the same package; and

The proper shipping name "Printing ink related material" may be used for consignments of packages containing "Printing ink" and "Printing ink related material" in the same package.

368 In the case of non-fissile or fissile-excepted uranium hexafluoride, the material shall be classified under UN No. 3507 or UN No. 2978.

369 In accordance with 2.1.3.5.3 (a), this radioactive material in an excepted package possessing toxic and corrosive properties is classified in Class 6.1 with radioactivity and corrosivity subsidiary Highly Hazardous.

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Uranium hexafluoride may be classified under this entry only if the conditions of 2.2.7.2.4.1.2, 2.2.7.2.4.1.5, 2.2.7.2.4.5.2 and, for fissile-excepted material, of 2.2.7.2.3.5 are met.

In addition to the provisions applicable to the carriage of Class 6.1 substances with a corrosivity subsidiary Highly Hazardous, the provisions of 5.1.3.2, 5.1.5.2.2, 5.1.5.4.1 (b), 7.5.11 CV33 (3.1), (5.1) to (5.4) and (6) shall apply.

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No Class 7 label is required to be displayed.

370 This entry applies to:

- ammonium nitrate with more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any added substance; and
  - ammonium nitrate with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any added substance, that gives a positive result when tested in accordance with Test Series 2 (see Manual of Tests and Criteria, Part I). See also UN No. 1942.
- 371 (1) This entry also applies to articles, containing a small pressure receptacle with a release device. Such articles shall comply with the following requirements:
- (a) The water capacity of the pressure receptacle shall not exceed 0.5 litres and the working pressure shall not exceed 25 bar at 15 °C;
  - (b) The minimum burst pressure of the pressure receptacle shall be at least four times the pressure of the gas at 15 °C;
  - (c) Each article shall be manufactured in such a way that unintentional firing or release is avoided under normal conditions of handling, packing, carriage and use. This may be fulfilled by an additional locking device linked to the activator;
  - (d) Each article shall be manufactured in such a way as to prevent hazardous projections of the pressure receptacle or parts of the pressure receptacle;
  - (e) Each pressure receptacle shall be manufactured from material which will not fragment upon rupture;
  - (f) The design type of the article shall be subjected to a fire test. For this test, the provisions of paragraphs 16.6.1.2 except letter g, 16.6.1.3.1 to 16.6.1.3.6, 16.6.1.3.7 (b) and 16.6.1.3.8 of the Manual of Tests and Criteria shall be applied. It shall be demonstrated that the article relieves its pressure by means of a fire degradable seal or other pressure relief device, in such a way that the pressure receptacle will not fragment and that the article or fragments of the article do not rocket more than 10 metres;
  - (g) The design type of the article shall be subjected to the following test. A stimulating mechanism shall be used to initiate one article in the middle of the packaging. There shall be no hazardous effects outside the package such as disruption of the package, metal fragments or a receptacle which passes through the packaging.
- (2) The manufacturer shall produce technical documentation of the design type, manufacture as well as the tests and their results. The manufacturer shall apply procedures to ensure that articles produced in series are made of good quality, conform to the design type and are able to meet the requirements in (1). The manufacturer shall provide such information to the competent authority on request.

372 This entry applies to asymmetric capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to ADR.

Energy storage capacity means the energy stored in a capacitor, as calculated according to the following equation,

$$Wh = 1/2C_N(U_R^2 - U_L^2) \times (1/3600),$$

using the nominal capacitance ( $C_N$ ), rated voltage ( $U_R$ ) and rated lower limit voltage ( $U_L$ ).

All asymmetric capacitors to which this entry applies shall meet the following conditions:

- (a) Capacitors or modules shall be protected against short circuit;
- (b) Capacitors shall be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Any liquid which is released upon venting shall be contained by packaging or by equipment in which a capacitor is installed;

- (c) Capacitors shall be marked with the energy storage capacity in Wh; and
- (d) Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods shall be designed to withstand a 95 kPa pressure differential;

Capacitors containing an electrolyte not meeting the classification criteria of any class of dangerous goods, including when configured in a module or when installed in equipment are not subject to other provisions of ADR.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods, with an energy storage capacity of 20 Wh or less, including when configured in a module, are not subject to other provisions of ADR when the capacitors are capable of withstanding a 1.2 metre drop test unpackaged on an unyielding surface without loss of contents.

Capacitors containing an electrolyte meeting the classification criteria of any class of dangerous goods that are not installed in equipment and with an energy storage capacity of more than 20 Wh are subject to ADR.

Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class of dangerous goods, are not subject to other provisions of ADR provided that the equipment is packaged in a strong outer packaging constructed of suitable material, and of adequate strength and design, in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during carriage. Large robust equipment containing capacitors may be offered for carriage unpackaged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained.

*NOTE: Notwithstanding the provisions of this special provision, nickel-carbon asymmetric capacitors containing Class 8 alkaline electrolytes shall be carried as UN 2795 BATTERIES, WET, FILLED WITH ALKALI, electric storage.*

373 Neutron radiation detectors containing non-pressurized boron trifluoride gas may be carried under this entry provided that the following conditions are met:

- (a) Each radiation detector shall meet the following conditions.
  - (i) The pressure in each detector shall not exceed 105 kPa absolute at 20 °C;
  - (ii) The amount of gas shall not exceed 13 g per detector;
  - (iii) Each detector shall be manufactured under a registered quality assurance programme;
 

*NOTE: ISO 9001 may be used for this purpose.*
  - (iv) Each neutron radiation detector shall be of welded metal construction with brazed metal to ceramic feed through assemblies. These detectors shall have a minimum burst pressure of 1800 kPa as demonstrated by design type qualification testing; and
  - (v) Each detector shall be tested to a  $1 \times 10^{-10}$  cm<sup>3</sup>/s leaktightness standard before filling.
- (b) Radiation detectors carried as individual components shall be carried as follows:
  - (i) Detectors shall be packed in a sealed intermediate plastics liner with sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents;
  - (ii) They shall be packed in strong outer packaging. The completed package shall be capable of withstanding a 1.8 m drop test without leakage of gas contents from detectors;
  - (iii) The total amount of gas from all detectors per outer packaging shall not exceed 52 g.



- (c) Completed neutron radiation detection systems containing detectors meeting the conditions of paragraph (a) shall be carried as follows:
- (i) The detectors shall be contained in a strong sealed outer casing;
  - (ii) The casing shall contain sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents;
  - (iii) The completed systems shall be packed in strong outer packagings capable of withstanding a 1.8 m drop test without leakage unless a system's outer casing affords equivalent protection.

Packing instruction P200 of 4.1.4.1 is not applicable.

The transport document shall include the following statement "Transport in accordance with special provision 373".

Neutron radiation detectors containing not more than 1 g of boron trifluoride, including those with solder glass joints, are not subject to ADR provided they meet the requirements in paragraph (a) and are packed in accordance with paragraph (b). Radiation detection systems containing such detectors are not subject to ADR provided they are packed in accordance with paragraph (c).

374 *(Reserved)*

375 These substances when carried in single or combination packagings containing a net quantity per single or inner packaging of 5 l or less for liquids or having a net mass per single or inner packaging of 5 kg or less for solids, are not subject to any other provisions of ADR provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

376 Lithium ion cells or batteries and lithium metal cells or batteries identified as being damaged or defective such that they do not conform to the type tested according to the applicable provisions of the Manual of Tests and Criteria shall comply with the requirements of this special provision.

For the purposes of this special provision, these may include, but are not limited to:

- Cells or batteries identified as being defective for safety reasons;
- Cells or batteries that have leaked or vented;
- Cells or batteries that cannot be diagnosed prior to carriage; or
- Cells or batteries that have sustained physical or mechanical damage.

*NOTE: In assessing a battery as damaged or defective, the type of battery and its previous use and misuse shall be taken into account.*

Cells and batteries shall be carried according to the provisions applicable to UN No. 3090, UN No. 3091, UN No. 3480 and No. UN 3481, except special provision 230 and as otherwise stated in this special provision.

Cells and batteries shall be packed in accordance with packing instructions P908 of 4.1.4.1, or LP904 of 4.1.4.3, as applicable.

Cells and batteries identified as damaged or defective and liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage shall be packed and carried in accordance with packing instruction P911 of 4.1.4.1 or LP906 of 4.1.4.3, as applicable. Alternative packing and/or carriage conditions may be authorized by the competent authority of any ADR Contracting Party who may also recognize an approval granted by the competent authority of a country which is not an ADR Contracting Party provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions. In both cases the cells and batteries are assigned to transport category 0.

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~~Packages shall be marked "DAMAGED/DEFECTIVE LITHIUM-ION BATTERIES" or "DAMAGED/DEFECTIVE LITHIUM METAL BATTERIES", as applicable.~~

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~~The transport document shall include the following statement "Transport in accordance with special provision 376".~~

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~~If applicable, a copy of the competent authority approval shall accompany the carriage.~~

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~~Packages shall be marked "DAMAGED/DEFECTIVE LITHIUM ION BATTERIES" or "DAMAGED/DEFECTIVE LITHIUM METAL BATTERIES", as applicable.~~

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~~Cells and batteries shall be packed in accordance with packing instructions P908 of 4.1.4.1 or LP904 of 4.1.4.3, as applicable.~~

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~~Cells and batteries liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage shall not be carried except under conditions approved by the competent authority of any ADR Contracting Party who may also recognize an approval granted by the competent authority of a country which is not an ADR Contracting Party provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions. In this case the cells and batteries are assigned to transport category 0.~~

- 377 Lithium ion and lithium metal cells and batteries and equipment containing such cells and batteries carried for disposal or recycling, either packed together with or packed without non-lithium batteries, may be packaged in accordance with packing instruction P909 of 4.1.4.1.

These cells and batteries are not subject to the ~~requirements-provisions~~ of 2.2.9.1.7 (a) to (eg).

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Packages shall be marked "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING".

Identified damaged or defective batteries shall be carried in accordance with special provision 376 and packaged in accordance with packing instruction P908 of 4.1.4.1 or packing instruction LP904 of 4.1.4.3, as applicable.

- 378 Radiation detectors containing this gas in non-refillable pressure receptacles not meeting the requirements of Chapter 6.2 and packing instruction P200 of 4.1.4.1 may be carried under this entry provided:

- (a) The working pressure in each receptacle does not exceed 50 bar;
- (b) The receptacle capacity does not exceed 12 litres;
- (c) Each receptacle has a minimum burst pressure of at least 3 times the working pressure when a relief device is fitted and at least 4 times the working pressure when no relief device is fitted;
- (d) Each receptacle is manufactured from material which will not fragment upon rupture;
- (e) Each detector is manufactured under a registered quality assurance programme;

*NOTE: ISO 9001 may be used for this purpose.*

- (f) Detectors are carried in strong outer packagings. The complete package shall be capable of withstanding a 1.2 metre drop test without breakage of the detector or rupture of the outer packaging. Equipment that includes a detector shall be packed in strong outer packaging unless the detector is afforded equivalent protection by the equipment in which it is contained; and
- (g) The transport document includes the following statement "Transport in accordance with special provision 378".

Radiation detectors, including detectors in radiation detection systems, are not subject to any other requirements of ADR if the detectors meet the requirements in (a) to (f) above and the capacity of detector receptacles does not exceed 50 ml.

379 Anhydrous ammonia adsorbed or absorbed on a solid contained in ammonia dispensing systems or receptacles intended to form part of such systems are not subject to the other provisions of ADR if the following conditions are observed:

- (a) The adsorption or absorption presents the following properties:
  - (i) The pressure at a temperature of 20 °C in the receptacle is less than 0.6 bar;
  - (ii) The pressure at a temperature of 35 °C in the receptacle is less than 1 bar;
  - (iii) The pressure at a temperature of 85 °C in the receptacle is less than 12 bar.
- (b) The adsorbent or absorbent material shall not have dangerous properties listed in classes 1 to 8;
- (c) The maximum contents of a receptacle shall be 10 kg of ammonia; and
- (d) Receptacles containing adsorbed or absorbed ammonia shall meet the following conditions:
  - (i) Receptacles shall be made of a material compatible with ammonia as specified in ISO 11114-1:2012;
  - (ii) Receptacles and their means of closure shall be hermetically sealed and able to contain the generated ammonia;
  - (iii) Each receptacle shall be able to withstand the pressure generated at 85 °C with a volumetric expansion no greater than 0.1%;
  - (iv) Each receptacle shall be fitted with a device that allows for gas evacuation once pressure exceeds 15 bar without violent rupture, explosion or projection; and
  - (v) Each receptacle shall be able to withstand a pressure of 20 bar without leakage when the pressure relief device is deactivated.

When carried in an ammonia dispenser, the receptacles shall be connected to the dispenser in such a way that the assembly is guaranteed to have the same strength as a single receptacle.

The properties of mechanical strength mentioned in this special provision shall be tested using a prototype of a receptacle and/or dispenser filled to nominal capacity, by increasing the temperature until the specified pressures are reached.

The test results shall be documented, shall be traceable and shall be communicated to the relevant authorities upon request.

380 and 381 (*Reserved*)

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

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

384 (*Reserved*)

385 ~~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, carried with the batteries installed shall be assigned to this entry. Vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the batteries installed, shall be assigned to the entry UN No. 3171 BATTERY POWERED VEHICLE (see special provision 240).~~

~~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, shall be securely installed in the vehicle and are not otherwise subject to ADR. However, lithium batteries shall meet the requirements of 2.2.9.1.7, except as otherwise provided for in special provision 667, ~~[Deleted]~~~~

386 When substances are stabilized by temperature control, the provisions of 2.2.41.1.17, 7.1.7, special provision V8 of Chapter 7.2, special provision S4 of Chapter 8.5 and the requirements of Chapter 9.6 apply. When chemical stabilization is employed, the person offering the packaging, IBC or tank for carriage shall ensure that the level of stabilization is sufficient to prevent the substance in the packaging, IBC or tank from dangerous polymerization at a bulk mean temperature of 50 °C, or, in the case of a portable tank, 45 °C. Where chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of carriage, temperature control is required. In making this determination factors to be taken into consideration include, but are not limited to, the capacity and geometry of the packaging, IBC or tank and the effect of any insulation present, the temperature of the substance when offered for carriage, the duration of the journey and the ambient temperature conditions typically encountered in the journey (considering also the season of year), the effectiveness and other properties of the stabilizer employed, applicable operational controls imposed by regulation (e.g. requirements to protect from sources of heat, including other cargo carried at a temperature above ambient) and any other relevant factors.

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387 Lithium batteries in conformity with 2.2.9.1.7 (f) containing both primary lithium metal cells and rechargeable lithium ion cells shall be assigned to UN Nos. 3090 or 3091 as appropriate. When such batteries are carried in accordance with special provision 188, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh.

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388 UN No. 3166 entries apply to vehicles powered by flammable liquid or gas internal combustion engines or fuel cells.

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Vehicles powered by a fuel cell engine shall be assigned to the entries UN 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed.

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Other vehicles which contain an internal combustion engine shall be assigned to the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed.

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If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it shall be assigned to UN 3166 VEHICLE, FLAMMABLE GAS POWERED.

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Entry UN 3171 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 carried 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 cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with a motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheelchairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. This includes vehicles carried in a packaging. In this case some parts of the vehicle may be detached from its frame to fit into the packaging.

Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries shall be assigned to the entries UN 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or UN 3091 LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT or UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or UN 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, as appropriate.

Dangerous goods, such as batteries, airbags, fire extinguishers, compressed gas accumulators, safety devices and other integral components of the vehicle that are necessary for the operation of the vehicle or for the safety of its operator or passengers, shall be securely installed in the vehicle and are not otherwise subject to ADR. However, lithium batteries shall meet the provisions of 2.2.9.1.7, except as otherwise provided for in special provision 667.

Where a lithium battery installed in a vehicle or equipment is damaged or defective, the vehicle or equipment shall be carried in accordance with the conditions defined in special provision 667 (c).

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389 This entry only applies to cargo transport units in which lithium ion batteries or lithium metal batteries are installed and which are designed only to provide power external to the unit. The lithium batteries shall meet the provisions of 2.2.9.1.7 (a) to (g) and contain the necessary systems to prevent overcharge and over discharge between the batteries.

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The batteries shall be securely attached to the interior structure of the cargo transport unit (e.g., by means of placement in racks, cabinets, etc.) in such a manner as to prevent short circuits, accidental operation, and significant movement relative to the cargo transport unit under the shocks, loadings and vibrations normally incident to carriage. Dangerous goods necessary for the safe and proper operation of the cargo transport unit (e.g., fire extinguishing systems and air conditioning systems), shall be properly secured to or installed in the cargo transport unit and are not otherwise subject to ADR. Dangerous goods not necessary for the safe and proper operation of the cargo transport unit shall not be carried within the cargo transport unit.

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The batteries inside the cargo transport unit are not subject to marking or labelling requirements. The cargo transport unit shall bear orange-coloured plates in accordance with 5.3.2.2 and placards in accordance with 5.3.1.1 on two opposing sides.

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~~390-391 (Reserved)~~

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392 For the carriage of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of 4.1.4.1 and Chapter 6.2 need not be applied when carried for disposal, recycling, repair, inspection, maintenance or from where they are manufactured to a vehicle assembly plant, provided the following conditions are met:

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(a) The fuel gas containment systems shall meet the requirements of the standards or regulations for fuel tanks for vehicles, as applicable. Examples of applicable standards and regulations are;

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<b>LPG tanks</b>	
<a href="#">ECEUN Regulation No. 67 Revision 2</a>	Uniform provisions concerning: I. Approval of specific equipment of vehicles of category M and N using liquefied petroleum gases in their propulsion system; II. Approval of vehicles of category M and N fitted with specific equipment for the use of liquefied petroleum gases in their propulsion system with regard to the installation of such equipment
<a href="#">ECEUN Regulation No. 115</a>	Uniform provisions concerning the approval of: I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion systems; II Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system
<b>CNG and LNG tanks</b>	
<a href="#">ECEUN Regulation No. 110</a>	Uniform provisions concerning the approval of: I. _____ Specific components of motor vehicles using compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system II. _____ Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system
<a href="#">ECEUN Regulation No. 115</a>	Uniform provisions concerning the approval of: I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion systems; II Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system
<a href="#">ISO 11439:2013</a>	Gas cylinders — High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles
<a href="#">ISO 15500-Series</a>	Road vehicles -- Compressed natural gas (CNG) fuel system components – several parts as applicable
<a href="#">ANSI NGV 2</a>	Compressed natural gas vehicle fuel containers
<a href="#">CSA B51 Part 2:2014</a>	Boiler, pressure vessel, and pressure piping code Part 2 Requirements for high-pressure cylinders for on-board storage of fuels for automotive vehicles
<b>Hydrogen pressure tanks</b>	
<a href="#">Global Technical Regulation (GTR) No. 13</a>	Global technical regulation on hydrogen and fuel cell vehicles (ECE/TRANS/180/Add.13).
<a href="#">ISO/TS 15869:2009</a>	Gaseous hydrogen and hydrogen blends - Land vehicle fuel tanks
<a href="#">Regulation (EC) No.79/2009</a>	Regulation (EC) No. 79/2009 of the European Parliament and of the Council of 14 January 2009 on type approval of hydrogen-powered motor vehicles, and amending Directive 2007/46/EC
<a href="#">Regulation (EU) No. 406/2010</a>	Commission Regulation (EU) No 406/2010 of 26 April 2010 implementing Regulation (EC) No 79/2009 of the European Parliament and of the Council on type-approval of hydrogen-powered motor vehicles
<a href="#">ECEUN Regulation No. 134</a>	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogen-fuelled vehicles (HFCV)Hydrogen and fuel-cell-vehicles (HFCV)
<a href="#">CSA B51 Part 2: 2014</a>	Boiler, pressure vessel, and pressure piping code - Part 2: Requirements for high-pressure cylinders for on-board storage of fuels for automotive vehicles

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Gas tanks designed and constructed in accordance with previous versions of relevant standards or regulations for gas tanks for motor vehicles, which were applicable at the time of the certification of the vehicles for which the gas tanks were designed and constructed may continue to be carried;

(b) The fuel gas containment systems shall be leakproof and shall not exhibit any signs of external damage which may affect their safety;

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NOTE 1: Criteria may be found in standard ISO 11623:2015 Gas cylinders – Composite construction – Periodic inspection and testing ISO 11623:2015 Transportable gas cylinders – Periodic inspection and testing of composite gas cylinders (or ISO 19078:2013 Gas cylinders – Inspection of the cylinder installation, and requalification of high pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles).

NOTE 2: If the fuel gas containment systems are not leakproof or are overfilled or if they exhibit damage that could affect their safety (e.g. in case of a safety related recall), they shall only be carried in salvage pressure receptacles in conformity with ADR.

- (c) If a fuel gas containment system is equipped with two valves or more integrated in line, the two valves shall be closed as to be gastight under normal conditions of carriage. If only one valve exists or only one valve works, all openings with the exception of the opening of the pressure relief device shall be closed as to be gastight under normal conditions of carriage;
- (d) Fuel gas containment systems shall be carried in such a way as to prevent obstruction of the pressure relief device or any damage to the valves and any other pressurised part of the fuel gas containment systems and unintentional release of the gas under normal conditions of carriage. The fuel gas containment system shall be secured in order to prevent slipping, rolling or vertical movement;
- (e) Valves shall be protected by one of the methods described in 4.1.6.8 (a) to (e);
- (f) Except for the case of fuel gas containment systems removed for disposal, recycling, repair, inspection or maintenance, they shall be filled with not more than 20% of their nominal filling ratio or nominal working pressure, as applicable;
- (g) Notwithstanding the provisions of Chapter 5.2, when fuel gas containment systems are consigned in a handling device, marks and labels may be affixed to the handling device; and
- (h) Notwithstanding the provisions of 5.4.1.1.1 (f) the information on the total quantity of dangerous goods may be replaced by the following information:
  - (i) The number of fuel gas containment systems; and
  - (ii) In the case of liquefied gases the total net mass (kg) of gas of each fuel gas containment system and, in the case of compressed gases, the total water capacity (l) of each fuel gas containment system followed by the nominal working pressure.

Examples for information in the transport document:

Example 1: “UN 1971 natural gas, compressed, 2.1, 1 fuel gas containment system of 50 l in total, 200 bar”.

Example 2: “UN 1965 hydrocarbon gas mixture, liquefied, n.o.s., 2.1, 3 fuel gas containment systems, each of 15 kg net mass of gas”.

~~387~~ ~~393-499~~ (*Reserved*)

500 (*Deleted*)

501 For naphthalene, molten, see UN No. 2304.

502 UN No. 2006 plastics, nitrocellulose-based, self-heating, n.o.s., and 2002 celluloid scrap are substances of Class 4.2.

503 For phosphorus, white, molten, see UN No. 2447.

504 UN No. 1847 potassium sulphide, hydrated with not less than 30% water of crystallization, UN No. 1849 sodium sulphide, hydrated with not less than 30% water of crystallization and UN No. 2949 sodium hydrosulphide hydrated with not less than 25% water of crystallization are substances of Class 8.

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- 505 UN No. 2004 magnesium diamide is a substance of Class 4.2.
- 506 Alkaline earth metals and alkaline earth metal alloys in pyrophoric form are substances of Class 4.2.  
UN No. 1869 magnesium or magnesium alloys containing more than 50% magnesium as pellets, turnings or ribbons, are substances of Class 4.1.
- 507 UN No. 3048 aluminium phosphide pesticides, with additives inhibiting the emission of toxic flammable gases are substances of Class 6.1.
- 508 UN No. 1871 titanium hydride and UN No. 1437 zirconium hydride are substances of Class 4.1. UN No. 2870 aluminium borohydride is a substance of Class 4.2.
- 509 UN No. 1908 chlorite solution is a substance of Class 8.
- 510 UN No. 1755 chromic acid solution is a substance of Class 8.
- 511 UN No. 1625 mercuric nitrate, UN No. 1627 mercurous nitrate and UN No. 2727 thallium nitrate are substances of Class 6.1. Thorium nitrate, solid, uranyl nitrate hexahydrate solution and uranyl nitrate, solid are substances of Class 7.
- 512 UN No. 1730 antimony pentachloride, liquid, UN No. 1731 antimony pentachloride solution, UN No. 1732 antimony pentafluoride and UN No. 1733 antimony trichloride are substances of Class 8.
- 513 UN No. 0224 barium azide, dry or wetted with less than 50% water, by mass, is a substance of Class 1. UN No. 1571 barium azide, wetted with not less than 50% water, by mass, is a substance of Class 4.1. UN No. 1854 barium alloys, pyrophoric, are substances of Class 4.2. UN No. 1445 barium chlorate, solid, UN No. 1446 barium nitrate, UN No. 1447 barium perchlorate, solid, UN No. 1448 barium permanganate, UN No. 1449 barium peroxide, UN No. 2719 barium bromate, UN No. 2741 barium hypochlorite with more than 22% available chlorine, UN No. 3405 barium chlorate, solution and UN No. 3406 barium perchlorate, solution, are substances of Class 5.1. UN No. 1565 barium cyanide and UN No. 1884 barium oxide are substances of Class 6.1.
- 514 UN No. 2464 beryllium nitrate is a substance of Class 5.1.
- 515 UN No. 1581 chloropicrin and methyl bromide mixture and UN No. 1582 chloropicrin and methyl chloride mixture are substances of Class 2.
- 516 UN No. 1912 methyl chloride and methylene chloride mixture is a substance of Class 2.
- 517 UN No. 1690 sodium fluoride, solid, UN No. 1812 potassium fluoride, solid, UN No. 2505 ammonium fluoride, UN No. 2674 sodium fluorosilicate, UN No. 2856 fluorosilicates, n.o.s., UN No. 3415 sodium fluoride, solution and UN No. 3422 potassium fluoride, solution, are substances of Class 6.1.
- 518 UN No. 1463 chromium trioxide, anhydrous (chromic acid, solid) is a substance of Class 5.1.
- 519 UN No. 1048 hydrogen bromide, anhydrous, is a substance of Class 2.
- 520 UN No. 1050 hydrogen chloride, anhydrous, is a substance of Class 2.
- 521 Solid chlorites and hypochlorites are substances of Class 5.1.
- 522 UN No. 1873 perchloric acid aqueous solution with more than 50% but not more than 72% pure acid, by mass are substances of Class 5.1. Perchloric acid solutions containing more than 72% pure acid, by mass, or mixtures of perchloric acid with any liquid other than water, are not to be accepted for carriage.
- 523 UN No. 1382 anhydrous potassium sulphide and UN No. 1385 anhydrous sodium sulphide and their hydrates with less than 30% water of crystallization, and UN No. 2318 sodium hydrosulphide with less than 25% water of crystallization are substances of Class 4.2.



- 524 UN No. 2858 finished zirconium products of a thickness of 18 µm or more are substances of Class 4.1.
- 525 Solutions of inorganic cyanides with a total cyanide ion content of more than 30% shall be classified in packing group I, solutions with a total cyanide ion content of more than 3% and not more than 30% in packing group II and solutions with a cyanide ion content of more than 0.3% and not more than 3% in packing group III.
- 526 UN No. 2000 celluloid is assigned to Class 4.1.
- 528 UN No. 1353 fibres or fabrics impregnated with weakly nitrated cellulose, non-self heating are substances of Class 4.1.
- 529 UN No. 0135 mercury fulminate, wetted with not less than 20% water, or mixture of alcohol and water, by mass, is a substance of Class 1. Mercurous chloride (calomel) is a substance of Class 6.1 (UN No. 2025).
- 530 UN No. 3293 hydrazine, aqueous solution with not more than 37% hydrazine, by mass, is a substance of Class 6.1.
- 531 Mixtures having a flash-point below 23 °C and containing more than 55% nitrocellulose, whatever its nitrogen content or containing not more than 55% nitrocellulose with a nitrogen content above 12.6% (by dry mass), are substances of Class 1 (see UN Nos. 0340 or 0342) or of Class 4.1 (UN Nos. 2555, 2556 or 2557).
- 532 UN No. 2672 ammonia solution containing not less than 10% but not more than 35% ammonia is a substance of Class 8.
- 533 UN No. 1198 formaldehyde solutions, flammable are substances of Class 3. Formaldehyde solutions, non-flammable, with less than 25% formaldehyde are not subject to the requirements of ADR.
- 534 While in some climatic conditions, petrol (gasoline) may have a vapour pressure at 50 °C of more than 110 kPa (1.10 bar) but not more than 150 kPa (1.50 bar) it is to continue to be considered as a substance having a vapour pressure at 50 °C of not more than 110 kPa (1.10 bar).
- 535 UN No. 1469 lead nitrate, UN No. 1470 lead perchlorate, solid and UN No. 3408 lead perchlorate, solution, are substances of Class 5.1.
- 536 For naphthalene, solid, see UN No. 1334.
- 537 UN No. 2869 titanium trichloride mixture, not pyrophoric, is a substance of Class 8.
- 538 For sulphur (in the solid state), see UN No. 1350.
- 539 Solutions of isocyanates having a flash-point of not less than 23 °C are substances of Class 6.1.
- 540 UN No. 1326 hafnium powder, wetted, UN No. 1352 titanium powder, wetted or UN No. 1358 zirconium powder, wetted, with not less than 25% water, are substances of Class 4.1.
- 541 Nitrocellulose mixtures with a water content, alcohol content or plasticizer content lower than the stated limits are substances of Class 1.
- 542 Talc containing tremolite and/or actinolite is covered by this entry.
- 543 UN No. 1005 ammonia, anhydrous, UN No. 3318 ammonia solution with more than 50% ammonia and UN No. 2073 ammonia solution, with more than 35% but not more than 50% ammonia, are substances of Class 2. Ammonia solutions with not more than 10% ammonia are not subject to the requirements of ADR.
- 544 UN No. 1032 dimethylamine, anhydrous, UN No. 1036 ethylamine, UN No. 1061 methylamine, anhydrous and UN No. 1083 trimethylamine, anhydrous, are substances of Class 2.

- 545 UN No. 0401 dipicryl sulphide, wetted with less than 10% water by mass is a substance of Class 1.
- 546 UN No. 2009 zirconium, dry, finished sheets, strip or coiled wire, in thicknesses of less than 18 µm, is a substance of Class 4.2. Zirconium, dry, finished sheets, strip or coiled wire, in thicknesses of 254 µm or more, is not subject to the requirements of ADR.
- 547 UN No. 2210 maneb or UN No. 2210 maneb preparations in self-heating form are substances of Class 4.2.
- 548 Chlorosilanes which, in contact with water, emit flammable gases, are substances of Class 4.3.
- 549 Chlorosilanes having a flash-point of less than 23 °C and which, in contact with water, do not emit flammable gases are substances of Class 3. Chlorosilanes having a flash-point equal to or greater than 23 °C and which, in contact with water, do not emit flammable gases are substances of Class 8.
- 550 UN No. 1333 cerium in slabs, rods or ingots is a substance of Class 4.1.
- 551 Solutions of these isocyanates having a flash-point below 23 °C are substances of Class 3.
- 552 Metals and metal alloys in powdered or other flammable form, liable to spontaneous combustion, are substances of Class 4.2. Metals and metal alloys in powdered or other flammable form which, in contact with water, emit flammable gases are substances of Class 4.3.
- 553 This mixture of hydrogen peroxide and peroxyacetic acid shall, in laboratory testing (see *Manual of Tests and Criteria*, Part II, section 20), neither detonate in the cavitated state nor deflagrate at all and shall show no effect when heated under confinement nor any explosive power. The formulation shall be thermally stable (self-accelerating decomposition temperature 60 °C or higher for a 50 kg package), and a liquid compatible with peroxyacetic acid shall be used for desensitization. Formulations not meeting these criteria are to be regarded as substances of Class 5.2 (see *Manual of Tests and Criteria*, Part II, paragraph 20.4.3(g)).
- 554 Metal hydrides which, in contact with water, emit flammable gases are substances of Class 4.3. UN No. 2870 aluminium borohydride or UN No. 2870 aluminium borohydride in devices is a substance of Class 4.2.
- 555 Dust and powder of metals in non-spontaneously combustible form, non-toxic which nevertheless, in contact with water, emit flammable gases, are substances of Class 4.3.
- 556 Organometallic compounds and their solutions which ignite spontaneously are substances of Class 4.2. Flammable solutions with organometallic compounds in concentrations which, in contact with water, neither emit flammable gases in dangerous quantities nor ignite spontaneously are substances of Class 3.
- 557 Dust and powder of metals in pyrophoric form are substances of Class 4.2.
- 558 Metals and metal alloys in pyrophoric form are substances of Class 4.2. Metals and metal alloys which, in contact with water, do not emit flammable gases and are not pyrophoric or self-heating, but which are easily ignited, are substances of Class 4.1.
- 559 *(Deleted)*
- 560 An elevated temperature liquid, n.o.s. at or above 100 °C (including molten metals and molten salts) and, for a substance having a flashpoint, at a temperature below its flashpoint, is a substance of Class 9 (UN No. 3257).
- 561 Chloroformates having predominantly corrosive properties are substances of Class 8.
- 562 Spontaneously combustible organometallic compounds are substances of Class 4.2. Water-reactive organometallic compounds, flammable, are substances of Class 4.3.
- 563 UN No. 1905 selenic acid is a substance of Class 8.

564 UN No. 2443 vanadium oxytrichloride, UN No. 2444 vanadium tetrachloride and UN No. 2475 vanadium trichloride are substances of Class 8.

565 Unspecified wastes resulting from medical/veterinary treatment of humans/animals or from biological research, and which are unlikely to contain substances of Class 6.2 shall be assigned to this entry. Decontaminated clinical wastes or wastes resulting from biological research which previously contained infectious substances are not subject to the requirements of Class 6.2.

566 UN No. 2030 hydrazine aqueous solution, with more than 37% hydrazine, by mass, is a substance of Class 8.

567 *(Deleted)*

568 Barium azide with a water content lower than the stated limit is a substance of Class 1, UN No. 0224.

569-579 *(Reserved)*

580 *(Deleted)*

581 This entry covers mixtures of propadiene with 1 to 4% methylacetylene as well as the following mixtures:

Mixture	Content, % by volume			Permitted technical name for purposes of 5.4.1.1
	Methylacetylene and propadiene, not more than	Propane and propylene, not more than	C4-saturated hydrocarbons, not less than	
P1	63	24	14	"Mixture P1"
P2	48	50	5	"Mixture P2"

582 This entry covers, *inter alia*, mixtures of gases indicated by the letter R ..., with the following properties:

Mixture	Maximum vapour pressure at 70 °C (MPa)	Minimum density at 50 °C (kg/l)	Permitted technical name for purposes of 5.4.1.1
F1	1.3	1.30	"Mixture F1"
F2	1.9	1.21	"Mixture F2"
F3	3.0	1.09	"Mixture F3"

**NOTE 1:** Trichlorofluoromethane (refrigerant R 11), 1,1,2-trichloro-1,2,2-trifluoroethane (refrigerant R 113), 1,1,1-trichloro-2,2,2-trifluoroethane (refrigerant R 113a), 1-chloro-1,2,2-trifluoroethane (refrigerant R 133) and 1-chloro-1,1,2-trifluoroethane (refrigerant R 133b) are not substances of Class 2. They may, however, enter into the composition of mixtures F1 to F3.

**NOTE 2:** The reference densities correspond to the densities of dichlorofluoromethane (1.30 kg/l), dichlorodifluoromethane (1.21 kg/l) and chlorodifluoromethane (1.09 kg/l).

583 This entry covers, *inter alia*, mixtures of gases with the following properties:

Mixture	Maximum vapour pressure at 70 °C (MPa)	Minimum density at 50 °C (kg/l)	Permitted technical name for purposes of 5.4.1.1
A	1.1	0.525	"Mixture A" or "Butane"
A01	1.6	0.516	"Mixture A01" or "Butane"
A02	1.6	0.505	"Mixture A02" or "Butane"
A0	1.6	0.495	"Mixture A0" or "Butane"
A1	2.1	0.485	"Mixture A1"
B1	2.6	0.474	"Mixture B1"
B2	2.6	0.463	"Mixture B2"
B	2.6	0.450	"Mixture B"
C	3.1	0.440	"Mixture C" or "Propane"

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<sup>a</sup> For carriage in tanks, the trade names "Butane" or "Propane" may be used only as a complement

584 This gas is not subject to the requirements of ADR when:

- It contains not more than 0.5% air in the gaseous state;
- It is contained in metal capsules (sodors, sparklets) free from defects which may impair their strength;
- The leakproofness of the closure of the capsule is ensured;
- A capsule contains not more than 25 g of this gas;
- A capsule contains not more than 0.75 g of this gas per cm<sup>3</sup> of capacity.

585 *(Deleted)*

586 Hafnium, titanium and zirconium powders shall contain a visible excess of water. Hafnium, titanium and zirconium powders, wetted, mechanically produced, of a particle size of 53 µm and over, or chemically produced, of a particle size of 840 µm and over, are not subject to the requirements of ADR.

587 Barium stearate and barium titanate are not subject to the requirements of ADR.

588 Solid hydrated forms of aluminium bromide and aluminium chloride are not subject to the requirements of ADR.

589 *(Deleted)*

590 Ferric chloride hexahydrate is not subject to the requirements of ADR.

591 Lead sulphate with not more than 3% free acid is not subject to the requirements of ADR.

592 Uncleaned empty packagings (including empty IBCs and large packagings), empty tank-vehicles, empty demountable tanks, empty portable tanks, empty tank-containers and empty small containers which have contained this substance are not subject to the requirements of ADR.

593 This gas, intended for the cooling of e.g. medical or biological specimens, if contained in double wall receptacles which comply with the provisions of packing instruction P203, paragraph (6) for open cryogenic receptacles of 4.1.4.1 is not subject to the requirements of ADR except as specified in 5.5.3.

594 The following articles, manufactured and filled according to the provisions applied in the country of manufacture, are not subject to the requirements of ADR:

- (a) UN No. 1044 fire extinguishers provided with protection against inadvertent discharge, when:

- they are packaged in a strong outer packaging; or
  - they are large fire extinguishers which meet the requirements of special packing provision PP91 of packing instruction P003 in 4.1.4.1;
- (b) UN No. 3164 articles, pressurized pneumatic or hydraulic, designed to withstand stresses greater than the internal gas pressure by virtue of transmission of force, intrinsic strength or construction, when they are packaged in a strong outer packaging.

**NOTE:** "Provisions applied in the country of manufacture" means the provisions applicable in the country of manufacture or those applicable in the country of use.

596 Cadmium pigments, such as cadmium sulphides, cadmium sulphoselenides and cadmium salts of higher fatty acids (e.g. cadmium stearate), are not subject to the requirements of ADR.

597 Acetic acid solutions with not more than 10% pure acid by mass, are not subject to the requirements of ADR.

598 The following are not subject to the requirements of ADR:

(a) New storage batteries when:

- they are secured in such a way that they cannot slip, fall or be damaged;
- they are provided with carrying devices, unless they are suitably stacked, e.g. on pallets;
- there are no dangerous traces of alkalis or acids on the outside;
- they are protected against short circuits;

(b) Used storage batteries when:

- their cases are undamaged;
- they are secured in such a way that they cannot leak, slip, fall or be damaged, e.g. by stacking on pallets;
- there are no dangerous traces of alkalis or acids on the outside of the articles;
- they are protected against short circuits.

"Used storage batteries" means storage batteries carried for recycling at the end of their normal service life.

599 *(Deleted)*

600 Vanadium pentoxide, fused and solidified, is not subject to the requirements of ADR.

601 Pharmaceutical products (medicines) ready for use, which are substances manufactured and packaged for retail sale or distribution for personal or household consumption are not subject to the requirements of ADR.

602 Phosphorus sulphides which are not free from yellow and white phosphorus are not to be accepted for carriage.

603 Anhydrous hydrogen cyanide not meeting the description for UN No. 1051 or UN No. 1614 is not to be accepted for carriage. Hydrogen cyanide (hydrocyanic acid) containing less than 3% water is stable, if the pH-value is  $2.5 \pm 0.5$  and the liquid is clear and colourless.

604-606 *(Deleted)*

607 Mixtures of potassium nitrate and sodium nitrite with an ammonium salt are not to be accepted for carriage.

608 *(Deleted)*

- 609 Tetranitromethane not free from combustible impurities is not to be accepted for carriage.
- 610 The carriage of this substance, when it contains more than 45% hydrogen cyanide is prohibited.
- 611 Ammonium nitrate containing more than 0.2% combustible substances (including any organic substance calculated as carbon) is not to be accepted for carriage unless it is a constituent of a substance or article of Class 1.
- 612 *(Reserved)*
- 613 Chloric acid solution containing more than 10% chloric acid and mixtures of chloric acid with any liquid other than water is not to be accepted for carriage.
- 614 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in concentrations considered highly toxic according to the criteria in 2.2.61.1 is not to be accepted for carriage.
- 615 *(Reserved)*
- 616 Substances containing more than 40% liquid nitric esters shall satisfy the exudation test specified in 2.3.1.
- 617 In addition to the type of explosive, the commercial name of the particular explosive shall be marked on the package.
- 618 In receptacles containing 1,2-butadiene, the oxygen concentration in the gaseous phase shall not exceed 50 ml/m<sup>3</sup>.
- 619-622 *(Reserved)*
- 623 UN No. 1829 sulphur trioxide shall be inhibited. Sulphur trioxide, 99.95% pure or above, may be carried without inhibitor in tanks provided that its temperature is maintained at or above 32.5 °C. For the carriage of this substance without inhibitor in tanks at a minimum temperature of 32.5 °C, the specification "**Transport under minimum temperature of the product of 32.5 °C**" shall appear in the transport document.
- 625 Packages containing these articles shall be clearly marked as follows: "**UN 1950 AEROSOLS**".
- 626-627 *(Reserved)*
- 632 Considered to be spontaneously flammable (pyrophoric).
- 633 Packages and small containers containing this substance shall bear the following mark: "**Keep away from any source of ignition**". This mark shall be in an official language of the forwarding country, and also, if that language is not English, French or German, in English, French or German, unless any agreements concluded between the countries concerned in the transport operation provide otherwise.
- 634 *(Deleted)*
- 635 Packages containing these articles need not bear a label conforming to model No. 9 unless the article is fully enclosed by packaging, crates or other means that prevent the ready identification of the article.
- ~~636 (a) Cells contained in equipment shall not be capable of being discharged during carriage to the extent that the open circuit voltage falls below 2 volts or two thirds of the voltage of the undischarged cell, whichever is the lower.~~
- ~~(b) Up to the intermediate processing facility:~~
- ~~lithium cells and batteries with a gross mass of not more than 500 g each or lithium ion cells with a Watt hour rating of not more than 20 Wh, lithium ion batteries with a Watt hour rating of not more than 100 Wh, lithium metal cells with a lithium content of not more than 1 g and lithium metal batteries with an~~

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~~aggregate lithium content of not more than 2 g, not contained in equipment, collected and handed over for carriage for sorting, disposal or recycling; as well as~~

~~lithium cells and batteries contained in equipment from private households collected and handed over for carriage for depollution, dismantling, recycling or disposal;~~

~~*NOTE: "Equipment from private households" means equipment which comes from private households and equipment which comes from commercial, industrial, institutional and other sources which, because of its nature and quantity, is similar to that from private households. Equipment likely to be used by both private households and users other than private households shall in any event be considered to be equipment from private households.*~~

~~are not subject to the other provisions of ADR including special provision 376 and paragraph 2.2.9.1.7, if they meet the following conditions:~~

~~(i) The provisions of packing instruction P909 of 4.1.4.1 apply except for the additional requirements 1 and 2;~~

~~(ii) A quality assurance system is in place to ensure that the total amount of lithium cells or batteries per transport unit does not exceed 333 kg;~~

~~*NOTE: The total quantity of lithium cells and batteries in the mix may be assessed by means of a statistical method included in the quality assurance system. A copy of the quality assurance records shall be made available to the competent authority upon request.*~~

~~(iii) Packages are marked "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING" as appropriate.~~

~~If equipment containing lithium cells or batteries is carried unpackaged or on pallets in accordance with packing instruction P 909 (3) of 4.1.4.1, this mark may alternatively be affixed to the external surface of the vehicles or containers.~~

~~636 Up to the intermediate processing facility, lithium cells and batteries with a gross mass of not more than 500 g each, lithium ion cells with a Watt-hour rating of not more than 20 Wh, lithium ion batteries with a Watt-hour rating of not more than 100 Wh, lithium metal cells with a lithium content of not more than 1 g and lithium metal batteries with an aggregate lithium content of not more than 2 g, not contained in equipment, collected and handed over for carriage for sorting, disposal or recycling, together with or without other non-lithium cells or batteries, are not subject to the other provisions of ADR including special provision 376 and 2.2.9.1.7, if the following conditions are met,~~

~~(a) The cells and batteries are packed according to packing instruction P909 of 4.1.4.1 except for the additional requirements 1 and 2;~~

~~(b) A quality assurance system is in place to ensure that the total amount of lithium cells and batteries per transport unit does not exceed 333 kg;~~

~~*NOTE: The total quantity of lithium cells and batteries in the mix may be assessed by means of a statistical method included in the quality assurance system. A copy of the quality assurance records shall be made available to the competent authority upon request.*~~

~~(c) Packages are marked "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING" as appropriate.~~

637 Genetically modified microorganisms and genetically modified organisms are those which are not dangerous for humans and animals, but which could alter animals, plants, microbiological substances and ecosystems in such a way as cannot occur naturally. Genetically modified microorganisms and genetically modified organisms are not subject to the requirements of

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ADR when authorized for use by the competent authorities of the countries of origin, transit and destination<sup>3</sup>.

Live vertebrate or invertebrate animals shall not be used to carry these substances classified under this UN number unless the substance can be carried in no other way.

For the carriage of easily perishable substances under this UN number appropriate information shall be given, e.g.: "Cool at +2 °/+4 °C" or "Carry in frozen state" or "Do not freeze".

638 Substances related to self-reactive substances (see 2.2.41.1.19).

639 See 2.2.2.3, classification code 2F, UN No. 1965, Note 2.

640 The physical and technical characteristics mentioned in column (2) of Table A of Chapter 3.2 determine different tank codes for the carriage of substances of the same packing group in ADR tanks.

In order to identify these physical and technical characteristics of the product carried in the tank, the following shall be added, to the particulars required in the transport document, only in case of carriage in ADR tanks:

"Special provision 640X" where "X" is the applicable capital letter appearing after the reference to special provision 640 in column (6) of Table A of Chapter 3.2.

These particulars may, however, be dispensed with in the case of carriage in the type of tank which, for substances of a specific packing group of a specific UN number, meets at least the most stringent requirements.

642 Except as authorized under 1.1.4.2, this entry of the UN Model Regulations shall not be used for the carriage of fertilizer ammoniating solutions with free ammonia.

643 Stone or aggregate asphalt mixture is not subject to the requirements for Class 9.

644 This substance is admitted for carriage provided that:

- The pH is between 5 and 7 measured in an aqueous solution of 10% of the substance carried;
- The solution does not contain more than 0.2% combustible material or chlorine compounds in quantities such that the chlorine level exceeds 0.02%.

645 The classification code as mentioned in Column (3b) of Table A of Chapter 3.2 shall be used only with the approval of the competent authority of a Contracting Party to ADR prior to carriage. The approval shall be given in writing as a classification approval certificate (see 5.4.1.2.1 (g)) and shall be provided with a unique reference. When assignment to a division is made in accordance with the procedure in 2.2.1.1.7.2, the competent authority may require the default classification to be verified on the basis of test data derived from Test Series 6 of the Manual of Tests and Criteria, Part I, Section 16.

646 Carbon made by steam activation process is not subject to the requirements of ADR.

647 The carriage of vinegar and acetic acid food grade with not more than 25% pure acid by mass is subject only to the following requirements:

- (a) Packagings, including IBCs and large packagings, and tanks shall be manufactured from stainless steel or plastic material which is permanently resistant to corrosion of vinegar/acetic acid food grade;
- (b) Packagings, including IBCs and large packagings, and tanks shall be subjected to a visual inspection by the owner at least once a year. The results of the inspections shall

<sup>3</sup> See in particular Part C of Directive 2001/18/EC of the European Parliament and of the Council on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC (Official Journal of the European Communities, No. L 106, of 17 April 2001, pp. 8-14), which sets out the authorization procedures for the European Community.



be recorded and the records kept for at least one year. Damaged packagings, including IBCs and large packagings, and tanks shall not be filled;

- (c) Packagings, including IBCs and large packagings, and tanks shall be filled in a way that no product is spilled or adheres to the outer surface;
- (d) Seals and closures shall be resistant to vinegar/acetic acid food grade. Packagings, including IBCs and large packagings, and tanks shall be hermetically sealed by the packer or the filler so that under normal conditions of carriage there will be no leakage;
- (e) Combination packagings with inner packaging made of glass or plastic (see packing instruction P001 in 4.1.4.1) which fulfil the general packing requirements of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.5, 4.1.1.6, 4.1.1.7 and 4.1.1.8 may be used;

The other provisions of ADR do not apply.

648 Articles impregnated with this pesticide, such as fibreboard plates, paper strips, cotton-wool balls, sheets of plastics material, in hermetically closed wrappings, are not subject to the provisions of ADR.

649 *(Deleted)*

650 Waste consisting of packaging residues, solidified residues and liquid residues of paint may be carried under the conditions of packing group II. In addition to the provisions of UN No. 1263 packing group II, the waste may also be packed and carried as follows:

- (a) The waste may be packed in accordance with packing instruction P002 of 4.1.4.1 or to packing instruction IBC06 of 4.1.4.2;
- (b) The waste may be packed in flexible IBCs of types 13H3, 13H4 and 13H5 in overpacks with complete walls;
- (c) Testing of packagings and IBCs indicated under (a) or (b) may be carried out in accordance with the requirements of Chapters 6.1 or 6.5, as appropriate, in relation to solids, at the packing group II performance level.

The tests shall be carried out on packagings and IBCs, filled with a representative sample of the waste, as prepared for carriage;

- (d) Carriage in bulk in sheeted vehicles, closed containers or sheeted large containers, all with complete walls is allowed. The body of vehicles or containers shall be leakproof or rendered leakproof, for example by means of a suitable and sufficiently stout inner lining;
- (e) If the waste is carried under the conditions of this special provision, the goods shall be declared in accordance with 5.4.1.1.3 in the transport document, as follows:  
"UN 1263 WASTE PAINT, 3, II, (D/E)", or  
"UN 1263 WASTE PAINT, 3, PG II, (D/E)".

651 Special provision V2 (1) does not apply if the net explosive mass per transport unit does not exceed 4 000 kg, provided that the net explosive mass per vehicle does not exceed 3 000 kg.

652 Austenitic stainless steel, ferritic and austenitic steel (Duplex steel) and welded titanium receptacles which do not meet the requirements of Chapter 6.2 but have been constructed and approved in accordance with national aviation provisions for use as hot air balloon or hot air airship fuel receptacles, brought into service (date of initial inspection) before 1 July 2004, may be carried by road provided they meet the following conditions:

- (a) The general provisions of 6.2.1 shall be complied with;
- (b) The design and construction of the receptacles shall have been approved for aviation use by a national air transport authority;
- (c) As an exemption from 6.2.3.1.2, the calculation pressure shall be derived from a reduced maximum ambient temperature of +40 °C; in this case:

- (i) as an exemption from 6.2.5.1, cylinders may be manufactured from rolled and annealed commercially pure titanium with the minimum requirements of  $R_m > 450$  MPa,  $\epsilon_A > 20\%$  ( $\epsilon_A$  = elongation after fracture);
  - (ii) austenitic stainless steel and ferritic and austenitic steel (Duplex steel) cylinders may be used with a stress level up to 85% of the minimum guaranteed yield strength ( $R_e$ ) at a calculation pressure derived from a reduced maximum ambient temperature of +40 °C;
  - (iii) the receptacles shall be equipped with a pressure relief device having a nominal set pressure of 26 bar; the test pressure of these receptacles shall be not less than 30 bar;
- (d) When the exemptions from (c) are not applied, the receptacles shall be designed for a reference temperature of 65 °C and shall be equipped with pressure relief devices with a nominal set pressure specified by the competent authority of the country of use;
  - (e) The main body of the receptacles shall be covered by an outer, water-resistant protective layer at least 25 mm thick made from structural cellular foam or similar material;
  - (f) During carriage, the receptacle shall be firmly secured in a crate or an additional safety device;
  - (g) The receptacles shall be marked with a clear, visible label stating that the receptacles are for use only in hot air balloons and hot air airships;
  - (h) The duration of service (from the date of initial inspection) shall not exceed 25 years.
- 653 The carriage of this gas in cylinders having a test pressure capacity product of maximum 15.2 MPa.litre (152 bar.litre) is not subject to the other provisions of ADR if the following conditions are met:
- The provisions for construction and testing of cylinders are observed;
  - The cylinders are contained in outer packagings which at least meet the requirements of Part 4 for combination packagings. The general provisions of packing of 4.1.1.1, 4.1.1.2 and 4.1.1.5 to 4.1.1.7 shall be observed;
  - The cylinders are not packed together with other dangerous goods;
  - The total gross mass of a package does not exceed 30 kg; and
  - Each package is clearly and durably marked with "UN 1006" for argon compressed, "UN 1013" for carbon dioxide, "UN 1046" for helium compressed or "UN 1066" for nitrogen compressed. This mark is displayed within a diamond-shaped area surrounded by a line that measures at least 100 mm by 100 mm.
- 654 Waste lighters collected separately and consigned in accordance with 5.4.1.1.3 may be carried under this entry for the purposes of disposal. They need not be protected against inadvertent discharge provided that measures are taken to prevent the dangerous build up of pressure and dangerous atmospheres.
- Waste lighters, other than those leaking or severely deformed, shall be packed in accordance with packing instruction P003. In addition the following provisions shall apply:
- Only rigid packagings of a maximum capacity of 60 litres shall be used;
  - The packagings shall be filled with water or any other appropriate protection material to avoid any ignition;
  - Under normal conditions of carriage all ignition devices of the lighters shall fully be covered by the protection material;

- The packagings shall be adequately vented to prevent the creation of flammable atmosphere and the build up of pressure;
- The packages shall only be carried in ventilated or open vehicles or containers.

Leaking or severely deformed lighters shall be carried in salvage packagings, provided appropriate measures are taken to ensure there is no dangerous build up of pressure.

*NOTE: Special provision 201 and special packing provisions PP84 and RR5 of packing instruction P002 in 4.1.4.1 do not apply to waste lighters.*

- 655 Cylinders and their closures designed, constructed, approved and marked in accordance with Directive 97/23/EC<sup>4</sup> or Directive 2014/68 EU<sup>5</sup> and used for breathing apparatus may be carried without conforming to Chapter 6.2, provided that they are subject to inspections and tests specified in 6.2.1.6.1 and the interval between tests specified in packing instruction P200 in 4.1.4.1 is not exceeded. The pressure used for the hydraulic pressure test is the pressure marked on the cylinder in accordance with Directive 97/23/EC<sup>4</sup> or Directive 2014/68 EU<sup>5</sup>.
- 656 *(Deleted)*
- 657 This entry shall be used for the technically pure substance only; for mixtures of LPG components, see UN No. 1965 or see UN No. 1075 in conjunction with NOTE 2 in 2.2.2.3.
- 658 UN No. 1057 LIGHTERS complying with standard EN ISO 9994:2006 + A1:2008 "Lighters – Safety Specification" and UN No. 1057 LIGHTER REFILLS, may be carried subject only to the provisions of 3.4.1 (a) to (h), 3.4.2 (except for the total gross mass of 30 kg), 3.4.3 (except for the total gross mass of 20 kg), 3.4.11 and 3.4.12, provided the following conditions are met:
- (a) The total gross mass of each package is not more than 10 kg;
  - (b) Not more than 100 kg gross mass of such packages is carried in a vehicle or large container; and
  - (c) Each outer packaging is clearly and durably marked with "UN 1057 LIGHTERS" or "UN 1057 LIGHTER REFILLS", as appropriate.
- 659 Substances to which PP86 or TP7 are assigned in Column (9a) and Column (11) of Table A in Chapter 3.2 and therefore require air to be eliminated from the vapour space, shall not be used for carriage under this UN number but shall be carried under their respective UN numbers as listed in Table A of Chapter 3.2.

*NOTE: See also 2.2.2.1.7.*

- 660 ~~For the carriage of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of 4.1.4.1 and Chapter 6.2 need not be applied when carried for disposal, recycling, repair, inspection, maintenance or from where they are manufactured to a vehicle assembly plant, provided the conditions described in special provision 392 are met. This also applies for mixtures of gases subject to special provision 392 and gases of group A subject to this special provision. For the carriage of fuel gas containment systems designed to be fitted in motor vehicles containing this gas the provisions of sub-section 4.1.4.1, Chapter 5.2, Chapter 5.4 and Chapter 6.2 of ADR need not be applied, provided the following conditions are met:~~

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<sup>4</sup> Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment (PED) (Official Journal of the European Communities No. L 181 of 9 July 1997, p. 1 - 55).

<sup>5</sup> Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment (PED) (Official Journal of the European Union No. L 189 of 27 June 2014, p. 164 - 259).

~~(a) The fuel gas containment systems shall meet the requirements of ECE Regulation No. 67 Revision 2<sup>6</sup>, ECE Regulation No. 110 Revision 1<sup>7</sup> or ECE Regulation No. 115<sup>8</sup> or Regulation (EC) No. 79/2009<sup>9</sup> in combination with Regulation (EU) No. 406/2010<sup>10</sup>, as applicable.~~

~~(b) The fuel gas containment systems shall be leakproof and shall not exhibit any signs of external damage which may affect their safety.~~

~~**NOTE 1:** Criteria may be found in standard ISO 11623:2002 Transportable gas cylinders—Periodic inspection and testing of composite gas cylinders (or ISO DIS 19078 Gas cylinders—Inspection of the cylinder installation, and requalification of high pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles).~~

~~**NOTE 2:** If the fuel gas containment systems are not leakproof or overfilled or if they exhibit damage that could affect their safety, they shall only be carried in salvage pressure receptacles in conformity with ADR.~~

~~(c) If the fuel gas containment system is equipped with two valves or more integrated in line, two valves shall be so closed as to be gastight under normal conditions of carriage. If only one valve exists or only one valve works properly all openings with the exception of the opening of the pressure relief device shall be so closed as to be gastight under normal conditions of carriage.~~

~~(d) Fuel gas containment systems shall be carried in such a way as to prevent obstruction of the pressure relief device or any damage to the valves and any other pressurised part of the fuel gas containment systems and unintentional release of the gas under normal conditions of carriage. The fuel gas containment system shall be secured so as to prevent slipping, rolling or vertical movement.~~

~~(e) Fuel gas containment systems shall satisfy the provisions of 4.1.6.8 (a), (b), (c), (d) or (e).~~

~~(f) The marking and labelling provisions of Chapter 5.2 shall be met, unless fuel gas containment systems are consigned in a handling device. If so, the marks and danger labels shall be affixed to the handling device.~~

~~(g) Documentation~~

~~Every consignment that is carried in accordance with this special provision shall be accompanied by a transport document, containing at least the following information:~~

~~(i) The UN number of the gas contained in the fuel gas containment systems, preceded by the letters "UN";~~

~~(ii) The proper shipping name of the gas;~~

~~(iii) The label model number;~~

<sup>6</sup>—ECE Regulation No. 67 (Uniform provisions concerning the approval of: I. Approval of specific equipment of vehicles of category M and N using liquefied petroleum gases in their propulsion system. II. Approval of vehicles of category M and N fitted with specific equipment for the use of liquefied petroleum gases in their propulsion system with regard to the installation of such equipment.);

<sup>7</sup>—ECE Regulation No. 110 (Uniform provisions concerning the approval of: I. Specific components of motor vehicles using compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system; II. Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system.);

<sup>8</sup>—ECE Regulation No. 115 (Uniform provisions concerning the approval of: I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion system; II. Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system);

<sup>9</sup>—Regulation (EC) No 79/2009 of the European Parliament and of the Council of 14 January 2009 on type-approval of hydrogen-powered motor vehicles, and amending Directive 2007/46/EC.

<sup>10</sup>—Commission Regulation (EU) No 406/2010 of 26 April 2010 implementing Regulation (EC) No 79/2009 of the European Parliament and of the Council on type-approval of hydrogen-powered motor vehicles.

~~(iv) The number of fuel gas containment systems;~~

~~(v) In the case of liquefied gases the net mass in kg of the gas of each fuel gas containment system and in the case of compressed gases the water capacity in litres of each fuel gas containment system followed by the nominal working pressure;~~

~~(vi) The names and the addresses of the consignor and the consignee.~~

~~(i) to (v) shall appear according to one of the following examples:~~

~~Example 1: UN 1971 natural gas, compressed, 2.1, 1 fuel gas containment system of 50 l in total, 200 bar.~~

~~Example 2: UN 1965 hydrocarbon gas mixture, liquefied, n.o.s., 2.1, 3 fuel gas containment systems, each of 15 kg net mass of gas.~~

~~NOTE: All other provisions of ADR shall be applied.~~

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661 *(Deleted)*

662 Cylinders not conforming to the provisions of Chapter 6.2 which are used exclusively on board a ship or aircraft, may be carried for the purpose of filling or inspection and subsequent return, provided the cylinders are designed and constructed in accordance with a standard recognized by the competent authority of the country of approval and all the other relevant requirements of ADR are met including:

- (a) The cylinders shall be carried with valve protection in conformity with 4.1.6.8;
- (b) The cylinders shall be marked and labelled in conformity with 5.2.1 and 5.2.2; and
- (c) All the relevant filling requirements of packing instruction P200 of 4.1.4.1 shall be complied with.

The transport document shall include the following statement: "Carriage in accordance with special provision 662".

663 This entry may only be used for packagings, large packagings or IBCs, or parts thereof, which have contained dangerous goods which are carried for disposal, recycling or recovery of their material, other than reconditioning, repair, routine maintenance, remanufacturing or reuse, and which have been emptied to the extent that only residues of dangerous goods adhering to the packaging parts are present when they are handed over for carriage.

**Scope:**

Residues present in the packagings, discarded, empty, uncleaned shall only be of dangerous goods of classes 3, 4.1, 5.1, 6.1, 8 or 9. In addition, they shall not be:

- Substances assigned to packing group I or that have "0" assigned in Column (7a) of Table A of Chapter 3.2; nor
- Substances classified as desensitized explosive substances of Class 3 or Class 4.1; nor
- Substances classified as self-reactive substances of Class 4.1; nor
- Radioactive material; nor
- Asbestos (UN 2212 and UN 2590), polychlorinated biphenyls (UN 2315 and UN 3432) and polyhalogenated biphenyls, halogenated monomethyldiphenylmethanes or polyhalogenated terphenyls (UN 3151 and UN 3152).

**General provisions:**

Packagings, discarded, empty, uncleaned with residues presenting a **high hazard** or a subsidiary **high hazard** of Class 5.1 shall not be packed together with other packagings, discarded, empty, uncleaned, or loaded together with other packagings, discarded, empty, uncleaned in the same container, vehicle or bulk container.

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Documented sorting procedures shall be implemented on the loading site to ensure compliance with the provisions applicable to this entry.

**NOTE:** All the other provisions of ADR apply.

664 When substances under this entry are carried in fixed tanks (tank-vehicles) or demountable tanks, these tanks may be equipped with additive devices.

Additive devices:

- are part of the service equipment for dispensing additives of UN 1202, UN 1993 packing group III, UN 3082 or non-dangerous substances during discharge of the tank;
- consist of elements such as connecting pipes and hoses, closing devices, pumps and dosing devices which are permanently connected to the discharge device of the tank's service equipment;
- include means of containment which are an integral part of the shell, or permanently fixed to the exterior of the tank or tank-vehicle.

Alternatively, additive devices may have connectors for connecting packagings. In this latter case, the packaging itself is not considered part of the additive device.

The following requirements shall apply depending on the configuration:

- (a) Construction of the means of containment:
- (i) As an integral part of the shell (e.g. a tank compartment), they shall meet the relevant provisions of Chapter 6.8.
  - (ii) When permanently fixed to the exterior of the tank or to the tank-vehicle, they are not subject to the construction provisions of ADR provided they comply with the following provisions:

They shall be made of a metallic material and comply with the following minimum wall thickness requirements:

Material	Minimum wall thickness <sup>a</sup>
Austenitic stainless steels	2.5 mm
Other steels	3 mm
Aluminium alloys	4 mm
Pure aluminium of 99.80%	6 mm

<sup>a</sup> For means of containment made with double walls, the aggregate thickness of the outer metal wall and the inner metal wall shall correspond to the wall thickness prescribed.

Welding shall be carried out in accordance with the first paragraph of 6.8.2.1.23, except that other suitable methods may be applied to confirm the quality of the welding.

- (iii) Packagings which are connectable to the additive device shall be metal packagings and meet the relevant construction requirements of Chapter 6.1, as applicable for the additive concerned.

(b) Tank approval

For tanks equipped or intended to be equipped with additive devices, where the additive device is not included in the original type approval of the tank, the provisions of 6.8.2.3.4 shall apply.

(c) Use of means of containment and additive devices

- (i) In case of (a) (i) above, no additional requirements.
- (ii) In case of (a) (ii) above, the total capacity of the means of containment shall not exceed 400 litres per vehicle.
- (iii) In case of (a) (iii) above, 7.5.7.5 and 8.3.3 shall not apply. The packagings may only be connected to the additive device during discharge of the tank. During carriage, the closures and connectors shall be closed so as to be leaktight.

(d) Testing for additive devices

The provisions of 6.8.2.4 shall apply to the additive device. However, in case of (a) (ii) above, at the time of the initial, intermediate or periodic inspection of the tank, the means of containment of the additive device shall only be subject to an external visual inspection and a leakproofness test. The leakproofness test shall be carried out at a test pressure of at least 0.2 bar.

*NOTE: For the packagings described in (a) (iii) above, the relevant provisions of ADR shall apply.*

(e) Transport document

Only the information required in accordance with 5.4.1.1.1 (a) to (d) needs to be added to the transport document for the additive concerned. In this case, the remark "additive device" shall be added to the transport document.

(f) Training of drivers

Drivers who have been trained in accordance with 8.2.1 for carriage of this substance in tanks need no additional training for the carriage of the additives.

(g) Placarding or marking

Placarding or marking of the fixed tank (tank-vehicle) or demountable tank for the carriage of substances under this entry in accordance with Chapter 5.3 is not affected by the presence of an additive device or the additives contained therein.

665 Unground hard coal, coke and anthracite, meeting the classification criteria of Class 4.2, packing group III, are not subject to the requirements of ADR.

666 ~~Vehicles and battery powered equipment, referred to by special provision 388, when carried as a load, as well as any dangerous goods they contain that are necessary for their operation or the operation of their equipment, are not subject to any other provisions of ADR, provided the following conditions are met: Vehicles assigned to UN No. 3166 or UN No. 3171 and battery powered equipment assigned to UN 3171 in conformity with special provisions 240, 312 and 385, as well as any dangerous goods they contain that are necessary for their operation or the operation of their equipment, when carried as a load, are not subject to any other provisions of ADR, provided the following conditions are met:~~

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- (a) For liquid fuels, any valves between the engine or equipment and the fuel tank shall be closed during carriage unless it is essential for the equipment to remain operational. Where appropriate, the vehicles shall be loaded upright and secured against falling;
- (b) For gaseous fuels, the valve between the gas tank and engine shall be closed and the electric contact open unless it is essential for the equipment to remain operational;
- (c) Metal hydride storage systems shall be approved by the competent authority of the

country of manufacture. If the country of manufacture is not a contracting party to ADR the approval shall be recognized by the competent authority of a contracting party to ADR;

- (d) The provisions of (a) and (b) do not apply to vehicles which are empty of liquid or gaseous fuels,

**NOTE 1:** A vehicle is considered to be empty of liquid fuel when the liquid fuel tank has been drained and the vehicle cannot be operated due to a lack of fuel. Vehicle components such as fuel lines, fuel filters and injectors do not need to be cleaned, drained or purged to be considered empty of liquid fuels. In addition, the liquid fuel tank does not need to be cleaned or purged.

**NOTE 2:** A vehicle is considered to be empty of gaseous fuels when the gaseous fuel tanks are empty of liquid (for liquefied gases), the pressure in the tanks does not exceed 2 bar and the fuel shut-off or isolation valve is closed and secured.

667 (a) The ~~requirements-provisions~~ of 2.2.9.1.7 (a) do not apply when pre-production prototype lithium cells or batteries or lithium cells or batteries of a small production run, consisting of not more than 100 cells or batteries, are installed in the vehicle, ~~engine, or machinery or article~~;

- (b) The ~~requirements-provisions~~ of 2.2.9.1.7 do not apply to lithium cells or batteries in damaged or defective vehicles, ~~engine, or machinery or article~~. In such cases the following conditions shall be met;

(i) If the damage or defect has no significant impact on the safety of the cell or battery, damaged and defective vehicles, ~~engines, or machinery or article~~, may be carried under the conditions defined in special provisions 363 or 666, as appropriate;

(ii) If the damage or defect has a significant impact on the safety of the cell or battery, the lithium cell or battery shall be removed and carried according to special provision 376.

However if it is not possible to safely remove the cell or battery or it is not possible to verify the status of the cell or battery, the vehicle, ~~engine, or machinery or article~~ may be towed or carried as specified in (i);

~~(c) The procedures described in (b) also apply to damaged lithium cells or batteries in vehicles, engines, machinery or articles.~~

668 Elevated temperature substances for the purpose of applying road markings are not subject to the requirements of ADR, provided that the following conditions are met:

- (a) They do not fulfil the criteria of any class other than Class 9;
- (b) The temperature of the outer surface of the boiler does not exceed 70 °C;
- (c) The boiler is closed in such a way that any loss of product is prevented during carriage;
- (d) The maximum capacity of the boiler is limited to 3 000 l.

669 A trailer fitted with equipment, powered by a liquid or gaseous fuel or an electric energy storage and production system, that is intended for use during carriage operated by this trailer as a part of a transport unit, shall be assigned to UN numbers 3166 or 3171 and be subject to the same conditions as specified for these UN numbers, when carried as a load on a vehicle, provided that the total capacity of the tanks containing liquid fuel does not exceed 500 litres.

670 (a) ~~Lithium cells and batteries installed in equipment from private households collected and handed over for carriage for depollution, dismantling, recycling or disposal are not subject to the other provisions of ADR including special provision 376 and 2.2.9.1.7 when;~~

~~(i) They are not the main power source for the operation of the equipment in which they are contained;~~

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(ii) The equipment in which they are contained does not contain any other lithium cell or battery used as the main power source; and

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(iii) They are afforded protection by the equipment in which they are contained.

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Examples for cells and batteries covered by this paragraph are button cells used for data integrity in household appliances (e.g. refrigerators, washing machines, dishwashers) or in other electrical or electronic equipment;

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(b) Up to the intermediate processing facility lithium cells and batteries contained in equipment from private households not meeting the requirements of (a) collected and handed over for carriage for depollution, dismantling, recycling or disposal are not subject to the other provisions of ADR including special provision 376 and 2.2.9.1.7, if the following conditions are met;

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(i) The equipment is packed in accordance with packing instruction P909 of 4.1.4.1 except for the additional requirements 1 and 2; or it is packed in strong outer packagings, e.g. specially designed collection receptacles, which meet the following requirements;

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The packagings shall be constructed of suitable material and be of adequate strength and design in relation to the packaging capacity and its intended use. The packagings need not meet the requirements of 4.1.1.3;

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Appropriate measures shall be taken to minimize the damage of the equipment when filling and handling the packaging, e.g. use of rubber mats; and

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The packagings shall be constructed and closed so as to prevent any loss of contents during carriage, e.g. by lids, strong inner liners, covers for transport. Openings designed for filling are acceptable if they are constructed so as to prevent loss of content;

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(ii) A quality assurance system is in place to ensure that the total amount of lithium cells and batteries per transport unit does not exceed 333 kg;

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*NOTE: The total quantity of lithium cells and batteries in the equipment from private households may be assessed by means of a statistical method included in the quality assurance system. A copy of the quality assurance records shall be made available to the competent authority upon request.*

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(iii) Packages are marked "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING" as appropriate. If equipment containing lithium cells or batteries is carried unpackaged or on pallets in accordance with packing instruction P909 (3) of 4.1.4.1, this mark may alternatively be affixed to the external surface of the vehicles or containers).

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*NOTE: "Equipment from private households" means equipment which comes from private households and equipment which comes from commercial, industrial, institutional and other sources which, because of its nature and quantity, is similar to that from private households. Equipment likely to be used by both private households and users other than private households shall in any event be considered to be equipment from private households.*

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671 For the purposes of the exemption related to quantities carried per transport unit (see 1.1.3.6), the transport category shall be determined in relation to the packing group (see paragraph 3 of special provision 251):

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- Transport category 3 for kits assigned to packing group III;

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- Transport category 2 for kits assigned to packing group II;

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- Transport category 1 for kits assigned to packing group I.

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672 Machinery and apparatus carried under this entry and in conformity with special provision 301 are not subject to any other provision of ADR provided they are either:

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- packed in a strong outer packaging constructed of suitable material, and of adequate strength and design in relation to the packaging's capacity and its intended use, and meeting the applicable requirements of 4.1.1.1; or

- carried without outer packaging if the machinery or apparatus is constructed and designed so that the receptacles containing the dangerous goods are afforded adequate protection.

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673 (Reserved)

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674 This special provision applies to periodic inspection and test of over-moulded cylinders as defined in 1.2.1.

Over-moulded cylinders subject to 6.2.3.5.3.1 shall be subject to periodic inspection and test in accordance with 6.2.1.6.1, adapted by the following alternative method:

- Substitute test required in 6.2.1.6.1 d) by alternative destructive tests;

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- Perform specific additional destructive tests related to the characteristics of over-moulded cylinders.

The procedures and requirements of this alternative method are described below.

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Alternative method:

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(a) General

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The following provisions apply to over-moulded cylinders produced serially and based on welded steel cylinders in accordance with EN 1442:2017, EN 14140:2014 + AC:2015 or annex I, parts 1 to 3 to Council Directive 84/527/EEC. The design of the over-moulding shall prevent water from penetrating on to the inner steel cylinder. The conversion of the steel cylinder to an over-moulded cylinder shall comply with the relevant requirements of EN 1442:2017 and EN 14140:2014 + AC:2015.

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Over-moulded cylinders shall be equipped with self-closing valves.

(b) Basic population

A basic population of over-moulded cylinders is defined as the production of cylinders from only one over-moulding manufacturer using new inner cylinders manufactured by only one manufacturer within one calendar year, based on the same design type, the same materials and production processes.

(c) Sub-groups of a basic population

Within the above defined basic population, over-moulded cylinders belonging to different owners shall be separated into specific sub-groups, one per owner.

If the whole basic population is owned by one owner, the sub-group equals the basic population.

(d) Traceability

Inner steel cylinder marks in accordance with 6.2.3.9 shall be repeated on the over-moulding. In addition, each over-moulded cylinder shall be fitted with an individual resilient electronic identification device. The detailed characteristics of the over-moulded cylinders shall be recorded by the owner in a central database. The database shall be used to:

- Identify the specific sub-group;

- Make available to inspection bodies, filling centres and competent authorities the specific technical characteristics of the cylinders consisting of at least the following: serial number, steel cylinder production batch, over-moulding production batch, date of over-moulding;

- Identify the cylinder by linking the electronic device to the database with the

serial number;

- Check individual cylinder history and determine measures (e.g. filling, sampling, retesting, withdrawal);
- Record performed measures including the date and the address of where it was done.

The recorded data shall be kept available by the owner of the over-moulded cylinders for the entire life of the sub-group.

(e) Sampling for statistical assessment

The sampling shall be random among a sub-group as defined in sub-paragraph (c). The size of each sample per sub-group shall be in accordance with the table in sub-paragraph (g).

(f) Test procedure for destructive testing

The inspection and test required by 6.2.1.6.1 shall be carried out except (d) which shall be substituted by the following test procedure:

- Burst test (according to EN 1442:2017 or EN 14140:2014 + AC:2015).

In addition, the following tests shall be performed:

- Adhesion test (according to EN 1442:2017 or EN 14140:2014 + AC:2015);
- Peeling and Corrosion tests (according to EN ISO 4628-3:2016).

Adhesion test, peeling and corrosion tests, and burst test shall be performed on each related sample according to the table in sub-paragraph (g) and shall be conducted after the first 3 years in service and every 5 years thereafter.

(g) Statistical evaluation of test results – Method and minimum requirements

The procedure for statistical evaluation according to the related rejection criteria is described in the following.

Test interval (years)	Type of test	Standard	Rejection criteria	Sampling out of a sub-group
After 3 years in service (see (f))	Burst test	EN 1442:2017	Burst pressure point of the representative sample must be above the lower limit of tolerance interval on the Sample Performance Chart $\Omega_m \geq 1 + \Omega_s \times k3(n;p;1-\alpha)^a$ No individual test result shall be less than the test pressure	$3\sqrt{Q}$ or $Q/200$ whichever is lower, and with a minimum of 20 per sub-group (Q)
	Peeling and corrosion	EN ISO 4628-3:2016	Max corrosion grade: Ri2	Q/1 000
	Adhesion of Polyurethane	ISO 2859-1:1999 + A1:2011 EN 1442:2017 EN 14140:2014 + AC:2015	Adhesion value > 0.5 N/mm <sup>2</sup>	See ISO 2859-1:1999 + A1:2011 applied to Q/1000
Every 5 years thereafter (see (f))	Burst test	EN 1442:2017	Burst pressure point of the representative sample must be above the lower limit of tolerance interval on the Sample Performance Chart $\Omega_m \geq 1 + \Omega_s \times k3(n;p;1-\alpha)^a$ No individual test result shall be less than the test pressure	$6\sqrt{Q}$ or $Q/100$ whichever is lower, and with a minimum of 40 per sub-group (Q)

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Peeling and corrosion	EN ISO 4628-3:2016	Max corrosion grade: Ri2	Q/1 000
Adhesion of Polyurethane	ISO 2859-1:1999 + A1:2011 EN 1442:2017 EN 14140:2014 + AC:2015	Adhesion value > 0.5 N/mm <sup>2</sup>	See ISO 2859-1:1999 + A1:2011 applied to Q/1000

<sup>a</sup> *Burst pressure point (BPP) of the representative sample is used for the evaluation of test results by using a Sample Performance Chart:*

**Step 1: Determination of the burst pressure point (BPP) of a representative sample**

*Each sample is represented by a point whose coordinates are the mean value of burst test results and the standard deviation of burst test results, each normalised to the relevant test pressure.*

$$BPP: (\Omega_s = \frac{s}{PH}; \Omega_m = \frac{x}{PH})$$

with

*x*: sample mean value;

*s*: sample standard deviation;

*PH*: test pressure

**Step 2: Plotting on a Sample Performance Chart**

*Each BPP is plotted on a Sample Performance Chart with following axis:*

- *Abscissa* : Standard Deviation normalised to test pressure ( $\Omega_s$ )
- *Ordinate* : Mean value normalised to test pressure ( $\Omega_m$ )

**Step 3: Determination of the relevant lower limit of tolerance interval in the Sample Performance Chart**

*Results for burst pressure shall first be checked according to the Joint Test (multidirectional test) using a significance level of  $\alpha=0.05$  (see paragraph 7 of ISO 5479:1997) to determine whether the distribution of results for each sample is normal or non-normal.*

- *For a normal distribution, the determination of the relevant lower limit of tolerance is given in step 3.1.*
- *For a non-normal distribution, the determination of the relevant lower limit of tolerance is given in step 3.2.*

**Step 3.1: Lower limit of tolerance interval for results following a normal distribution**

*In accordance with the standard ISO 16269-6:2014, and considering that the variance is unknown, the unilateral statistical tolerance interval shall be considered for a confidence level of 95% and a fraction of population equal to 99.9999%.*

*By application in the Sample Performance Chart, the lower limit of tolerance interval is represented by a line of constant survival rate defined by the formula:*

$$\Omega_m = 1 + \Omega_s \times k3(n;p;1-\alpha)$$

with

*k3*: factor function of *n*, *p* and *1- $\alpha$* ;

*p*: proportion of the population selected for the tolerance interval (99.9999%);

*1- $\alpha$* : confidence level (95%);

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*n*: sample size.

The value for *k*<sub>3</sub> dedicated to Normal Distributions shall be taken from the table at end of Step 3.

Step 3.2: Lower limit of tolerance interval for results following a non-normal distribution

The unilateral statistical tolerance interval shall be calculated for a confidence level of 95% and a fraction of population equal to 99.9999%.

The lower limit of tolerance is represented by a line of constant survival rate defined by the formula given in previous step 3.1, with factors *k*<sub>3</sub> based and calculated on the properties of a Weibull Distribution.

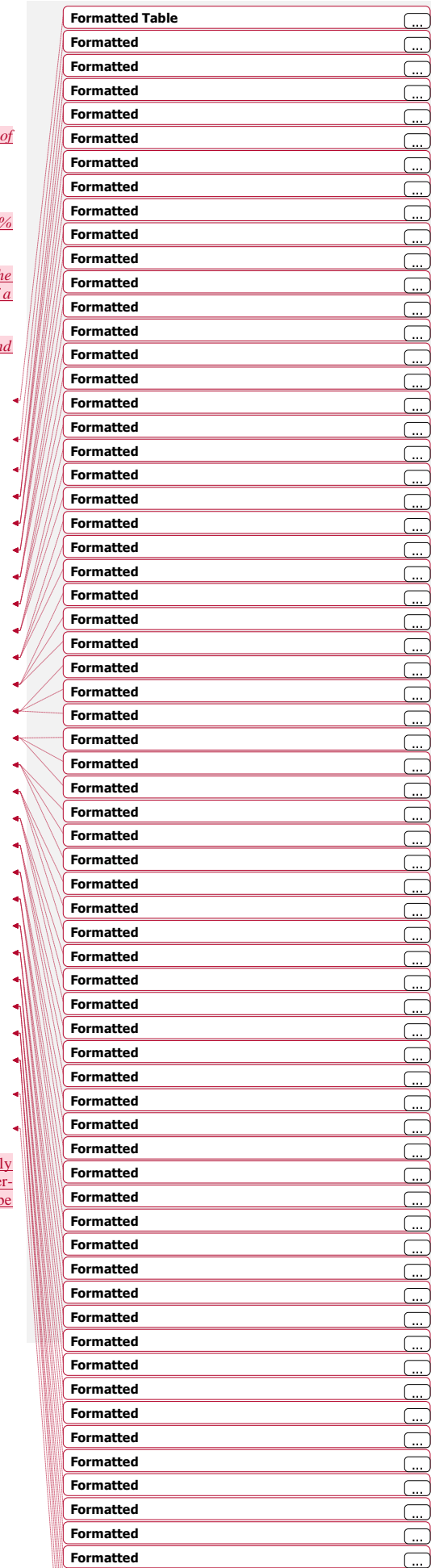
The value for *k*<sub>3</sub> dedicated to Weibull Distributions shall be taken from the table below at end of Step 3.

<b>Sample size <i>n</i></b>	<b>Normal distribution <i>k</i><sub>3</sub></b>	<b>Weibull distribution <i>k</i><sub>3</sub></b>
20	6.901	16.021
22	6.765	15.722
24	6.651	15.472
26	6.553	15.258
28	6.468	15.072
30	6.393	14.909
35	6.241	14.578
40	6.123	14.321
45	6.028	14.116
50	5.949	13.947
60	5.827	13.683
70	5.735	13.485
80	5.662	13.329
90	5.603	13.203
100	5.554	13.098
150	5.393	12.754
200	5.300	12.557
250	5.238	12.426
300	5.193	12.330
400	5.131	12.199
500	5.089	12.111
1000	4.988	11.897
∞	4.753	11.408

**NOTE:** If sample size is between two values, the closest lower sample size shall be selected.

(h) Measures if the acceptance criteria are not met

If a result of the burst test, peeling and corrosion test or adhesion test does not comply with the criteria detailed in the table in paragraph (g), the affected sub-group of over-moulded cylinders shall be segregated by the owner for further investigations and not be filled or made available for transport and use.



In agreement with the competent authority or the Xa-body which issued the design approval, additional tests shall be performed to determine the root cause of the failure.

If the root cause cannot be proved to be limited to the affected sub-group of the owner, the competent authority or the Xa-body shall take measures concerning the whole basic population and potentially other years of production.

If the root cause can be proved to be limited to a part of the affected sub-group, not affected parts may be authorized by the competent authority to return to service. It shall be proved that no individual over-moulded cylinder returning to service is affected.

(i) Filling centre requirements

The owner shall make available to the competent authority documentary evidence that the filling centres:

- Comply with the provisions of packing instruction P200 (7) of 4.1.4.1 and that the requirements of the standard on pre-fill inspections referenced in table P200 (11) of 4.1.4.1 are fulfilled and correctly applied;
- Have the appropriate means to identify over-moulded cylinders through the electronic identification device;
- Have access to the database as defined in (d);
- Have the capacity to update the database;
- Apply a quality system, according to the standard ISO 9000 (series) or equivalent, certified by an accredited independent body recognized by the competent authority.

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## CHAPTER 3.4

### DANGEROUS GOODS PACKED IN LIMITED QUANTITIES

3.4.1 This Chapter provides the provisions applicable to the carriage of dangerous goods of certain classes packed in limited quantities. The applicable quantity limit for the inner packaging or article is specified for each substance in Column (7a) of Table A of Chapter 3.2. In addition, the quantity "0" has been indicated in this column for each entry not permitted to be carried in accordance with this Chapter.

Limited quantities of dangerous goods packed in such limited quantities, meeting the provisions of this Chapter are not subject to any other provisions of ADR except the relevant provisions of:

- (a) Part 1, Chapters 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9;
- (b) Part 2;
- (c) Part 3, Chapters 3.1, 3.2, 3.3 (except special provisions 61, 178, 181, 220, 274, 625, 633 and 650 (e));
- (d) Part 4, paragraphs 4.1.1.1, 4.1.1.2, 4.1.1.4 to 4.1.1.8;
- (e) Part 5, 5.1.2.1(a) (i) and (b), 5.1.2.2, 5.1.2.3, 5.2.1.10, 5.4.2;
- (f) Part 6, construction requirements of 6.1.4 and paragraphs 6.2.5.1 and 6.2.6.1 to 6.2.6.3;
- (g) Part 7, Chapter 7.1 and 7.2.1, 7.2.2, 7.5.1 (except 7.5.1.4), 7.5.2.4, 7.5.7, 7.5.8 and 7.5.9;
- (h) 8.6.3.3 and 8.6.4.

3.4.2 Dangerous goods shall be packed only in inner packagings placed in suitable outer packagings. Intermediate packagings may be used. In addition, for articles of Division 1.4, Compatibility Group S, the provisions of section 4.1.5 shall be fully complied with. The use of inner packagings is not necessary for the carriage of articles such as aerosols or "receptacles, small, containing gas". The total gross mass of the package shall not exceed 30 kg.

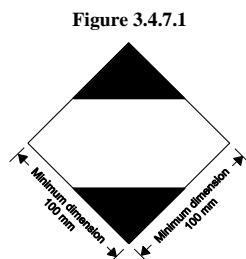
3.4.3 Except for articles of Division 1.4, Compatibility Group S, shrink-wrapped or stretch-wrapped trays meeting the conditions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 are acceptable as outer packagings for articles or inner packagings containing dangerous goods carried in accordance with this Chapter. Inner packagings that are liable to break or be easily punctured, such as those made of glass, porcelain, stoneware or certain plastics, shall be placed in suitable intermediate packagings meeting the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8, and be so designed that they meet the construction requirements of 6.1.4. The total gross mass of the package shall not exceed 20 kg.

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

3.4.5 and 3.4.6 *(Reserved)*

#### 3.4.7 Marking of packages containing limited quantities

3.4.7.1 Except for air transport, packages containing dangerous goods in limited quantities shall bear the mark shown in Figure 3.4.7.1:



Mark for packages containing limited quantities

The mark shall be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness.

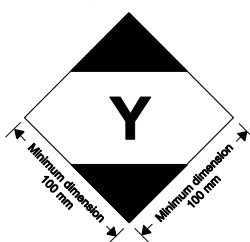
The mark shall be in the form of a square set at an angle of 45° (diamond-shaped). The top and bottom portions and the surrounding line shall be black. The centre area shall be white or a suitable contrasting background. The minimum dimensions shall be 100 mm x 100 mm and the minimum width of the line forming the diamond shall be 2 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

3.4.7.2 If the size of the package so requires, the minimum outer dimensions shown in Figure 3.4.7.1 may be reduced to be not less than 50 mm x 50 mm provided the mark remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm.

### 3.4.8 Marking of packages containing limited quantities conforming to Part 3, Chapter 4 of the ICAO Technical Instructions

3.4.8.1 Packages containing dangerous goods packed in conformity with the provisions of Part 3, Chapter 4 of the ICAO Technical Instructions may bear the mark shown in Figure 3.4.8.1 to certify conformity with these provisions:

Figure 3.4.8.1



Mark for packages containing limited quantities conforming to Part 3, Chapter 4 of the ICAO Technical Instructions

The mark shall be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness.

The mark shall be in the form of a square set at an angle of 45° (diamond-shaped). The top and bottom portions and the surrounding line shall be black. The centre area shall be white or a suitable contrasting background. The minimum dimensions shall be 100 mm x 100 mm and the minimum width of the line forming the diamond shall be 2 mm. The symbol "Y" shall be placed in the centre of the mark and shall be clearly visible. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

3.4.8.2 If the size of the package so requires, the minimum outer dimensions shown in Figure 3.4.8.1 may be reduced to be not less than 50 mm x 50 mm provided the 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" shall remain in approximate proportion to that shown in Figure 3.4.8.1.

3.4.9 Packages containing dangerous goods bearing the mark shown in 3.4.8 with or without the additional labels and marks for air transport shall be deemed to meet the provisions of section 3.4.1 as appropriate and of sections 3.4.2 to 3.4.4 and need not bear the mark shown in 3.4.7.

3.4.10 Packages containing dangerous goods in limited quantities bearing the mark shown in 3.4.7 and conforming with the provisions of the ICAO Technical Instructions, including all necessary marks and labels specified in Parts 5 and 6, shall be deemed to meet the provisions of section 3.4.1 as appropriate and of sections 3.4.2 to 3.4.4.



### 3.4.11 Use of overpacks

For an overpack containing dangerous goods packed in limited quantities, the following applies:

Unless the marks representative of all dangerous goods in an overpack are visible, the overpack shall be:

- marked with the word “OVERPACK”. The lettering of the “OVERPACK” mark shall be at least 12 mm high. The mark shall be in an official language of the country of origin and also, if that language is not English, French or German, in English, French or German, unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise; and
- marked with the marks required by this Chapter.

Except for air transport, the other provisions of 5.1.2.1 apply only if other dangerous goods which are not packed in limited quantities are contained in the overpack and only in relation to these other dangerous goods.

3.4.12 In advance of carriage, consignors of dangerous goods packed in limited quantities shall inform the carrier in a traceable form of the total gross mass of such goods to be consigned.

3.4.13 (a) Transport units with a maximum mass exceeding 12 tonnes carrying dangerous goods packed in limited quantities shall be marked in accordance with 3.4.15 at the front and at the rear except when the transport unit contains other dangerous goods for which orange-coloured plate marking in accordance with 5.3.2 is required. In this latter case, the transport unit may display the required orange-coloured plate marking only, or both the orange-coloured plate marking in accordance with 5.3.2 and the marks in accordance with 3.4.15.

(b) Containers carrying dangerous goods packed in limited quantities, on transport units with a maximum mass exceeding 12 tonnes, shall be marked in accordance with 3.4.15 on all four sides except when the container contains other dangerous goods for which placarding in accordance with 5.3.1 is required. In this latter case, the container may display the required placards only, or both the placards in accordance with 5.3.1 and the marks in accordance with 3.4.15.

The carrying transport unit need not be marked, except when the marks affixed to the containers are not visible from outside this carrying transport unit. In this latter case, the same marks shall be affixed at the front and at the rear of the transport unit.

3.4.14 The marks specified in 3.4.13 may be dispensed with, if the total gross mass of the packages containing dangerous goods packed in limited quantities carried does not exceed 8 tonnes per transport unit.

3.4.15 The marks specified in 3.4.13 shall be the same as the one required in 3.4.7, except that their minimum dimensions shall be 250 mm × 250 mm. These marks shall be removed or covered if no dangerous goods in limited quantities are carried.



**CHAPTER 3.5**  
**DANGEROUS GOODS**  
**PACKED IN EXCEPTED QUANTITIES**

**3.5.1 Excepted quantities**

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

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

*NOTE: In the case of radioactive material, the requirements for radioactive material in excepted packages in 1.7.1.5 apply.*

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

Code	Maximum net quantity per inner packaging (in grams for solids and ml for liquids and gases)	Maximum net quantity per outer packaging (in grams for solids and ml for liquids and gases, or sum of grams and ml in the case of mixed packing)
E0	Not permitted as Excepted Quantity	
E1	30	1000
E2	30	500
E3	30	300
E4	1	500
E5	1	300

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

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

3.5.1.4 Excepted quantities of dangerous goods assigned to codes E1, E2, E4 and E5 with a maximum net quantity of dangerous goods per inner packaging limited to 1 ml for liquids and gases and 1 g for solids and a maximum net quantity of dangerous goods per outer packaging which does not exceed 100 g for solids or 100 ml for liquids and gases are only subject to:

- (a) The provisions of 3.5.2, except that an intermediate packaging is not required if the inner packagings are securely packed in an outer packaging with cushioning material in such a way that, under normal conditions of carriage, they cannot break, be punctured, or leak their contents; and for liquids, the outer packaging contains sufficient absorbent material to absorb the entire contents of the inner packagings; and
- (b) The provisions of 3.5.3.

### 3.5.2 Packagings

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

- (a) There shall be an inner packaging and each inner packaging shall be constructed of plastic (with a minimum thickness of 0.2 mm when used for liquids), or of glass, porcelain, stoneware, earthenware or metal (see also 4.1.1.2) and the closure of each inner packaging shall be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads shall have a leak proof threaded type cap. The closure shall be resistant to the contents;
- (b) Each inner packaging shall be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents. For liquid dangerous goods, the intermediate or outer packaging shall contain sufficient absorbent material to absorb the entire contents of the inner packagings. When placed in the intermediate packaging, the absorbent material may be the cushioning material. Dangerous goods shall not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials. Regardless of its orientation, the package shall completely contain the contents in case of breakage or leakage;
- (c) The intermediate packaging shall be securely packed in a strong, rigid outer packaging (wooden, 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 marks; and
- (f) Overpacks may be used and may also contain packages of dangerous goods or goods not subject to the requirements of ADR.

### 3.5.3 Tests for packages

#### 3.5.3.1

The complete package as prepared for carriage, with inner packagings filled to not less than 95% of their capacity for solids 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 sample).

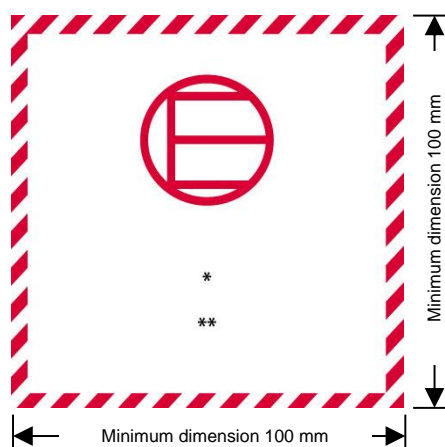
3.5.3.2 For the purposes of testing, the substances to be carried in the packaging may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used, it must have the same physical characteristics (mass, grain size, etc.) as the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

### 3.5.4 Marking of packages

3.5.4.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this Chapter shall be durably and legibly marked with the mark shown in 3.5.4.2. The first or only label number indicated in column (5) of Table A of Chapter 3.2 for each of the dangerous goods contained in the package shall be shown in the mark. Where the name of the consignor or consignee is not shown elsewhere on the package this information shall be included within the mark.

#### 3.5.4.2 Excepted quantities mark

Figure 3.5.4.2



Excepted quantities mark

\* The first or only label number indicated in column (5) of Table A of Chapter 3.2 shall be shown in this location.

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

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

#### **3.5.4.3**      *Use of overpacks*

For an overpack containing dangerous goods packed in excepted quantities, the following applies:

Unless the marks representative of all dangerous goods in an overpack are visible, the overpack shall be:

- marked with the word “OVERPACK”. The lettering of the “OVERPACK” mark shall be at least 12 mm high. The mark shall be in an official language of the country of origin and also, if that language is not English, French or German, in English, French or German, unless agreements, if any, concluded between the countries concerned in the transport operation provide otherwise; and
- marked with the marks required by this Chapter.

The other provisions of 5.1.2.1 apply only if other dangerous goods which are not packed in excepted quantities are contained in the overpack and only in relation to these other dangerous goods.

#### **3.5.5**      **Maximum number of packages in any vehicle or container**

The number of packages in any vehicle or container shall not exceed 1 000.

#### **3.5.6**      **Documentation**

If a document or documents (such as a bill of lading, air waybill or CMR/CIM consignment note) accompanies(y) dangerous goods in excepted quantities, at least one of these documents shall include the statement “Dangerous Goods in Excepted Quantities” and indicate the number of packages.