

**§ 172.102 Special provisions.**

(a) *General.* When column 7 of the § 172.101 table refers to a special provision for a hazardous material, the meaning and requirements of that provision are as set forth in this section. When a special provision specifies packaging or packaging requirements—

(1) The special provision is in addition to the standard requirements for all packagings prescribed in § 173.24 of this subchapter and any other applicable packaging requirements in subparts A and B of part 173 of this subchapter; and

(2) To the extent a special provision imposes limitations or additional requirements on the packaging provisions set forth in column 8 of the § 172.101 table, packagings must conform to the requirements of the special provision.

(b) *Description of codes for special provisions.* Special provisions contain packaging provisions, prohibitions, exceptions from requirements for particular quantities or forms of materials and requirements or prohibitions applicable to specific modes of transportation, as follows:

(1) A code consisting only of numbers (for example, “11”) is multi-modal in application and may apply to bulk and non-bulk packagings.

(2) A code containing the letter “A” refers to a special provision which applies only to transportation by aircraft.

(3) A code containing the letter “B” refers to a special provision that applies only to bulk packaging requirements. Unless otherwise provided in this subchapter, these special provisions do not apply to UN, IM Specification portable tanks or IBCs.

(4) A code containing the letters “IB” or “IP” refers to a special provision that applies only to transportation in IBCs.

(5) A code containing the letter “N” refers to a special provision which applies only to non-bulk packaging requirements.

(6) A code containing the letter “R” refers to a special provision which applies only to transportation by rail.

(7) A code containing the letter “T” refers to a special provision which ap-

plies only to transportation in UN or IM Specification portable tanks.

(8) A code containing the letters “TP” refers to a portable tank special provision for UN or IM Specification portable tanks that is in addition to those provided by the portable tank instructions or the requirements in part 178 of this subchapter.

(9) A code containing the letter “W” refers to a special provision that applies only to transportation by water.

(c) *Tables of special provisions.* The following tables list, and set forth the requirements of, the special provisions referred to in column 7 of the § 172.101 table.

(1) *Numeric provisions.* These provisions are multi-modal and apply to bulk and non-bulk packagings:

*Code/Special Provisions*

- 1 This material is poisonous by inhalation (see § 171.8 of this subchapter) in Hazard Zone A (see § 173.116(a) or § 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
- 2 This material is poisonous by inhalation (see § 171.8 of this subchapter) in Hazard Zone B (see § 173.116(a) or § 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
- 3 This material is poisonous by inhalation (see § 171.8 of this subchapter) in Hazard Zone C (see § 173.116(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
- 4 This material is poisonous by inhalation (see § 171.8 of this subchapter) in Hazard Zone D (see § 173.116(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
- 5 If this material meets the definition for a material poisonous by inhalation (see § 171.8 of this subchapter), a shipping name must be selected which identifies the inhalation hazard, in Division 2.3 or Division 6.1, as appropriate.
- 6 This material is poisonous-by-inhalation and must be described as an inhalation hazard under the provisions of this subchapter.
- 8 A hazardous substance that is not a hazardous waste may be shipped under the shipping description “Other regulated substances, liquid or solid, n.o.s.”, as appropriate. In addition, for solid materials, special provision B54 applies.

- 9 Packaging for certain PCBs for disposal and storage is prescribed by EPA in 40 CFR 761.60 and 761.65.
- 11 The hazardous material must be packaged as either a liquid or a solid, as appropriate, depending on its physical form at 55 °C (131 °F) at atmospheric pressure.
- 12 In concentrations greater than 40 percent, this material has strong oxidizing properties and is capable of starting fires in contact with combustible materials. If appropriate, a package containing this material must conform to the additional labeling requirements of §172.402 of this subchapter.
- 13 The words “Inhalation Hazard” shall be entered on each shipping paper in association with the shipping description, shall be marked on each non-bulk package in association with the proper shipping name and identification number, and shall be marked on two opposing sides of each bulk package. Size of marking on bulk package must conform to §172.302(b) of this subchapter. The requirements of §§172.203(m) and 172.505 of this subchapter do not apply.
- 14 Motor fuel antiknock mixtures are:
- Mixtures of one or more organic lead mixtures (such as tetraethyl lead, triethylmethyl lead, diethyldimethyl lead, ethyltrimethyl lead, and tetramethyl lead) with one or more halogen compounds (such as ethylene dibromide and ethylene dichloride), hydrocarbon solvents or other equally efficient stabilizers; or
  - tetraethyl lead.
- 15 This entry applies to “Chemical kits” and “First aid kits” containing one or more compatible items of hazardous materials in boxes, cases, *etc.* that, for example, are used for medical, analytical, diagnostic, testing, or repair purposes. Kits that are carried on board transport vehicles for first aid or operating purposes are not subject to the requirements of this subchapter.
- 16 This description applies to smokeless powder and other solid propellants that are used as powder for small arms and have been classed as Division 1.3C, 1.4C and Division 4.1 in accordance with §173.56 of this subchapter.
- 19 For domestic transportation only, the identification number “UN1075” may be used in place of the identification number specified in column (4) of the §172.101 table. The identification number used must be consistent on package markings, shipping papers and emergency response information.
- 21 This material must be stabilized by appropriate means (e.g., addition of chemical inhibitor, purging to remove oxygen) to prevent dangerous polymerization (see §173.21(f) of this subchapter).
- 22 If the hazardous material is in dispersion in organic liquid, the organic liquid must have a flash point above 50 °C (122 °F).
- 23 This material may be transported under the provisions of Division 4.1 only if it is so packed that the percentage of diluent will not fall below that stated in the shipping description at any time during transport. Quantities of not more than 500 g per package with not less than 10 percent water by mass may also be classed in Division 4.1, provided a negative test result is obtained when tested in accordance with test series 6(c) of the UN Manual of Tests and Criteria (IBR, see §171.7 of this subchapter).
- 24 Alcoholic beverages containing more than 70 percent alcohol by volume must be transported as materials in Packing Group II. Alcoholic beverages containing more than 24 percent but not more than 70 percent alcohol by volume must be transported as materials in Packing Group III.
- 26 This entry does not include ammonium permanganate, the transport of which is prohibited except when approved by the Associate Administrator.
- 28 The dihydrated sodium salt of dichloroisocyanuric acid does not meet the criteria for inclusion in Division 5.1 (Oxidizer) and is not subject to the requirements of this subchapter unless meeting the criteria for inclusion in another class or division.
- 30 Sulfur is not subject to the requirements of this subchapter if transported in a non-bulk packaging or if formed to a specific shape (for example, prills, granules, pellets, pastilles, or flakes). A bulk packaging containing sulfur is not subject to the placarding requirements of subpart F of this part, if it is marked with the appropriate identification number as required by subpart D of this part. Molten sulfur must be marked as required by §172.325 of this subchapter.
- 31 Materials which have undergone sufficient heat treatment to render them non-hazardous are not subject to the requirements of this subchapter.
- 32 Polymeric beads and molding compounds may be made from polystyrene, poly(methyl methacrylate) or other polymeric material.
- 33 Ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt are prohibited.
- 34 The commercial grade of calcium nitrate fertilizer, when consisting mainly of a double salt (calcium nitrate and ammonium nitrate) containing not more than 10 percent ammonium nitrate and at least 12 percent water of crystallization, is not subject to the requirements of this subchapter.
- 35 Antimony sulphides and oxides which do not contain more than 0.5 percent of arsenic calculated on the total mass do not meet the definition of Division 6.1.

- 37 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 must remain liquid during normal transport conditions. It must not freeze at temperatures above  $-15^{\circ}\text{C}$  ( $5^{\circ}\text{F}$ ).
- 38 If this material shows a violent effect in laboratory tests involving heating under confinement, the labeling requirements of Special Provision 53 apply, and the material must be packaged in accordance with packing method OP6 in § 173.225 of this subchapter. If the SADT of the technically pure substance is higher than  $75^{\circ}\text{C}$ , the technically pure substance and formulations derived from it are not self-reactive materials and, if not meeting any other hazard class, are not subject to the requirements of this subchapter.
- 39 This substance may be carried under provisions other than those of Class 1 only if it is so packed that the percentage of water will not fall below that stated at any time during transport. When phlegmatized with water and inorganic inert material, the content of urea nitrate must not exceed 75 percent by mass and the mixture should not be capable of being detonated by test 1(a)(i) or test 1(a)(ii) in the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter).
- 40 Polyester resin kits consist of two components: A base material (either Class 3 or Division 4.1, Packing Group II or III) and an activator (organic peroxide), each separately packed in an inner packaging. The organic peroxide must be type D, E, or F, not requiring temperature control. The components may be placed in the same outer packaging provided they will not interact dangerously in the event of leakage. The Packing Group assigned will be II or III, according to the classification criteria for either Class 3 or Division 4.1, as appropriate, applied to the base material. Additionally, unless otherwise excepted in this subchapter, polyester resin kits must be packaged in specification combination packagings based on the performance level of the base material contained within the kit.
- 41 This material at the Packing Group II hazard criteria level may be transported in Large Packagings.
- 43 The membrane filters, including paper separators and coating or backing materials, that are present in transport, must not be able to propagate a detonation as tested by one of the tests described in the UN Manual of Tests and Criteria, Part I, Test series 1(a) (IBR, see § 171.7 of this subchapter). On the basis of the results of suitable burning rate tests, and taking into account the standard tests in the UN Manual of Tests and Criteria, Part III, subsection 33.2.1 (IBR, see § 171.7 of this subchapter), nitrocellulose membrane filters in the form in which they are to be transported that do not meet the criteria for a Division 4.1 material are not subject to the requirements of this subchapter. Packagings must be so constructed that explosion is not possible by reason of increased internal pressure. Nitrocellulose membrane filters covered by this entry, each with a mass not exceeding 0.5 g, are not subject to the requirements of this subchapter when contained individually in an article or a sealed packet.
- 44 The formulation must be prepared so that it remains homogenous and does not separate during transport. Formulations with low nitrocellulose contents and neither showing dangerous properties when tested for their ability to detonate, deflagrate or explode when heated under defined confinement by the appropriate test methods and criteria in the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter), nor classed as a Division 4.1 (flammable solid) when tested in accordance with the procedures specified in § 173.124 of this subchapter (chips, if necessary, crushed and sieved to a particle size of less than 1.25 mm), are not subject to the requirements of this subchapter.
- 45 Temperature should be maintained between  $18^{\circ}\text{C}$  ( $64.4^{\circ}\text{F}$ ) and  $40^{\circ}\text{C}$  ( $104^{\circ}\text{F}$ ). Tanks containing solidified methacrylic acid must not be reheated during transport.
- 46 This material must be packed in accordance with packing method OP6 (see § 173.225 of this subchapter). During transport, it must be protected from direct sunshine and stored (or kept) in a cool and well-ventilated place, away from all sources of heat.
- 47 Mixtures of solids that are not subject to this subchapter and flammable liquids may be transported under this entry without first applying the classification criteria of Division 4.1, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport unit is closed. Except when the liquids are fully absorbed in solid material contained in sealed bags, for single packagings, each packaging must correspond to a design type that has passed a leakproofness test at the Packing Group II level. Sealed packets and articles containing less than 10 mL of a Class 3 liquid in Packing Group II or III absorbed onto a solid material are not subject to this subchapter provided there is no free liquid in the packet or article.
- 48 Mixtures of solids that are not subject to this subchapter and toxic liquids may be transported under this entry without first applying the classification criteria of Division 6.1, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport

unit is closed. For single packagings, each packaging must correspond to a design type that has passed a leakproofness test at the Packing Group II level. This entry may not be used for solids containing a Packing Group I liquid.

49 Mixtures of solids that are not subject to this subchapter and corrosive liquids may be transported under this entry without first applying the classification criteria of Class 8, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport unit is closed. For single packagings, each packaging must correspond to a design type that has passed a leakproofness test at the Packing Group II level.

50 Cases, cartridge, empty with primer which are made of metallic or plastic casings and meeting the classification criteria of Division 1.4 are not regulated for domestic transportation.

51 This description applies to items previously described as “Toy propellant devices, Class C” and includes reloadable kits. Model rocket motors containing 30 grams or less propellant are classed as Division 1.4S and items containing more than 30 grams of propellant but not more than 62.5 grams of propellant are classed as Division 1.4C.

52 This entry may only be used for substances that are too insensitive for acceptance into Class 1 (explosive) when tested in accordance with Test Series 2 in the UN Manual of Tests and Criteria, Part I (incorporated by reference; see §171.7 of this subchapter).

53 Packages of these materials must bear the subsidiary risk label, “EXPLOSIVE”, and the subsidiary hazard class/division must be entered in parentheses immediately following the primary hazard class in the shipping description, unless otherwise provided in this subchapter or through an approval issued by the Associate Administrator, or the competent authority of the country of origin. A copy of the approval shall accompany the shipping papers.

54 Maneb or maneb preparations not meeting the definition of Division 4.3 or any other hazard class are not subject to the requirements of this subchapter when transported by motor vehicle, rail car, or aircraft.

55 This device must be approved in accordance with §173.56 of this subchapter by the Associate Administrator.

56 A means to interrupt and prevent detonation of the detonator from initiating the detonating cord must be installed between each electric detonator and the detonating cord ends of the jet perforating guns before the charged jet perforating guns are offered for transportation.

57 Maneb or Maneb preparations stabilized against self-heating need not be classified in Division 4.2 when it can be demonstrated by testing that a volume of 1 m<sup>3</sup> of substance does not self-ignite and that the temperature at the center 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, in accordance with procedures set forth for testing self-heating materials in the UN Manual of Tests and Criteria (IBR, see §171.7 of this subchapter).

58 Aqueous solutions of Division 5.1 inorganic solid nitrate substances are considered as not meeting the criteria of Division 5.1 if the concentration of the substances in solution at the minimum temperature encountered in transport is not greater than 80% of the saturation limit.

59 Ferrocium, stabilized against corrosion, with a minimum iron content of 10 percent is not subject to the requirements of this subchapter.

61 A chemical oxygen generator is spent if its means of ignition and all or a part of its chemical contents have been expended.

62 Oxygen generators (see §171.8 of this subchapter) are not authorized for transportation under this entry.

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

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

66 Formulations of these substances containing not less than 30 percent non-volatile, non-flammable phlegmatizer are not subject to this subchapter.

70 Black powder that has been classed in accordance with the requirements of §173.56 of this subchapter may be reclassified and offered for domestic transportation as a Division 4.1 material if it is offered for transportation and transported in accordance with the limitations and packaging requirements of §173.170 of this subchapter.

74 During transport, this material must be protected from direct sunshine and stored or kept in a cool and well-ventilated place, away from all sources of heat.

78 This entry may not be used to describe compressed air which contains more than 23.5 percent oxygen. Compressed air containing greater than 23.5 percent oxygen must be shipped using the description “Compressed gas, oxidizing, n.o.s., UN3156.”

79 This entry may not be used for mixtures that meet the definition for oxidizing gas.

81 Polychlorinated biphenyl items, as defined in 40 CFR 761.3, for which specification packagings are impractical, may be packaged in non-specification packagings meeting the general packaging requirements of subparts A and B of part 173 of

this subchapter. Alternatively, the item itself may be used as a packaging if it meets the general packaging requirements of subparts A and B of part 173 of this subchapter.

- 101 The name of the particular substance or article must be specified.
- 102 The ends of the detonating cord must be tied fast so that the explosive cannot escape. The articles may be transported as in Division 1.4 Compatibility Group D (1.4D) if all of the conditions specified in §173.63(a) of this subchapter are met.
- 105 The word "Agents" may be used instead of "Explosives" when approved by the Associate Administrator.
- 106 The recognized name of the particular explosive may be specified in addition to the type.
- 107 The classification of the substance is expected to vary especially with the particle size and packaging but the border lines have not been experimentally determined; appropriate classifications should be verified following the test procedures in §§173.57 and 173.58 of this subchapter.
- 108 Fireworks must be so constructed and packaged that loose pyrotechnic composition will not be present in packages during transportation.
- 109 Rocket motors must be nonpropulsive in transportation unless approved in accordance with §173.56 of this subchapter. A rocket motor to be considered "nonpropulsive" must be capable of unrestrained burning and must not appreciably move in any direction when ignited by any means.
- 110 Fire extinguishers transported under UN1044 and oxygen cylinders transported for emergency use under UN1072 may include installed actuating cartridges (cartridges, power device of Division 1.4C or 1.4S), without changing the classification of Division 2.2, provided the aggregate quantity of deflagrating (propellant) explosives does not exceed 3.2 grams per cylinder. Oxygen cylinders with installed actuating cartridges as prepared for transportation must have an effective means of preventing inadvertent activation.
- 111 Explosive substances of Division 1.1 Compatibility Group A (1.1A) are forbidden for transportation if dry or not desensitized, unless incorporated in a device.
- 113 The sample must be given a tentative approval by an agency or laboratory in accordance with §173.56 of this subchapter.
- 114 Jet perforating guns, charged, oil well, without detonator may be reclassified to Division 1.4 Compatibility Group D (1.4D) if the following conditions are met:
  - a. The total weight of the explosive contents of the shaped charges assembled in the guns does not exceed 90.5 kg (200 pounds) per vehicle; and

- b. The guns are packaged in accordance with Packing Method US 1 as specified in §173.62 of this subchapter.

- 115 Boosters with detonator, detonator assemblies and boosters with detonators in which the total explosive charge per unit does not exceed 25 g, and which will not mass detonate and undergo only limited propagation in the shipping package may be assigned to 1.4B classification code. Mass detonate means more than 90 percent of the devices tested in a package explode practically simultaneously. Limited propagation means that if one booster near the center of the package is exploded, the aggregate weight of explosives, excluding ignition and delay charges, in this and all additional boosters in the outside packaging that explode may not exceed 25 g.
- 116 Fuzes, detonating may be classed in Division 1.4 if the fuzes do not contain more than 25 g of explosive per fuze and are made and packaged so that they will not cause functioning of other fuzes, explosives or other explosive devices if one of the fuzes detonates in a shipping packaging or in adjacent packages.
- 117 If shipment of the explosive substance is to take place at a time that freezing weather is anticipated, the water contained in the explosive substance must be mixed with denatured alcohol so that freezing will not occur.
- 118 This substance may not be transported under the provisions of Division 4.1 unless specifically authorized by the Associate Administrator (see UN0143 or UN0150 as appropriate).
- 119 This substance, when in quantities of not more than 11.5 kg (25.3 pounds), with not less than 10 percent water, by mass, also may be classed as Division 4.1, provided a negative test result is obtained when tested in accordance with test series 6(c) of the UN Manual of Tests and Criteria (IBR, see §171.7 of this subchapter).
- 120 The phlegmatized substance must be significantly less sensitive than dry PETN.
- 121 This substance, when containing less alcohol, water or phlegmatizer than specified, may not be transported unless approved by the Associate Administrator.
- 123 Any explosives, blasting, type C containing chlorates must be segregated from explosives containing ammonium nitrate or other ammonium salts.
- 125 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. These mixtures may be classified in Division 4.1 when tested in accordance with test series 6(c) of the UN Manual of Tests and Criteria (IBR, see §171.7 of this subchapter) and approved by the Associate Administrator. Testing must be conducted on at least three packages as prepared for transport. Mixtures

containing at least 98%, by mass, of phlegmatizer are not subject to the requirements of this subchapter. Packages containing mixtures with not less than 90% by mass, of phlegmatizer need not bear a POISON subsidiary risk label.

127 Mixtures containing oxidizing and organic materials transported under this entry may not meet the definition and criteria of a Class 1 material. (See § 173.50 of this subchapter.)

128 Regardless of the provisions of § 172.101(c)(12), aluminum smelting by-products and aluminum remelting by-products described under this entry, meeting the definition of Class 8, Packing Group II and III may be classed as a Division 4.3 material and transported under this entry. The presence of a Class 8 hazard must be communicated as required by this part for subsidiary hazards.

129 These materials may not be classified and transported unless authorized by the Associate Administrator on the basis of results from Series 2 Test and a Series 6(c) Test from the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter) on packages as prepared for transport. The packing group assignment and packaging must be approved by the Associate Administrator for Hazardous Materials Safety on the basis of the criteria in § 173.21 of this subchapter and the package type used for the Series 6(c) test.

130 “Batteries, dry, sealed, n.o.s.,” commonly referred to as dry batteries, are hermetically sealed and generally utilize metals (other than lead) and/or carbon as electrodes. These batteries are typically used for portable power applications. The rechargeable (and some non-rechargeable) types have gelled alkaline electrolytes (rather than acidic) making it difficult for them to generate hydrogen or oxygen when overcharged and therefore, differentiating them from non-spillable batteries. Dry batteries specifically covered by another entry in the § 172.101 Table must be transported in accordance with the requirements applicable to that entry. For example, nickel-metal hydride batteries transported by vessel in certain quantities are covered by another entry (*see* Batteries, nickel-metal hydride, UN3496). Dry batteries not specifically covered by another entry in the § 172.101 Table are covered by this entry (*i.e.*, Batteries, dry, sealed, n.o.s.) and are not subject to requirements of this subchapter except for the following:

(a) *Incident reporting.* For transportation by aircraft, a telephone report in accordance with § 171.15(a) is required if a fire, violent rupture, explosion or dangerous evolution of heat (*i.e.*, an amount of heat sufficient to be dangerous to packaging or personal safety to include charring of packaging, melting of packaging, scorch-

ing of packaging, or other evidence) occurs as a direct result of a dry battery. For all modes of transportation, a written report submitted, retained, and updated in accordance with § 171.16 is required if a fire, violent rupture, explosion or dangerous evolution of heat occurs as a direct result of a dry battery or battery-powered device.

(b) *Preparation for transport.* Batteries and battery-powered device(s) containing batteries must be prepared and packaged for transport in a manner to prevent:

- (1) A dangerous evolution of heat;
- (2) Short circuits, including but not limited to the following methods:

(i) Packaging each battery or each battery-powered device when practicable, in fully enclosed inner packagings made of non-conductive material;

(ii) Separating or packaging batteries in a manner to prevent contact with other batteries, devices or conductive materials (*e.g.*, metal) in the packagings; or

(iii) Ensuring exposed terminals or connectors are protected with non-conductive caps, non-conductive tape, or by other appropriate means; and

(3) Damage to terminals. If not impact resistant, the outer packaging should not be used as the sole means of protecting the battery terminals from damage or short circuiting. Batteries must be securely cushioned and packed to prevent shifting which could loosen terminal caps or reorient the terminals to produce short circuits. Batteries contained in devices must be securely installed. Terminal protection methods include but are not limited to the following:

(i) Securely attaching covers of sufficient strength to protect the terminals;

(ii) Packaging the battery in a rigid plastic packaging; or

(iii) Constructing the battery with terminals that are recessed or otherwise protected so that the terminals will not be subjected to damage if the package is dropped.

(c) *Additional air transport requirements.* For a battery whose voltage (electrical potential) exceeds 9 volts—

(1) When contained in a device, the device must be packaged in a manner that prevents unintentional activation or must have an independent means of preventing unintentional activation (*e.g.*, packaging restricts access to activation switch, switch caps or locks, recessed switches, trigger locks, temperature sensitive circuit breakers, *etc.*); and

(2) An indication of compliance with this special provision must be provided by marking each package with the words “not restricted” or by including the words “not restricted” on a transport

document such as an air waybill accompanying the shipment.

- (d) *Used or spent battery exception.* Used or spent dry batteries of both non-rechargeable and rechargeable designs, with a marked rating up to 9-volt that are combined in the same package and transported by highway or rail for recycling, reconditioning, or disposal are not subject to this special provision or any other requirement of the HMR. Note that batteries utilizing different chemistries (*i.e.*, those battery chemistries specifically covered by another entry in the §172.101 Table) as well as dry batteries with a marked rating greater than 9-volt may not be combined with used or spent batteries in the same package. Note also that this exception does not apply to batteries that have been reconditioned for reuse.
- 131 This material may not be offered for transportation unless approved by the Associate Administrator.
- 132 This description may only be used for ammonium nitrate-based compound fertilizers. They must be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, part III, section 39 (IBR, *see* §171.7 of this subchapter). Fertilizers meeting the criteria for this identification number are only subject to the requirements of this subchapter when offered for transportation and transported by air or vessel.
- 134 This entry applies only to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, and equipment powered by wet batteries or sodium batteries that are transported with these batteries installed. Lithium batteries installed in a cargo transport unit, designed only to provide power external to the transport unit must use the proper shipping name "Lithium batteries installed in cargo transport unit" found in the §172.101 Hazardous Materials Table.
- a. 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), lawn tractors, self-propelled farming and construction equipment, boats, aircraft, wheelchairs and other mobility aids. This includes vehicles transported in a packaging. In this case, some parts of the vehicle may be detached from its frame to fit into the packaging.
- b. Examples of equipment are lawnmowers, cleaning machines, or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries must be described using the entries "Lithium metal batteries contained in equipment" or "Lithium metal batteries packed with equipment" or "Lithium ion batteries contained in equipment" or "Lithium ion batteries packed with equipment," as appropriate.
- c. Self-propelled vehicles or equipment that also contain an internal combustion engine must be described using the entries "Engine, internal combustion, flammable gas powered" or "Engine, internal combustion, flammable liquid powered" or "Vehicle, flammable gas powered" or "Vehicle, flammable liquid powered," as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and batteries. Additionally, self-propelled vehicles or equipment that contain a fuel cell engine must be described using the entries "Engine, fuel cell, flammable gas powered" or "Engine, fuel cell, flammable liquid powered" or "Vehicle, fuel cell, flammable gas powered" or "Vehicle, fuel cell, flammable liquid powered," as appropriate. These entries include hybrid electric vehicles powered by a fuel cell engine, an internal combustion engine, and batteries.
- 135 Internal combustion engines installed in a vehicle must be described using "Vehicle, flammable gas powered" or "Vehicle, flammable liquid powered," as appropriate. If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it must be described using "Vehicle, flammable gas powered." This includes hybrid electric vehicles powered by both an internal combustion engine and wet, sodium or lithium batteries installed. If a fuel cell engine is installed in a vehicle, the vehicle must be described using "Vehicle, fuel cell, flammable gas powered" or "Vehicle, fuel cell, flammable liquid powered," as appropriate. This includes hybrid electric vehicles powered by a fuel cell, an internal combustion engine, and wet, sodium or lithium 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, trucks, locomotives, scooters, three- and four-wheeled vehicles or motorcycles, lawn tractors, self-propelled farming and construction equipment, boats, and aircraft. Furthermore, lithium batteries installed in a cargo transport unit, designed only to provide power external to the transport unit must be described using the proper shipping name "Lithium batteries installed in cargo transport unit"

found in the §172.101 Hazardous Materials Table.

- 136 This entry applies only to articles, machinery, and apparatus containing hazardous materials as an integral element of the article, machinery, or apparatus. It may not be used to describe articles, machinery, or apparatus for which a proper shipping name exists in the §172.101 Table. Except when approved by the Associate Administrator, these items may only contain hazardous materials for which exceptions are referenced in Column (8) of the §172.101 Table and are provided in part 173, subparts D and G, of this subchapter. Hazardous materials shipped under this entry are excepted from the labeling requirements of this subchapter unless offered for transportation or transported by aircraft and are not subject to the placarding requirements of subpart F of this part. Orientation markings as described in §172.312(a)(2) are required when liquid hazardous materials may escape due to incorrect orientation. The article, machinery, or apparatus, if unpackaged, or the packaging in which it is contained shall be marked “Dangerous goods in articles” or “Dangerous goods in machinery” or “Dangerous goods in apparatus” as appropriate, with the identification number UN3363. For transportation by aircraft, articles, machinery, or apparatus, may not contain any material forbidden for transportation by passenger or cargo aircraft. The Associate Administrator may except from the requirements of this subchapter articles, machinery, and apparatus provided:
- a. It is shown that it does not pose a significant risk in transportation;
  - b. The quantities of hazardous materials do not exceed those specified in §173.4a of this subchapter; and
  - c. The equipment, and machinery or apparatus articles conforms with §173.222 of this subchapter.

- 137 Cotton, dry; flax, dry; sisal, dry; and tampico fiber, dry are not subject to the requirements of this subchapter when they are baled in accordance with ISO 8115, “Cotton Bales—Dimensions and Density” (IBR, see §171.7 of this subchapter) to a density of not less than 360 kg/m<sup>3</sup> (22.1 lb/ft<sup>3</sup>) for cotton, 400 kg/m<sup>3</sup> (24.97 lb/ft<sup>3</sup>) for flax, 620 kg/m<sup>3</sup> (38.71 lb/ft<sup>3</sup>) for sisal and 360 kg/m<sup>3</sup> (22.1 lb/ft<sup>3</sup>) for tampico fiber and transported in a freight container or closed transport vehicle.

- 138 This entry applies to lead compounds which, when mixed in a ratio of 1:1,000 with 0.07 M (Molar concentration) hydrochloric acid and stirred for one hour at a temperature of 23 °C ±2 °C, exhibit a solubility of more than 5%. Lead compounds which, when mixed in a ratio of 1:1,000 with 0.07 M (Molar concentration) hydrochloric acid and stirred for one hour at a temperature

of 23 °C ±2 °C, exhibit a solubility of 5% or less are not subject to the requirements of this subchapter unless they meet criteria as another hazard class or division. Lead compounds that have a solubility of 5% or less in accordance with this special provision are not subject to the requirements of this subchapter that pertain to Marine Pollutants.

- 139 Use of the “special arrangement” proper shipping names for international shipments must be made under an IAEA Certificate of Competent Authority issued by the Associate Administrator in accordance with the requirements in §173.471, §173.472, or §173.473 of this subchapter. Use of these proper shipping names for domestic shipments may be made only under a DOT special permit, as defined in, and in accordance with the requirements of subpart B of part 107 of this subchapter.

- 140 This material is regulated only when it meets the defining criteria for a hazardous substance or a marine pollutant. In addition, the column 5 reference is modified to read “III” on those occasions when this material is offered for transportation or transported by highway or rail.

- 141 A toxin obtained from a plant, animal, or bacterial source containing an infectious substance, or a toxin contained in an infectious substance, must be classed as Division 6.2, described as an infectious substance, and assigned to UN 2814 or UN 2900, as appropriate.

- 142 These hazardous materials may not be classified and transported unless authorized by the Associate Administrator. The Associate Administrator will base the authorization on results from Series 2 tests and a Series 6(c) test from the UN Manual of Tests and Criteria (IBR, see §171.7 of this subchapter) on packages as prepared for transport in accordance with the requirements of this subchapter.

- 144 If transported as a residue in an underground storage tank (UST), as defined in 40 CFR 280.12, that has been cleaned and purged or rendered inert according to the American Petroleum Institute (API) Standard 1604 (IBR, see §171.7 of this subchapter), then the tank and this material are not subject to any other requirements of this subchapter. However, sediments remaining in the tank that meet the definition for a hazardous material are subject to the applicable regulations of this subchapter.

- 145 This entry applies to formulations that neither detonate in the cavitated state nor deflagrate in laboratory testing, show no effect when heated under confinement, exhibit no explosive power, and are thermally stable (self-accelerating decomposition temperature (SADT) at 60 °C (140 °F) or higher for a 50 kg (110.2 lbs.) package). Formulations not meeting these criteria



must be transported under the provisions applicable to the appropriate entry in the Organic Peroxide Table in §173.225 of this subchapter.

146 This description may be used for a material that poses a hazard to the environment but does not meet the definition for a hazardous waste or a hazardous substance, as defined in §171.8 of this subchapter, or any hazard class, as defined in part 173 of this subchapter, if it is designated as environmentally hazardous by another Competent Authority. This provision may be used for both domestic and international shipments.

147 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 or thickening 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. These substances must satisfy the criteria for classification as an ammonium nitrate emulsion of Test Series 8 of the UN Manual of Tests and Criteria, Part I, Section 18 (IBR, see §171.7 of this subchapter), and may not be classified and transported unless approved by the Associate Administrator.

148 For domestic transportation, this entry directs to §173.66 for:

- a. The standards for transporting a single bulk hazardous material for blasting by cargo tank motor vehicles (CTMV); and
- b. The standards for CTMVs capable of transporting multiple hazardous materials for blasting in bulk and non-bulk packagings (*i.e.*, a multipurpose bulk truck (MBT)).

149 When transported as a limited quantity or a consumer commodity, the maximum net capacity specified in §173.150(b)(2) of this subchapter for inner packagings may be increased to 5 L (1.3 gallons).

150 This description may only be used for ammonium nitrate-based fertilizers. They must be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, part III, section 39 (IBR, see §171.7 of this subchapter).

151 If this material meets the definition of a flammable liquid in §173.120 of this subchapter, a FLAMMABLE LIQUID label is also required and the basic description on the shipping paper must indicate the Class 3 subsidiary hazard.

155 Fish meal, fish scrap and krill meal may not be transported if the temperature at the time of loading either exceeds 35 °C (95 °F), or exceeds 5 °C (41 °F) above the ambient temperature, whichever is higher.

156 Asbestos that is immersed or fixed in a natural or artificial binder material, such as cement, plastic, asphalt, resins or mineral ore, or contained in manufactured products is not subject to the requirements of this subchapter.

157 When transported as a limited quantity or a consumer commodity, the maximum net capacity specified in §173.151(b)(1)(i) of this subchapter for inner packagings may be increased to 5 kg (11 pounds).

159 This material must be protected from direct sunshine and kept in a cool, well-ventilated place away from sources of heat.

160 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 containing Class 1 (explosive) materials or materials of other hazard classes. These articles must be tested in accordance with Test series 6(c) of Part I of the UN Manual of Tests and Criteria (incorporated by reference; see §171.7 of this subchapter), with no explosion of the device, no fragmentation of device casing or pressure vessel, and no projection hazard or thermal effect that would significantly hinder fire-fighting or other emergency response efforts in the immediate vicinity. If the air bag inflator unit satisfactorily passes the series 6(c) test, it is not necessary to repeat the test on the air bag module. This entry does not apply to life saving appliances described in §173.219 (UN2990 and UN3072).

162 This material may be transported under the provisions of Division 4.1 only if it is packed so that at no time during transport will the percentage of diluent fall below the percentage that is stated in the shipping description.

163 Substances must satisfactorily pass Test Series 8 of the UN Manual of Tests and Criteria, Part I, Section 18 (IBR, see §171.7 of this subchapter).

164 Substances must not be transported under this entry unless approved by the Associate Administrator on the basis of the results of appropriate tests according to Part I of the UN Manual of Tests and Criteria (IBR, see §171.7 of this subchapter). The material must be packaged so that the percentage of diluent does not fall below that stated in the approval at any time during transportation.

165 These substances are susceptible to exothermic decomposition at elevated temperatures. Decomposition can be initiated by heat, moisture or by impurities (e.g., powdered metals (iron, manganese, cobalt, magnesium)). During the course of transportation, these substances must be shaded from direct sunlight and all sources of heat and be placed in adequately ventilated areas.

166 When transported in non-friable tablet form, calcium hypochlorite, dry, may be transported as a Packing Group III material.

167 These storage systems must always be considered as containing hydrogen. A metal hydride storage system installed in or intended to be installed in a vehicle or equipment or in vehicle or equipment components must be approved for transport by the Associate Administrator. A copy of the approval must accompany each shipment.

168 For lighters containing a Division 2.1 gas (*see* §171.8 of this subchapter), representative samples of each new lighter design must be examined and successfully tested as specified in §173.308(b)(3). For criteria in determining what is a new lighter design, *see* §173.308(b)(1). For transportation of new lighter design samples for examination and testing, *see* §173.308(b)(2). The examination and testing of each lighter design must be performed by a person authorized by the Associate Administrator under the provisions of subpart E of part 107 of this chapter, as specified in §173.308(a)(4). For continued use of approvals dated prior to January 1, 2012, *see* §173.308(b)(5).

For non-pressurized lighters containing a Class 3 (flammable liquid) material, its design, description, and packaging must be approved by the Associate Administrator prior to being offered for transportation or transported in commerce. In addition, a lighter design intended to contain a non-pressurized Class 3 material is excepted from the examination and testing criteria specified in §173.308(b)(3). An unused lighter or a lighter that is cleaned of residue and purged of vapors is not subject to the requirements of this subchapter.

169 This entry applies to lighter refills (*see* §171.8 of this subchapter) that contain a Division 2.1 (flammable) gas but do not contain an ignition device. Lighter refills offered for transportation under this entry may not exceed 4 fluid ounces capacity (7.22 cubic inches) or contain more than 65 grams of fuel. A lighter refill exceeding 4 fluid ounces capacity (7.22 cubic inches) or containing more than 65 grams of fuel must be classed as a Division 2.1 material, described with the proper shipping name appropriate for the material, and packaged in the packaging specified in part 173 of

this subchapter for the flammable gas contained therein. In addition, a container exceeding 4 fluid ounces volumetric capacity (7.22 cubic inches) or containing more than 65 grams of fuel may not be connected or manifolded to a lighter or similar device and must also be described and packaged according to the fuel contained therein. For transportation by passenger-carrying aircraft, the net mass of lighter refills may not exceed 1 kg per package, and, for cargo-only aircraft, the net mass of lighter refills may not exceed 15 kg per package. *See* §173.306(h) of this subchapter.

170 Air must be eliminated from the vapor space by nitrogen or other means.

171 This entry may only be used when the material is transported in non-friable tablet form or for granular or powered mixtures that have been shown to meet the PG III criteria in §173.127.

172 This entry includes alcohol mixtures containing up to 5% petroleum products.

173 For adhesives, printing inks, printing ink-related materials, paints, paint-related materials, and resin solutions which are assigned to UN3082, and do not meet the definition of another hazard class, metal or plastic packaging for substances of packing groups II and III in quantities of 5 L (1.3 gallons) or less per packaging are not required to meet the UN performance package testing when transported:

a. Except for transportation by aircraft, in palletized loads, a pallet box or unit load device (*e.g.* individual packaging placed or stacked and secured by strapping, shrink or stretch-wrapping or other suitable means to a pallet). For vessel transport, the palletized loads, pallet boxes or unit load devices must be firmly packed and secured in closed cargo transport units; or

b. Except for transportation by aircraft, as an inner packaging of a combination packaging with a maximum net mass of 40 kg (88 pounds). For transportation by aircraft, as an inner packaging of a combination packaging with a maximum gross mass of 30 kg when packaged as a limited quantity in accordance with §173.27(f).

175 This substance must be stabilized when in concentrations of not more than 99%.

176 This entry must be used for formaldehyde solutions containing methanol as a stabilizer. Formaldehyde solutions not containing methanol and not meeting the Class 3 flammable liquid criteria must be described using a different proper shipping name.

177 Gasoline, or, ethanol and gasoline mixtures, for use in internal combustion engines (*e.g.*, in automobiles, stationary engines and other engines) must be assigned to Packing Group II regardless of variations in volatility.

181 When a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment, the following requirements apply:

- a. The shipper must ensure that all applicable requirements of § 173.185 of this subchapter are met. The total mass of lithium batteries contained in any package must not exceed the quantity limits in columns (9A) and (9B) for passenger aircraft or cargo aircraft, as applicable;
- b. Except as provided in § 173.185(c)(3) of this subchapter, the package must be marked "UN 3091 Lithium metal batteries packed with equipment", or "UN 3481 Lithium ion batteries packed with equipment," as appropriate. If a package contains both lithium metal batteries and lithium ion batteries packed with and contained in equipment, the package must be marked as required for both battery types. However, button cell batteries installed in equipment (including circuit boards) need not be considered; and
- c. The shipping paper must indicate "UN 3091 Lithium metal batteries packed with equipment" or "UN 3481 Lithium ion batteries packed with equipment," as appropriate. If a package contains both lithium metal batteries and lithium ion batteries packed with and contained in equipment, then the shipping paper must indicate both "UN 3091 Lithium metal batteries packed with equipment" and "UN 3481 Lithium ion batteries packed with equipment."

182 Equipment containing only lithium batteries must be classified as either UN 3091 or UN 3481.

196 The nitrocellulose must meet the criteria of the Bergmann-Junk test or methyl violet paper test in the UN Manual of Tests and Criteria, Appendix 10 (IBR, *see* § 171.7 of this subchapter). Test of type 3(c) is not required.

197 The nitrocellulose must meet the criteria of the Bergmann-Junk test or methyl violet paper test in the UN Manual of Tests and Criteria, Appendix 10 (IBR, *see* § 171.7 of this subchapter).

198 Nitrocellulose solutions containing not more than 20% nitrocellulose may be transported as paint, perfumery products, or printing ink, as applicable, provided the nitrocellulose contains no more 12.6% nitrogen (by dry mass). *See* UN1210, UN1263, UN1266, UN3066, UN3469, and UN3470.

200 Division 1.4G consumer fireworks may be certified for transportation by a DOT-approved Fireworks Certification Agency in accordance with the provisions of § 173.65 of this subchapter.

237 "Batteries, dry, containing potassium hydroxide solid, *electric storage*" must be prepared and packaged in accordance with

the requirements of § 173.159(a) and (c). For transportation by aircraft, the provisions of § 173.159(b)(2) apply. This entry may only be used for the transport of non-activated batteries that contain dry potassium hydroxide and that are intended to be activated prior to use by the addition of an appropriate amount of water to the individual cells.

238 Neutron radiation detectors: Neutron radiation detectors containing non-pressurized boron trifluoride gas in excess of 1 gram (0.035 ounces) and radiation detection systems containing such neutron radiation detectors as components may be transported by highway, rail, vessel, or cargo aircraft in accordance with the following:

a. Each radiation detector must meet the following conditions:

- (1) The pressure in each neutron radiation detector must not exceed 105 kPa absolute at 20 °C (68 °F);
- (2) The amount of gas must not exceed 13 grams (0.45 ounces) per detector; and
- (3) Each neutron radiation detector must be of welded metal construction with brazed metal to ceramic feed through assemblies. These detectors must have a minimum burst pressure of 1800 kPa as demonstrated by design type qualification testing; and
- (4) Each detector must be tested to a  $1 \times 10^{-10}$  cm<sup>3</sup>/s leaktightness standard before filling.

b. Radiation detectors transported as individual components must be transported as follows:

- (1) They must be packed in a sealed intermediate plastic liner with sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents.
- (2) They must be packed in strong outer packagings and the completed package must be capable of withstanding a 1.8 meter (5.9 feet) drop without leakage of gas contents from detectors.
- (3) The total amount of gas from all detectors per outer packaging must not exceed 52 grams (1.83 ounces).

c. Completed neutron radiation detection systems containing detectors meeting the conditions of paragraph a of this special provision must be transported as follows:

- (1) The detectors must be contained in a strong sealed outer casing;
- (2) The casing must contain include sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents;
- (3) The completed system must be packed in strong outer packagings capable of withstanding a 1.8 meter (5.9 feet) drop test without leakage unless a system's outer casing affords equivalent protection.

- d. Except for transportation by aircraft, neutron radiation detectors and radiation detection systems containing such detectors transported in accordance with paragraph a of this special provision are not subject to the labeling and placarding requirements of part 172 of this subchapter.
- e. When transported by highway, rail, vessel, or as cargo on an aircraft, neutron radiation detectors containing not more than 1 gram of boron trifluoride, including those with solder glass joints are not subject to any other requirements of this subchapter provided they meet the requirements in paragraph a of this special provision and are packed in accordance with paragraph b of this special provision. Radiation detection systems containing such detectors are not subject to any other requirements of this subchapter provided they are packed in accordance with paragraph c of this special provision.
- 325 In the case of non-fissile or fissile-accepted uranium hexafluoride, the material must be classified under UN 2978.
- 328 When lithium metal or lithium ion batteries are contained in the fuel cell system, the item must be described under this entry and the appropriate entries for “Lithium metal batteries contained in equipment” or “Lithium ion batteries contained in equipment”.
- 332 Magnesium nitrate hexahydrate is not subject to the requirements of this subchapter.
- 335 Mixtures of solids that are not subject to this subchapter and environmentally hazardous liquids or solids may be classified as “Environmentally hazardous substances, solid, n.o.s.” UN3077 and may be transported under this entry, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport unit is closed. Each transport unit must be leakproof when used as bulk packaging.
- 336 The use of UN1H1 drums, UN3H1 jerricans, and UN6HA1 composite packagings which meet the requirements of part 178 of the HMR at the Packing Group I or II performance level. These packagings are not required to: (1.) meet the venting requirements in §173.24(g) or (2.) be marked with the hydrostatic pressure test marking specified in §173.24a(b)(4). Shipment of packages under this special provision must be made by private or contract motor carrier. Transportation of these packages also requires the door of each van trailer to be marked with “Warning trailer may contain chemical vapor. Do not enter until vapors have dissipated.” The driver of the transport vehicle and the consignee(s) must be trained not to enter the transport vehicle until the ammonia vapors have dissipated, and the emergency response information on the shipping paper must indicate that the vehicle contains ammonia vapors. This training must be documented in training records required by §172.704(d). Transport vehicles must be vented to prevent accumulation of vapors at a poisonous or flammable concentration.
- 337 Authorizes the use of regulated waste containers manufactured prior to October 1, 2006 to be marked with the alternative shipping name of Regulated medical waste, UN3291 and arrows that deviate as prescribed in §172.312(a)(2) in that they may be black or white.
- 338 Life Saving appliances, self-inflating transported by motor vehicle only between an U.S. Coast Guard approved inflatable life raft servicing facility and a vessel are only subject to the following requirements:
- Prior to repacking into the life-saving appliance, an installed inflation cylinder must successfully meet and pass all inspection and test criteria and standards of the raft manufacturer and the vessel Flag State requirements for cylinders installed as part of life-saving appliances, self-inflating (UN2990) used on marine vessels. Additionally, each cylinder must be visually inspected in accordance with CGA pamphlet, CGA C-6 (incorporated by reference, see §171.7). A current copy of CGA pamphlet, CGA C-6 must be available at the facility servicing the life-saving appliance.
  - An installed inflation cylinder that requires recharging must be filled in accordance with §173.301(1).
  - Every installed inflation cylinder, as associated equipment of the life-saving appliance, must be packed within the protective packaging of the life raft and the life raft itself must otherwise be in compliance with §173.219.
  - The serial number for each cylinder must be recorded as part of the life-saving appliance service record by the U.S. Coast Guard-approved servicing facility.
- 340 This entry applies only to the vessel transportation of nickel-metal hydride batteries as cargo. Nickel-metal hydride button cells or nickel-metal hydride cells or batteries packed with or contained in battery-powered devices transported by vessel are not subject to the requirements of this special provision. *See* “Batteries, dry, sealed, n.o.s.” in the §172.101 Hazardous Materials Table (HMT) of this part for transportation requirements for nickel-metal hydride batteries transported by other modes and for nickel-metal hydride button cells or nickel-metal hydride cells or batteries packed with or contained in battery-powered devices transported by vessel. Nickel-metal hydride batteries subject to this special provision are subject only to the following requirements: (1) The

batteries must be prepared and packaged for transport in a manner to prevent a dangerous evolution of heat, short circuits, and damage to terminals; and are subject to the incident reporting in accordance with §171.16 of this subchapter if a fire, violent rupture, explosion or dangerous evolution of heat (*i.e.*, an amount of heat sufficient to be dangerous to packaging or personal safety to include charring of packaging, melting of packaging, scorching of packaging, or other evidence) occurs as a direct result of a nickel metal hydride battery; and (2) when loaded in a cargo transport unit in a total quantity of 100 kg gross mass or more, the shipping paper requirements of Subpart C of this part, the manifest requirements of §176.30 of this subchapter, and the vessel stowage requirements assigned to this entry in Column (10) of the §172.101 Hazardous Materials Table.

342 Glass inner packagings (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 transported in accordance with §173.4a of this subchapter, irrespective of the restriction of §173.4a(b) and the indication of “forbidden” in columns (9A) and (9B) of the §172.101 table provided that:

- a. After filling, each glass inner packaging must be determined to be leak-tight by placing the glass inner packaging in a hot water bath at a temperature and for a period of time sufficient to ensure that an internal pressure equal to the vapor pressure of ethylene oxide at 55 °C is achieved. Any glass inner packaging showing evidence of leakage, distortion or other defect under this test must not be transported under the terms of this special provision;
- b. In addition to the packaging required in §173.4a, each glass inner packaging must be placed in a sealed plastic bag compatible with ethylene oxide and capable of containing the contents in the event of breakage or leakage of the glass inner packaging; and
- c. Each glass inner packaging is protected by a means of preventing puncture of the plastic bag (*e.g.*, sleeves or cushioning) in the event of damage to the packaging (*e.g.*, by crushing).

343 A bulk packaging that emits hydrogen sulfide in sufficient concentration that vapors evolved from the sour crude oil can present an inhalation hazard must be marked as specified in §172.327.

345 “Nitrogen, refrigerated liquid (*cryogenic liquid*), UN1977” transported in open cryogenic receptacles with a maximum capacity of 1 L are not subject to the requirements of this subchapter. The receptacles

must be constructed with glass double walls having the space between the walls vacuum insulated and each receptacle must be transported in an outer packaging with sufficient cushioning and absorbent materials to protect the receptacle from damage.

346 “Nitrogen, refrigerated liquid (*cryogenic liquid*), UN1977” transported in accordance with the requirements for open cryogenic receptacles in §173.320 and this special provision are not subject to any other requirements of this subchapter. The receptacle must contain no hazardous materials other than the liquid nitrogen which must be fully absorbed in a porous material in the receptacle.

347 Effective July 1, 2011, for transportation by aircraft, this entry may only be used if the results of Test series 6(d) of Part I of the UN Manual of Tests and Criteria (IBR, *see* §171.7 of this subchapter) have demonstrated that any hazardous effects from accidental functioning are confined to within the package. Effective January 1, 2012, for transportation by vessel, this entry may only be used if the results of Test Series 6(d) of Part I of the UN Manual of Tests and Criteria (IBR, *see* §171.7 of this subchapter) have demonstrated that any hazardous effects from accidental functioning are confined to within the package. Effective January 1, 2014, for transportation domestically by highway or rail, this entry may only be used if the results of Test Series 6(d) of Part I of the UN Manual of Tests and Criteria (IBR, *see* §171.7 of this subchapter) have demonstrated that any hazardous effects from accidental functioning are confined to within the package. Testing must be performed or witnessed by a person who is approved by the Associate Administrator (*see* §173.56(b) of this subchapter). All successfully conducted tests or reassignment to another compatibility group require the issuance of a new or revised approval by the Associate Administrator prior to transportation on or after the dates specified for each authorized mode of transport in this special provision.

349 Mixtures of hypochlorite with an ammonium salt are forbidden for transport. A hypochlorite solution, UN1791, is a Class 8 corrosive material.

350 Ammonium bromate, ammonium bromate aqueous solutions, and mixtures of a bromate with an ammonium salt are forbidden for transport.

351 Ammonium chlorate, ammonium chlorate aqueous solutions, and mixtures of a chlorate with an ammonium salt are forbidden for transport.

352 Ammonium chlorite, ammonium chlorite aqueous solutions, and mixtures of a chlorite with an ammonium salt are forbidden for transport.

353 Ammonium permanganate, ammonium permanganate aqueous solutions, and mixtures of a permanganate with an ammonium salt are forbidden for transport.

357 A bulk packaging that emits hydrogen sulfide in sufficient concentration that vapors evolved from the crude oil can present an inhalation hazard must be marked as specified in §172.327 of this part.

360 Vehicles powered only by lithium batteries must be described using “UN3171, Battery-powered vehicle.” Lithium batteries installed in a cargo transport unit, designed only to provide power external to the transport unit, must be described using “UN3536, Lithium batteries installed in a cargo transport unit.”

361 Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to the requirements of this subchapter. Energy storage capacity means the energy held by a capacitor, as calculated using the nominal voltage and capacitance. This entry does not apply to capacitors that by design maintain a terminal voltage (e.g., asymmetrical capacitors.)

362 This entry applies to liquids, pastes or powders, pressurized with a propellant that meets the definition of a gas in §173.115. A chemical under pressure packaged in an aerosol dispenser must be transported under UN1950. The chemical under pressure must be classed based on the hazard characteristics of the components in the propellant; the liquid; or the solid. The following provisions also apply:

a. If one of the components, which can be a pure substance or a mixture, is classed as flammable, the chemical under pressure must be classed as flammable in Division 2.1. Flammable components are flammable liquids and liquid mixtures, flammable solids and solid mixtures or flammable gases and gas mixtures meeting the following criteria:

- (1) A flammable liquid is a liquid having a flashpoint of not more than 93 °C (200 °F);
- (2) A flammable solid is a solid that meets the criteria in §173.124 of this subchapter; or
- (3) A flammable gas is a gas that meets the criteria in §173.115 of this subchapter.

b. Gases of Division 2.3 and gases with a subsidiary risk of 5.1 must not be used as a propellant in a chemical under pressure.

c. Where the liquid or solid components are classed as Division 6.1, Packing Group II or III, or Class 8, Packing Group II or III, the chemical under pressure must be assigned a subsidiary risk of Division 6.1 or Class 8 and the appropriate identification number must be assigned. Components classed as Division 6.1, Packing Group I, or Class 8, Packing Group I, must not be offered for transportation and transported under this description.

d. A chemical under pressure with components meeting the properties of: Class 1 (explosives); Class 3 (liquid desensitized explosives); Division 4.1 (self-reactive substances and solid desensitized explosives); Division 4.2 (substances liable to spontaneous combustion); Division 4.3 (substances which, in contact with water, emit flammable gases or toxic gases); Division 5.1 (oxidizing substances); Division 5.2 (organic peroxides); Division 6.2 (Infectious substances); or, Class 7 (Radioactive material), must not be offered for transportation under this description.

e. A description to which special provision 170 or TP7 is assigned in Column 7 of the §172.101 Hazardous Materials Table, and therefore requires air to be eliminated from the package vapor space by nitrogen or other means, must not be offered for transportation under this description.

f. Chemicals under pressure containing components forbidden for transport on both passenger and cargo aircraft in Columns (9A) and (9B) of the §172.101 Hazardous Materials Table must not be transported by air.

365 For manufactured instruments and articles containing mercury, see UN3506.

367 For the purposes of documentation and package marking:

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

b. 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;

c. 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

d. 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 must be classified under UN3507 or UN2978.

369 In the case of non-fissile or fissile-excepted uranium hexafluoride, the material must be classified under UN 2978. Uranium hexafluoride may be classified under this entry only if the conditions of §§173.420(a)(4) and (6) and (d) and 173.421(b) and (d) of this subchapter, and, for fissile-excepted material, the conditions of §173.453 of this subchapter are met. In addition to the provisions applicable to the

transport of Division 6.1 substances, the provisions of §§173.421(c) and 173.443(a) of this subchapter apply. In addition, packages shall be legibly and durably marked with an identification of the consignor, the consignee, or both. No Class 7 label is required to be displayed. The consignor shall be in possession of a copy of each applicable certificate when packages include fissile material excepted by competent authority approval. When a consignment is undeliverable, the consignment shall be placed in a safe location and the appropriate competent authority shall be informed as soon as possible and a request made for instructions on further action. If it is evident that a package of radioactive material, or conveyance carrying unpackaged radioactive material, is leaking, or if it is suspected that the package, or conveyance carrying unpackaged material, may have leaked, the requirements of §173.443(e) of this subchapter apply.

370 This entry also applies to 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 of the UN Manual of Tests and Criteria, Part I (IBR; see §171.7 of this subchapter). *See also* UN1942 in the §172.101 Hazardous Materials Table. This entry may not be used for ammonium nitrate for which a proper shipping name already exists in the §172.101 Hazardous Materials Table, including ammonium nitrate mixed with fuel oil or any other commercial grade of ammonium nitrate (*e.g.*, ammonium nitrate fertilizer).

371 a. This entry also applies to articles not conforming to the requirements of §§173.302, 173.304, or 173.306 of this subchapter, containing a small pressure receptacle with a release device. Such articles must comply with the following requirements:

- (1) The water capacity of the pressure receptacle must not exceed 0.5 L and the working pressure must not exceed 25 bar at 15 °C (59 °F);
- (2) The minimum burst pressure of the pressure receptacle must be at least four times the pressure of the gas at 15 °C (59 °F);
- (3) Each article must be manufactured in such a way that unintentional firing or release is avoided under normal conditions of handling, packing, transport and use. This may be fulfilled by an additional locking device linked to the activator;
- (4) Each article must be manufactured in such a way as to prevent hazardous projections of the pressure receptacle or parts of the pressure receptacle;

(5) Each pressure receptacle must be manufactured from material which will not fragment upon rupture;

(6) The design type of the article must 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 UN Manual of Tests and Criteria must be applied. It must 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 meters; and

(7) The design type of the article must be subjected to the following test. A stimulating mechanism must be used to initiate one article in the middle of the packaging. There must be no hazardous effects outside the package such as disruption of the package, metal fragments or a receptacle which passes through the packaging.

b. The manufacturer must produce technical documentation of the design type, manufacture as well as the tests and their results. The manufacturer must 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 (a). The manufacturer must provide such information to a representative of the Department upon 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 the requirements of this subchapter.

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

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

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

Nickel-carbon asymmetric capacitors containing Class 8 alkaline electrolytes must be transported as UN2795, Batteries, wet, filled with alkali, electric storage.

379 When offered for transport by highway, rail, or cargo vessel, anhydrous ammonia adsorbed or absorbed on a solid contained in ammonia dispensing systems or receptacles intended to form part of such systems is not subject to the requirements of this subchapter if the following conditions in this provision are met. In addition to meeting the conditions in this provision, transport on cargo aircraft only may be authorized with prior approval of the Associate Administrator.

- a. The adsorption or absorption presents the following properties:
    - (1) The pressure at a temperature of 20 °C (68 °F) in the receptacle is less than 0.6 bar (60 kPa);
    - (2) The pressure at a temperature of 35 °C (95 °F) in the receptacle is less than 1 bar (100 kPa);
    - (3) The pressure at a temperature of 85 °C (185 °F) in the receptacle is less than 12 bar (1200 kPa).
  - b. The adsorbent or absorbent material shall not meet the definition or criteria for inclusion in Classes 1 to 8;
  - c. The maximum contents of a receptacle shall be 10 kg of ammonia; and
  - d. Receptacles containing adsorbed or absorbed ammonia shall meet the following conditions:
    - (1) Receptacles shall be made of a material compatible with ammonia as specified in ISO 11114-1:2012(E) and ISO 11114-1:2012/Amd 1:2017(E) (IBR, *see* §171.7 of this subchapter);
    - (2) Receptacles and their means of closure shall be hermetically sealed and able to contain the generated ammonia;
    - (3) Each receptacle shall be able to withstand the pressure generated at 85 °C (185 °F) with a volumetric expansion no greater than 0.1%;
    - (4) Each receptacle shall be fitted with a device that allows for gas evacuation once pressure exceeds 15 bar (1500 kPa) without violent rupture, explosion or projection; and
    - (5) Each receptacle shall be able to withstand a pressure of 20 bar (2000 kPa) without leakage when the pressure relief device is deactivated.
  - e. When offered for transport 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.
  - f. 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.
  - g. The test results shall be documented, shall be traceable, and shall be made available to a representative of the Department upon request.
- 380 For transportation by private carrier in a motor carrier only, this material is not subject to the segregation requirements of §177.848(d) of this subchapter under the following conditions:
- a. The material is packaged in a DOT Specification 4BW240 cylinder, or in a DOT-51 portable tank.
  - b. The material may only be loaded with Class 3, Class 8, and Division 4.1 materials in Packing Group II or III.
  - c. The motor carrier must maintain a satisfactory safety rating as prescribed in 49 CFR part 385.
- 381 For railroad flagging kits, *see* §173.184 (c) of this subchapter.
- 382 Packages containing toy plastic or paper caps for toy pistols described as “UN0349, Articles, explosive, n.o.s. (Toy caps), 1.4S” or “NA0337, Toy caps, 1.4S” are not subject to the subpart E (labeling) requirements of this part when offered for transportation by motor vehicle, rail freight, cargo vessel, and cargo aircraft and, notwithstanding the packing method assigned in §173.62 of this subchapter, in conformance with the following conditions:
- a. The toy plastic or paper caps must be in the form of sheets, strips, rolls, or individual caps;
  - b. The caps must not contain more than an average of twenty-five hundredths of a grain of explosive composition per cap;
  - c. The caps must be packed inside packagings constructed of cardboard not less than 0.013-inch in thickness, metal not less than 0.008-inch in thickness, non-combustible plastic not less than 0.015-inch in thickness, or a composite blister package consisting of cardboard not less than 0.013-inch in thickness and non-combustible plastic not less than 0.005-inch in thickness that completely encloses the caps;
  - d. The minimum dimensions of each side and each end of the cardboard packaging must be 1/8th inch in height or more;
  - e. The number of caps inside each packaging must be limited so that not more than 10 grains of explosives composition may be packed into one cubic inch of space, and not more than 17.5 grains of the explosive composition of toy caps may be packed in any inner packaging;
  - f. Inner packagings must be packed in outer packagings meeting PG II performance criteria;
  - g. Toy caps may be packed with non-explosive or non-flammable articles provided the outer packagings are marked as prescribed in this paragraph;
  - h. Toy paper caps of any kind must not be packed in the same packaging with fireworks;
  - i. The outside of each package must be plainly marked “ARTICLES, EXPLOSIVES, N.O.S. (TOY CAPS)—HANDLE CAREFULLY” OR “TOY CAPS—HANDLE CAREFULLY”; and
  - j. Explosives shipped in conformance with this paragraph must have been examined in accordance with §173.56 of this subchapter and approved by the Associate Administrator.
- 383 For transportation by motor vehicle, substances meeting the conditions for high viscosity flammable liquids as prescribed



in §173.121(b)(1)(i), (b)(1)(ii), and (b)(1)(iv) of this subchapter, may be reassigned to Packing Group III under the following conditions:

- a. Packaging must be UN standard metal drums attached with heavy duty steel strapping to a pallet; and
- b. The capacity of each drum must not exceed 220 L (58 gallons).

384 For green graphite electrodes and shapes that are large single component solid objects not subject to shifting, transport in open rail flat cars, open bed motor vehicles, and intermodal containers is also authorized. The objects must be secured to the flat car, motor vehicle, intermodal container, or unitized by steel banding to wooden runners or pallets and the units secured to the flat car, motor vehicle, or freight container to prevent shifting, including relative motion between the objects, under conditions normally incident to transportation. Stacking is permitted two or more levels high to achieve maximum allowable utilization of the designated vehicle, rail car weight, or intermodal freight container weight or vessel hold volume.

385 Notwithstanding the provisions of §177.834(l) of this subchapter, cargo heaters may be used when weather conditions are such that the freezing of a wetted explosive material is likely. Shipments must be made by private, leased or contract carrier vehicles under exclusive use of the offeror. Cargo heaters must be reverse refrigeration (heat pump) units. Shipments made in accordance with this Special provision are excepted from the requirements of §173.60(b)(4) of this subchapter.

386 When transported by private motor carrier only, the following corrosive liquids may be packaged in polyethylene bottles with a capacity no greater than 3.785 L (one gallon), further packed inside an open-top, heavy wall, high density polyethylene box (*i.e.*, crate) in a manner that the polyethylene bottles are not subjected to any superimposed weight, and the boxes must be reasonably secured against shifting within the transport vehicle and loaded so as to minimize the possibility of coming in contact with other lading:

- Compounds, cleaning liquid, NA1760, PG II or III;
- Corrosive liquid, acidic, inorganic, n.o.s., UN3264, PG II;
- Corrosive liquid, acidic, organic, n.o.s., UN3265, PG III;
- Corrosive liquid, basic, inorganic, n.o.s., UN3266, PG II;
- Hypochlorite solutions, UN1791, PG III;
- Hydrochloric acid solution, UN1789, PG II; and
- Sulfuric acid, UN2796, PG II.

a. No more than four bottles, securely closed with threaded caps, may be packed in each box.

b. Each empty bottle must have a minimum weight of not less than 140 grams and a minimum wall thickness of not less than 0.020 inch (0.508 mm).

c. The completed package must meet the Packing Group II performance level, as applicable for combination packagings with a plastic box outer packaging, in accordance with subpart M of part 178 of this subchapter.

(i) Tests must be performed on each type and size of bottle, for each manufacturing location. Samples taken at random must withstand the prescribed tests without breakage or leakage.

(ii) One bottle for every two hours of production, or for every 2,500 bottles produced, must be tested by dropping a bottle filled to 98 percent capacity with water from a height of 1.2 meters (3.9 feet) onto solid concrete directly on the closure.

(iii) A copy of the test results must be kept on file at each facility where packagings are offered for transportation, and must be made available to a representative of the Department upon request.

(iv) The name or symbol of the bottle producer, and the month and year of manufacture, must be marked by embossing, ink-jet printing of permanent ink, or other permanent means on the face or bottom of each bottle, in letters and numbers at least 6 mm (0.2 inch) high. Symbols, if used, must be registered with the Associate Administrator.

(v) The box must be constructed from high-density polyethylene in the density range 0.950–0.962, and be capable of holding liquid when in the upright position.

387 When materials are stabilized by temperature control, the provisions of §173.21(f) of this subchapter apply. When chemical stabilization is employed, the person offering the material for transport shall ensure that the level of stabilization is sufficient to prevent the material as packaged from dangerous polymerization at 50 °C(122 °F). If chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of transport, temperature control is required and is forbidden by aircraft. In making this determination factors to be taken into consideration include, but are not limited to, the capacity and geometry of the packaging and the effect of any insulation present, the temperature of the material when offered for transport, the duration of the journey, and the ambient temperature conditions typically encountered in the journey (considering also the season of

year), the effectiveness and other properties of the stabilizer employed, applicable operational controls imposed by regulation (*e.g.*, requirements to protect from sources of heat, including other cargo carried at a temperature above ambient) and any other relevant factors. The provisions of this special provision will be effective until January 2, 2023, unless we terminate them earlier or extend them beyond that date by notice of a final rule in the FEDERAL REGISTER.

388 a. Lithium batteries containing both primary lithium metal cells and rechargeable lithium ion cells that are not designed to be externally charged, must meet the following conditions:

- i. The rechargeable lithium ion cells can only be charged from the primary lithium metal cells;
  - ii. Overcharge of the rechargeable lithium ion cells is precluded by design;
  - iii. The battery has been tested as a primary lithium battery; and
  - iv. Component cells of the battery must be of a type proved to meet the respective testing requirements of the Manual of Tests and Criteria, part III, subsection 38.3 (IBR, see §171.7 of this subchapter).
- b. Lithium batteries conforming to paragraph a. of this special provision must be assigned to UN Nos. 3090 or 3091, as appropriate. When such batteries are transported in accordance with §173.185(c), the total lithium content of all lithium metal cells contained in the battery must not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery must not exceed 10 Wh.

389 This entry only applies to lithium ion batteries or lithium metal batteries installed in a cargo transport unit and designed only to provide power external to the cargo transport unit. The lithium batteries must meet the requirements of §173.185(a) and contain the necessary systems to prevent overcharge and over discharge between the batteries. The batteries must 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 transport. Hazardous materials necessary for the safe and proper operation of the cargo transport unit (*e.g.*, fire extinguishing systems and air conditioning systems), must be properly secured to or installed in the cargo transport unit and are not otherwise subject to this subchapter. Hazardous materials not necessary for the safe and proper operation of the cargo transport unit must not be transported within the cargo transport unit. The batteries inside the

cargo transport unit are not subject to marking or labelling requirements of part 172 subparts D and E of this subchapter. The cargo transport unit shall display the UN number in a manner in accordance with §172.332 of this subchapter and be placarded on two opposing sides. For transportation by aircraft, cargo transport units may only be offered for transportation and transported under conditions approved by the Associate Administrator.

391 Except for articles being transported by motor vehicle as a material of trade in accordance with §173.6 of this subchapter, articles containing hazardous materials of Division 2.3, or Division 4.2, or Division 4.3, or Division 5.1, or Division 5.2, or Division 6.1 (substances with an inhalation toxicity of Packing Group I) and articles containing more than one of the following hazards: (1) Gases of Class 2; (2) Liquid desensitized explosives of Class 3; or (3) Self-reactive substances and solid desensitized explosives of Division 4.1, may only be offered for transportation and transported under conditions approved by the Associate Administrator.

420 This entry does not apply to manufactured articles (such as table tennis balls).

421 This entry will no longer be effective on January 2, 2023, unless we terminate it earlier or extend it beyond that date by notice of a final rule in the FEDERAL REGISTER.

422 When labelling is required, the label to be used must be the label shown in §172.447. When a placard is displayed, the placard must be the placard shown in §172.560.

430 This entry shall only be used for solid medical waste of Category A transported for disposal.

440 When this material is transported by tank car, the offeror must ensure each tank car is remotely monitored for pressure and location. Additionally, the offeror must notify the carrier if the tank pressure rise exceeds 3 psig over any 24-hour period.

441 For marine pollutants transported under “UN3077, Environmentally hazardous substance, solid, n.o.s.” or “UN3082, Environmentally hazardous substance, liquid, n.o.s.” and for purposes of shipping paper and package marking requirements, the technical name used in association with the basic description may be a proper shipping name listed in the §172.101 Hazardous Material Table; provided that the name chosen is not also an entry that includes “n.o.s.” as a part of the name or one that has a “G” in column (1) of the table.

(2) “A” codes. These provisions apply only to transportation by aircraft:

*Code/Special Provisions*

A1 Single packagings are not permitted on passenger aircraft.

- A2 Single packagings are not permitted on aircraft.
- A3 For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with absorbent material in tightly closed rigid and leak-proof receptacles before packing in outer packagings.
- A4 Liquids having an inhalation toxicity of Packing Group I are not permitted on aircraft.
- A5 Solids having an inhalation toxicity of Packing Group I are not permitted on passenger aircraft and may not exceed a maximum net quantity per package of 15 kg (33 pounds) on cargo aircraft.
- A6 For combination packagings, if plastic inner packagings are used, they must be packed in tightly closed metal receptacles before packing in outer packagings.
- A7 Steel packagings must be corrosion-resistant or have protection against corrosion.
- A8 For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with cushioning material in tightly closed metal receptacles before packing in outer packagings.
- A9 For combination packagings, if plastic bags are used, they must be packed in tightly closed metal receptacles before packing in outer packagings.
- A10 When aluminum or aluminum alloy construction materials are used, they must be resistant to corrosion.
- A11 For combination packagings, when metal inner packagings are permitted, only specification cylinders constructed of metals which are compatible with the hazardous material may be used.
- A13 Bulk packagings are not authorized for transportation by aircraft.
- A14 This material is not authorized to be transported as a limited quantity or consumer commodity in accordance with §173.306 of this subchapter when transported aboard an aircraft.
- A19 Combination packagings consisting of outer fiber drums or plywood drums, with inner plastic packagings, are not authorized for transportation by aircraft.
- A20 Plastic bags as inner receptacles of combination packagings are not authorized for transportation by aircraft.
- A29 Combination packagings consisting of outer expanded plastic boxes with inner plastic bags are not authorized for transportation by aircraft.
- A30 Ammonium permanganate is not authorized for transportation on aircraft.
- A34 Aerosols containing a corrosive liquid in Packing Group II charged with a gas are not permitted for transportation by aircraft.
- A35 This includes any material which is not covered by any of the other classes but which has an anesthetic, narcotic, noxious or other similar properties such that, in the event of spillage or leakage on an aircraft, extreme annoyance or discomfort could be caused to crew members so as to prevent the correct performance of assigned duties.
- A37 This entry applies only to a material meeting the definition in §171.8 of this subchapter for self-defense spray.
- A51 For aircraft batteries, irrespective of the quantity limitations specified in Column (9A) of the §172.101 Table or §175.75(c), wet cell batteries, UN2794 or UN2795, up to a limit of 100 kg net mass per package may be transported aboard passenger aircraft. Transport in accordance with this special provision must be noted on the shipping paper.
- A53 Refrigerating machines and refrigerating machine components are not subject to the requirements of this subchapter when containing less than 12 kg (26.4 pounds) of a non-flammable gas or when containing 12 L (3 gallons) or less of ammonia solution (UN2672) (see §173.307 of this subchapter).
- A54 Irrespective of the quantity limits in Column 9B of the §172.101 table, a lithium battery, including a lithium battery packed with, or contained in, equipment that otherwise meets the applicable requirements of §173.185, may have a mass exceeding 35 kg if approved by the Associate Administrator prior to shipment.
- A56 Radioactive material with a subsidiary hazard of Division 4.2, Packing Group I, must be transported in Type B packages when offered for transportation by aircraft. Where the subsidiary hazard material is "Forbidden" in column (9A) or (9B) of the §172.101 Table, the radioactive material may only be offered for transportation and transported by aircraft under conditions approved by the Associate Administrator.
- A60 Sterilization devices, when containing less than 30 mL per inner packaging with not more than 150 mL per outer packaging, may be transported in accordance with the provisions in §173.4a, irrespective of §173.4a(b), provided such packagings were first subjected to comparative fire testing. Comparative fire testing between a package as prepared for transport (including the substance to be transported) and an identical package filled with water must show that the maximum temperature measured inside the packages during testing does not differ by more than 200 °C (392 °F). Packagings may include a vent to permit the slow escape of gas (*i.e.* not more than 0.1 mL/hour per 30 mL inner packaging at 20 °C (68 °F) produced from gradual decomposition. The requirements of §§173.24(g)(1) and 173.27(c) do not apply.
- A61 a. When used for purposes such as sterilization, inner packagings of peroxyacetic

acid, stabilized, classified as UN 3107 Organic peroxide type E, liquid or UN 3109 Organic peroxide type F, liquid may be fitted with a vent consisting of hydrophobic membrane, provided:

- (1) Each inner packaging contains not more than 70 mL;
- (2) The inner packaging is designed so that the vent is not immersed in liquid in any orientation;
- (3) Each inner packaging is enclosed in an intermediate rigid plastic packaging with a small opening to permit release of gas and contains a buffer that neutralizes the contents of the inner packaging in the event of leakage;
- (4) Intermediate packagings are packed in a fiberboard box (4G) outer packaging;
- (5) Each outer packaging contains not more than 1.4 L of liquid; and
- (6) The rate of oxygen release from the outer packaging does not exceed 15 mL per hour.

b. Such packages must be transported on cargo aircraft only. The requirements of §§173.24(g)(1) and 173.27(c) do not apply.

A82 The quantity limits in columns (9A) and (9B) do not apply to human or animal body parts, whole organs or whole bodies known to contain or suspected of containing an infectious substance.

A100 Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 percent of their rated capacity. Lithium ion cells and batteries at a state of charge greater than 30 percent of their rated capacity may only be transported under conditions approved by the Associate Administrator in accordance with the requirements in 49 CFR part 107, subpart H. Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria (IBR, see §171.7 of this subchapter).

A101 In addition to the applicable requirements of §173.185, the quantity of lithium metal in the batteries contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

A105 a. This entry applies to machinery or apparatus containing hazardous materials as a residue or as an integral element of the machinery or apparatus. It must not be used for machinery or apparatus for which a proper shipping name already exists in the §172.101 Table.

b. Where the quantity of hazardous materials contained as an integral element in machinery or apparatus exceeds the limits permitted by §173.222(c)(2), and the hazardous materials meet the provisions of §173.222(c), the machinery or apparatus may be transported by aircraft only with the prior approval of the Associate Administrator.

A112 Notwithstanding the quantity limits shown in Column (9A) and (9B) for this entry, the following IBCs are authorized for transportation aboard passenger and cargo-only aircraft. Each IBC may not exceed a maximum net quantity of 1,000 kg:

- a. Metal: 11A, 11B, 11N, 21A, 21B and 21N
- b. Rigid plastics: 11H1, 11H2, 21H1 and 21H2
- c. Composite with plastic inner receptacle: 11HZ1, 11HZ2, 21HZ1 and 21HZ2
- d. Fiberboard: 11G
- e. Wooden: 11C, 11D and 11F (with inner liners)
- f. Flexible: 13H2, 13H3, 13H4, 13H5, 13L2, 13L3, 13L4, 13M1 and 13M2 (flexible IBCs must be sift-proof and water resistant or must be fitted with a sift-proof and water resistant liner).

A189 Except where the defining criteria of another class or division are met, concentrations of formaldehyde solution:

- a. With less than 25 percent but not less than 10 percent formaldehyde, must be described as UN3334, Aviation regulated liquid, n.o.s.; and
- b. With less than 10 percent formaldehyde, are not subject to this subchapter.

A191 Notwithstanding the Division 6.1 subsidiary risk for this description, the toxic subsidiary risk label and the requirement to indicate the subsidiary risk on the shipping paper are not required for manufactured articles containing less than 5 kg (11 pounds) of mercury.

A200 These articles must be transported as cargo and may not be carried aboard an aircraft by passengers or crewmembers in carry-on baggage, checked baggage, or on their person unless specifically authorized in §175.10.

A210 This substance is forbidden for transport by air. It may be transported on cargo aircraft only with the prior approval of the Associate Administrator.

A212 “UN 2031, Nitric acid, *other than red fuming, with more than 20% and less than 65% nitric acid*” intended for use in sterilization devices only, may be transported on passenger aircraft irrespective of the indication of “forbidden” in columns (9A) of the §172.101 table provided that:

- a. Each inner packaging contains not more than 30 mL;
- b. Each inner packaging is contained in a sealed leak-proof intermediate packaging with sufficient absorbent material capable of containing the contents of the inner packaging;
- c. Intermediate packagings are securely packed in an outer packaging of a type permitted by §173.158(g) of this subchapter which meet the requirements of part 178 of this subchapter at the Packing Group I performance level;
- d. The maximum quantity of nitric acid in the package does not exceed 300 mL; and

e. Transport in accordance with this special provision must be noted on the shipping paper.

(3) “B” codes. These provisions apply only to bulk packagings. Except as otherwise provided in this subchapter, these special provisions do not apply to UN portable tanks or IBCs:

*Code/Special Provisions*

- B1 If the material has a flash point at or above 38 °C (100 °F) and below 93 °C (200 °F), then the bulk packaging requirements of §173.241 of this subchapter are applicable. If the material has a flash point of less than 38 °C (100 °F), then the bulk packaging requirements of §173.242 of this subchapter are applicable.
- B2 MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks are not authorized.
- B3 MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks and DOT 57 portable tanks are not authorized.
- B4 MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks are not authorized.
- B5 Only ammonium nitrate solutions with 35 percent or less water that will remain completely in solution under all conditions of transport at a maximum lading temperature of 116 °C (240 °F) are authorized for transport in the following bulk packagings: MC 307, MC 312, DOT 407 and DOT 412 cargo tanks with at least 172 kPa (25 psig) design pressure. The packaging shall be designed for a working temperature of at least 121 °C (250 °F). Only Specifications MC 304, MC 307 or DOT 407 cargo tank motor vehicles are authorized for transportation by vessel.
- B6 Packagings shall be made of steel.
- B7 Safety relief devices are not authorized on multi-unit tank car tanks. Openings for safety relief devices on multi-unit tank car tanks shall be plugged or blank flanged.
- B8 Packagings shall be made of nickel, stainless steel, or steel with nickel, stainless steel, lead or other suitable corrosion resistant metallic lining.
- B9 Bottom outlets are not authorized.
- B10 MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks, and DOT 57 portable tanks are not authorized.
- B11 Tank car tanks must have a test pressure of at least 2,068.5 kPa (300 psig). Cargo and portable tanks must have a design pressure of at least 1,207 kPa (175 psig).
- B13 A nonspecification cargo tank motor vehicle authorized in §173.247 of this subchapter must be at least equivalent in design and in construction to a DOT 406 cargo tank or MC 306 cargo tank (if constructed before August 31, 1995), except as follows:

- a. Packagings equivalent to MC 306 cargo tanks are excepted from the certification, venting, and emergency flow requirements of the MC 306 specification.
- b. Packagings equivalent to DOT 406 cargo tanks are excepted from §§178.345–7(d)(5), circumferential reinforcements; 178.345–10, pressure relief; 178.345–11, outlets; 178.345–14, marking, and 178.345–15, certification.
- c. Packagings are excepted from the design stress limits at elevated temperatures, as described in Section VIII of the ASME Code (IBR, see §171.7 of this subchapter). However, the design stress limits may not exceed 25 percent of the stress for 0 temper at the maximum design temperature of the cargo tank, as specified in the Aluminum Association’s “Aluminum Standards and Data” (IBR, see §171.7 of this subchapter).
- B14 Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 °C (60 °F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet.
- B15 Packagings must be protected with non-metallic linings impervious to the lading or have a suitable corrosion allowance.
- B16 The lading must be completely covered with nitrogen, inert gas or other inert materials.
- B18 Open steel hoppers or bins are authorized.
- B23 Tanks must be made of steel that is rubber lined or unlined. Unlined tanks must be passivated before being placed in service. If unlined tanks are washed out with water, they must be repassivated prior to return to service. Lading in unlined tanks must be inhibited so that the corrosive effect on steel is not greater than that of hydrofluoric acid of 65 percent concentration.
- B25 Packagings must be made from monel or nickel or monel-lined or nickel-lined steel.
- B26 Tanks must be insulated. Insulation must be at least 100 mm (3.9 inches) except that the insulation thickness may be reduced to 51 mm (2 inches) over the exterior heater coils. Interior heating coils are not authorized. The packaging may not be loaded with a material outside of the packaging’s design temperature range. In addition, the material also must be covered with an inert gas or the container must be filled with water to the tank’s capacity. After unloading, the residual material also must be covered with an inert gas or the container must be filled with water to the tank’s capacity.

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B27 Tanks must have a service pressure of 1,034 kPa (150 psig). Tank car tanks must have a test pressure rating of 1,379 kPa (200 psig). Lading must be blanketed at all times with a dry inert gas at a pressure not to exceed 103 kPa (15 psig).

B28 Packagings must be made of stainless steel.

B30 MC 312, MC 330, MC 331 and DOT 412 cargo tanks and DOT 51 portable tanks must be made of stainless steel, except that steel other than stainless steel may be used in accordance with the provisions of §173.24b(b) of this subchapter. Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 7.62 mm (0.300 inch) or the thickness required for a tank with a design pressure at least equal to 1.5 times the vapor pressure of the lading at 46 °C (115 °F). In addition, MC 312 and DOT 412 cargo tank motor vehicles must:

- Be ASME Code (U) stamped for 100% radiography of all pressure-retaining welds;
- Have accident damage protection which conforms with §178.345-8 of this subchapter;
- Have a MAWP or design pressure of at least 87 psig; and
- Have a bolted manway cover.

B32 MC 312, MC 330, MC 331, DOT 412 cargo tanks and DOT 51 portable tanks must be made of stainless steel, except that steel other than stainless steel may be used in accordance with the provisions of §173.24b(b) of this subchapter. Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 6.35 mm (0.250 inch) or the thickness required for a tank with a design pressure at least equal to 1.3 times the vapor pressure of the lading at 46 °C (115 °F). In addition, MC 312 and DOT 412 cargo tank motor vehicles must:

- Be ASME Code (U) stamped for 100% radiography of all pressure-retaining welds;
- Have accident damage protection which conforms with §178.345-8 of this subchapter;
- Have a MAWP or design pressure of at least 87 psig; and
- Have a bolted manway cover.

B33 MC 300, MC 301, MC 302, MC 303, MC 305, MC 306, and DOT 406 cargo tanks equipped with a 1 psig normal vent used to transport gasoline must conform to Table I of this Special Provision. Based on the volatility class determined by using ASTM D 439 and the Reid vapor pressure (RVP) of the particular gasoline, the maximum lading pressure and maximum ambient temperature permitted during the loading of gasoline may not exceed that listed in Table I.

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TABLE I—MAXIMUM AMBIENT TEMPERATURE—  
GASOLINE

ASTM D439 volatility class	Maximum lading and ambient temperature (see note 1)
A ..... (RVP ≤ 9.0 psia)	131 °F
B ..... (RVP ≤ 10.0 psia)	124 °F
C ..... (RVP ≤ 11.5 psia)	116 °F
D ..... (RVP ≤ 13.5 psia)	107 °F
E ..... (RVP ≤ 15.0 psia)	100 °F

NOTE 1: Based on maximum lading pressure of 1 psig at top of cargo tank.

B35 Tank cars containing hydrogen cyanide may be alternatively marked “Hydrocyanic acid, liquefied” if otherwise conforming to marking requirements in subpart D of this part. Tank cars marked “HYDROCYANIC ACID” prior to October 1, 1991 do not need to be remarked.

B42 Tank cars constructed before March 16, 2009, must have a test pressure of 34.47 Bar (500 psig) or greater and conform to Class 105J. Each tank car must have a reclosing pressure relief device having a start-to-discharge pressure of 10.34 Bar (150 psig). The tank car specification may be marked to indicate a test pressure of 13.79 Bar (200 psig).

B44 All parts of valves and safety relief devices in contact with lading must be of a material which will not cause formation of acetylides.

B45 Each tank must have a reclosing combination pressure relief device equipped with stainless steel or platinum rupture discs approved by the AAR Tank Car Committee.

B46 The detachable protective housing for the loading and unloading valves of multi-unit tank car tanks must withstand tank test pressure and must be approved by the Associate Administrator.

B47 Each tank may have a reclosing pressure relief device having a start-to-discharge pressure setting of 310 kPa (45 psig).

B48 Portable tanks in sodium metal service may be visually inspected at least once every 5 years instead of being retested hydrostatically. Date of the visual inspection must be stenciled on the tank near the other required markings.

B49 Tanks equipped with interior heater coils are not authorized. Single unit tank car tanks must have a reclosing pressure relief device having a start-to-discharge pressure set at no more than 1551 kPa (225 psig).

B52 Notwithstanding the provisions of §173.24b of this subchapter, non-reclosing pressure relief devices are authorized on DOT 57 portable tanks.

- B53 Packagings must be made of either aluminum or steel.
- B54 Open-top, sift-proof rail cars are also authorized.
- B55 Water-tight, sift-proof, closed-top, metal-covered hopper cars, equipped with a venting arrangement (including flame arrestors) approved by the Associate Administrator are also authorized.
- B56 Water-tight, sift-proof, closed-top, metal-covered hopper cars are also authorized if the particle size of the hazardous material is not less than 149 microns.
- B57 Class 115A tank car tanks used to transport chloroprene must be equipped with a non-reclosing pressure relief device of a diameter not less than 305 mm (12 inches) with a maximum rupture disc pressure of 310 kPa (45 psig).
- B59 Water-tight, sift-proof, closed-top, metal-covered hopper cars are also authorized provided that the lading is covered with a nitrogen blanket.
- B61 Written procedures covering details of tank car appurtenances, dome fittings, safety devices, and marking, loading, handling, inspection, and testing practices must be approved by the Associate Administrator before any single unit tank car tank is offered for transportation.
- B65 Tank cars constructed before March 16, 2009, must have a test pressure of 34.47 Bar (500 psig) or greater and conform to Class 105A. Each tank car must have a reclosing pressure relief device having a start-to-discharge pressure of 15.51 Bar (225 psig). The tank car specification may be marked to indicate a test pressure of 20.68 Bar (300 psig).
- B66 Each tank must be equipped with gas tight valve protection caps. Outage must be sufficient to prevent tanks from becoming liquid full at 55 °C (130 °F). Specification 110A500W tanks must be stainless steel.
- B67 All valves and fittings must be protected by a securely attached cover made of metal not subject to deterioration by the lading, and all valve openings, except safety valve, must be fitted with screw plugs or caps to prevent leakage in the event of valve failure.
- B68 Sodium must be in a molten condition when loaded and allowed to solidify before shipment. Outage must be at least 5 percent at 98 °C (208 °F). Bulk packagings must have exterior heating coils fusion welded to the tank shell which have been properly stress relieved. The only tank car tanks authorized are Class DOT 105 tank cars having a test pressure of 2,069 kPa (300 psig) or greater.
- B69 Dry sodium cyanide or potassium cyanide may be shipped in the following sift-proof and weather-resistant packagings: metal covered hopper cars, covered motor vehicles, portable tanks, or non-specification bins.
- B70 If DOT 103ANW tank car tank is used: All cast metal in contact with the lading must have 96.7 percent nickel content; and the lading must be anhydrous and free from any impurities.
- B76 Tank cars constructed before March 16, 2009, must have a test pressure of 20.68 Bar (300 psig) or greater and conform to Class 105S, 112J, 114J or 120S. Each tank car must have a reclosing pressure relief device having a start-to-discharge pressure of 10.34 Bar (150 psig). The tank car specification may be marked to indicate a test pressure of 13.79 Bar (200 psig).
- B77 Other packaging are authorized when approved by the Associate Administrator.
- B78 Tank cars must have a test pressure of 4.14 Bar (60 psig) or greater and conform to Class 103, 104, 105, 109, 111, 112, 114 or 120. Heater pipes must be of welded construction designed for a test pressure of 500 psig. A 25 mm (1 inch) woven lining of asbestos or other approved material must be placed between the bolster slabbing and the bottom of the tank. If a tank car tank is equipped with a non-reclosing pressure relief device, the rupture disc must be perforated with a 3.2 mm (0.13 inch) diameter hole. If a tank car tank is equipped with a reclosing pressure relief valve, the tank must also be equipped with a vacuum relief valve.
- B80 Each cargo tank must have a minimum design pressure of 276 kPa (40 psig).
- B81 Venting and pressure relief devices for tank car tanks and cargo tanks must be approved by the Associate Administrator.
- B82 Cargo tanks and portable tanks are not authorized.
- B83 Bottom outlets are prohibited on tank car tanks transporting sulfuric acid in concentrations over 65.25 percent.
- B84 Packagings must be protected with non-metallic linings impervious to the lading or have a suitable corrosion allowance for sulfuric acid or spent sulfuric acid in concentration up to 65.25 percent.
- B85 Cargo tanks must be marked with the name of the lading in accordance with the requirements of §172.302(b).
- B90 Steel tanks conforming or equivalent to ASME specifications which contain solid or semisolid residual motor fuel anti-knock mixture (including rust, scale, or other contaminants) may be shipped by rail freight or highway. The tank must have been designed and constructed to be capable of withstanding full vacuum. All openings must be closed with gasketed blank flanges or vapor tight threaded closures.
- B115 Rail cars, highway trailers, roll-on/roll-off bins, or other non-specification bulk packagings are authorized. Packagings must be sift-proof, prevent liquid

water from reaching the hazardous material, and be provided with sufficient venting to preclude dangerous accumulation of flammable, corrosive, or toxic gaseous emissions such as methane, hydrogen, and ammonia. The material must be loaded dry.

B116 The use of non specification, sift-proof dump or hopper type vehicles, and sift-proof roll-on/roll-off bulk bins, which must be covered by a tarpaulin, metal cover, or equivalent means is authorized for the transportation of spent bleaching earth by motor vehicle. The material is also be subject to operational controls which include not exceeding a temperature of 55°C (130°F) at the time it is offered or during transportation, not exceeding a transportation time of 24 hours, and drivers transporting spent bleaching earth must be trained in the properties and hazards of the spent bleaching earth. This training must be documented in training records required by § 172.704(d).

B120 The use of flexible bulk containers conforming to the requirements in subpart R and subpart S of part 178 of this subchapter is permitted.

B130 When transported by motor vehicle, used diatomaceous earth filter material is not subject to any other requirements of this subchapter except for the shipping paper requirements of subpart C of part 172 of this subchapter; emergency response information as required by § 172.602(a)(2) through (a)(7) of this subchapter; and the marking requirements of § 172.302 of this subchapter, if the following requirements are met:

- a. Packagings are non-DOT specification sift-proof motor vehicles or sift-proof roll-on/roll-off bulk bins, which are covered by a tarpaulin or other equivalent means.
- b. The temperature of the material at the time it is offered for transport and during transportation may not exceed 55 °C (130 °F).
- c. The time between offering the material for transportation at the point of origin, and unloading the material at the destination does not exceed 48 hours.
- d. In addition to the training requirements prescribed in §§ 172.700 through 172.704, each driver must be trained regarding the properties and hazards of diatomaceous earth filter material, precautions to ensure safe transport of the material, and actions to be taken in the event of an emergency during transportation, or a substantial delay in transit.

B131 When transported by highway, rail, or cargo vessel, waste Paint and Paint related material (UN1263; PG II and PG III), when in plastic or metal inner packagings of not more than 26.5 L (7 gallons), are excepted from the marking requirements in

§ 172.301(a) and (c) and the labeling requirements in § 172.400(a), when further packed in the following specification and non-specification bulk outer packagings and under the following conditions:

- a. Primary receptacles must conform to the general packaging requirements of subpart B of part 173 of this subchapter and may not leak. If they do leak, they must be overpacked in packagings conforming to the specification requirements of part 178 of this subchapter or in salvage packagings conforming to the requirements in § 173.12 of this subchapter.
- b. Primary receptacles must be further packed in non-specification bulk outer packagings such as cubic yard boxes, plastic rigid-wall bulk containers, dump trailers, and roll-off containers. Bulk outer packagings must be liquid tight through design or by the use of lining materials.
- c. Primary receptacles may also be further packed in specification bulk outer packagings. Authorized specification bulk outer packagings are UN11G fiberboard intermediate bulk containers (IBC) and UN13H4 woven plastic, coated and with liner flexible intermediate bulk containers (FIBCs) meeting the Packing Group II performance level and lined with a plastic liner of at least 6 mil thickness.
- d. All inner packagings placed inside bulk outer packagings must be blocked and braced to prevent shifting during transportation that could cause the container to open or fall over. Specification IBCs and FIBCs are to be secured to a pallet.

B132 Except for transportation by aircraft, UN2813, Water reactive solid, n.o.s. (contains magnesium, magnesium nitrides) in PG II or III may be packaged in sift-proof bulk packagings that prevent liquid from reaching the hazardous material with sufficient venting to preclude dangerous accumulation of flammable, corrosive or toxic gaseous emissions such as methane, hydrogen and ammonia.

B133 Hydrochloric acid concentration not exceeding 38%, in Packing Group II, is authorized to be packaged in UN31H1 or UN31HH1 intermediate bulk containers when loaded in accordance with the requirements of § 173.35(h) of this subchapter.

B134 For Large Packagings offered for transport by vessel, flexible or fibre inner packagings shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner.

B135 For Large Packagings offered for transport by vessel, flexible or fibre inner packagings shall be hermetically sealed.

B136 Non-specification closed bulk bins are authorized.



(4) *IB Codes and IP Codes.* These provisions apply only to transportation in IBCs and Large Packagings. Table 1 authorizes IBCs for specific proper shipping names through the use of IB Codes assigned in the §172.101 table of this subchapter. Table 2 defines IP Codes on the use of IBCs that are assigned to specific commodities in the §172.101 Table of this subchapter. Table 3 authorizes Large Packagings for specific proper shipping names through the use of IB Codes assigned in the §172.101 table of this subchapter. Large Packagings are authorized for the Packing Group III entries of specific proper shipping names when either special

provision IB3 or IB8 is assigned to that entry in the §172.101 Table. When no IB code is assigned in the §172.101 Table for a specific proper shipping name, or in §173.185 or §173.225(e) Organic Peroxide Table for Type F organic peroxides, use of an IBC or Large Packaging for the material may be authorized when approved by the Associate Administrator. The letter “Z” shown in the marking code for composite IBCs must be replaced with a capital code letter designation found in §178.702(a)(2) of this subchapter to specify the material used for the other packaging. Tables 1, 2, and 3 follow:

TABLE 1—IB CODES (IBC CODES)

IBC code	Authorized IBCs
IB1 .....	<i>Authorized IBCs:</i> Metal (31A, 31B and 31N). <i>Additional Requirement:</i> Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized.
IB2 .....	<i>Authorized IBCs:</i> Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). <i>Additional Requirement:</i> Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized.
IB3 .....	<i>Authorized IBCs:</i> Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1 and 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2). <i>Additional Requirement:</i> Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized, except for UN2672 (also see special provision IP8 in Table 2 for UN2672).
IB4 .....	<i>Authorized IBCs:</i> Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N).
IB5 .....	<i>Authorized IBCs:</i> Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 21HZ1 and 31HZ1).
IB6 .....	<i>Authorized IBCs:</i> Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2 and 31HZ1). <i>Additional Requirement:</i> Composite IBCs 11HZ2 and 21HZ2 may not be used when the hazardous materials being transported may become liquid during transport.
IB7 .....	<i>Authorized IBCs:</i> Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2 and 31HZ1); Wooden (11C, 11D and 11F). <i>Additional Requirement:</i> Liners of wooden IBCs must be sift-proof.
IB8 .....	<i>Authorized IBCs:</i> Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2 and 31HZ1); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).
IB9 .....	IBCs are only authorized if approved by the Associate Administrator.

TABLE 2—IP CODES

IP code	
IP1 .....	IBCs must be packed in closed freight containers or a closed transport vehicle.
IP2 .....	When IBCs other than metal or rigid plastics IBCs are used, they must be offered for transportation in a closed freight container or a closed transport vehicle.
IP3 .....	Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.
IP4 .....	Flexible, fiberboard or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.
IP5 .....	IBCs must have a device to allow venting. The inlet to the venting device must be located in the vapor space of the IBC under maximum filling conditions.
IP6 .....	Non-specification bulk bins are authorized.
IP7 .....	For UN identification numbers 1327, 1363, 1364, 1365, 1386, 1408, 1841, 2211, 2217, 2793 and 3314, IBCs are not required to meet the IBC performance tests specified in part 178, subpart N, of this subchapter.
IP8 .....	Ammonia solutions may be transported in rigid or composite plastic IBCs (31H1, 31H2 and 31HZ1) that have successfully passed, without leakage or permanent deformation, the hydrostatic test specified in § 178.814 of this subchapter at a test pressure that is not less than 1.5 times the vapor pressure of the contents at 55 °C (131 °F).

TABLE 2—IP CODES—Continued

IP code	
IP13 .....	Transportation by vessel in IBCs is prohibited.
IP14 .....	Air must be eliminated from the vapor space by nitrogen or other means.
IP15 .....	For UN2031 with more than 55% nitric acid, rigid plastic IBCs and composite IBCs with a rigid plastic inner receptacle are authorized for two years from the date of IBC manufacture.
IP16 .....	IBCs of type 31A and 31N are only authorized if approved by the Associate Administrator.
IP19 .....	For UN identification numbers 3531, 3532, 3533, and 3534, IBCs must be designed and constructed to permit the release of gas or vapor to prevent a build-up of pressure that could rupture the IBCs in the event of loss of stabilization.
IP20 .....	Dry sodium cyanide or potassium cyanide is also permitted in siftproof, water-resistant, fiberboard IBCs when transported in closed freight containers or transport vehicles.
IP21 .....	When transported by vessel, flexible, fiberboard or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.

TABLE 3—IB CODES  
[Large packaging authorizations]

IB3	Authorized Large Packagings (LIQUIDS) (PG III materials only) <sup>2</sup>	
Inner packagings: Glass 10 liter .... Plastics 30 liter .... Metal 40 liter ....	Large outer packagings: steel (50A). aluminum (50B). metal other than steel or aluminum (50N). rigid plastics (50H). natural wood (50C). plywood (50D). reconstituted wood (50F). rigid fiberboard (50G).	
IB8	Authorized Large Packagings (SOLIDS) (PG III materials only) <sup>2</sup>	
Inner packagings: Glass 10 kg ..... Plastics 50 kg ..... Metal 50 kg ..... Paper 50 kg ..... Fiber 50 kg .....	Large outer packagings: steel (50A). aluminum (50B). metal other than steel or aluminum (50N). flexible plastics (51H). <sup>1</sup> rigid plastics (50H). natural wood (50C). plywood (50D). reconstituted wood (50F). rigid fiberboard (50G).	

<sup>1</sup> Flexible plastic (51H) Large Packagings are only authorized for use with flexible inner packagings.<sup>2</sup> Except when authorized under Special Provision 41.

(5) “N” codes. These provisions apply only to non-bulk packagings:

*Code/Special Provisions*

N3 Glass inner packagings are permitted in combination or composite packagings only if the hazardous material is free from hydrofluoric acid.

N4 For combination or composite packagings, glass inner packagings, other than ampoules, are not permitted.

N5 Glass materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material.

N6 Battery fluid packaged with electric storage batteries, wet or dry, must conform to the packaging provisions of §173.159 (g) or (h) of this subchapter.

N7 The hazard class or division number of the material must be marked on the pack-

age in accordance with §172.302 of this subchapter. However, the hazard label corresponding to the hazard class or division may be substituted for the marking.

N8 Nitroglycerin solution in alcohol may be transported under this entry only when the solution is packed in metal cans of not more than 1 L capacity each, overpacked in a wooden box containing not more than 5 L. Metal cans must be completely surrounded with absorbent cushioning material. Wooden boxes must be completely lined with a suitable material impervious to water and nitroglycerin.

N11 This material is excepted for the specification packaging requirements of this subchapter if the material is packaged in strong, tight non-bulk packaging meeting the requirements of subparts A and B of part 173 of this subchapter.

N12 Plastic packagings are not authorized.

- N20 A 5M1 multi-wall paper bag is authorized if transported in a closed transport vehicle.
- N25 Steel single packagings are not authorized.
- N32 Aluminum materials of construction are not authorized for single packagings.
- N33 Aluminum drums are not authorized.
- N34 Aluminum construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material.
- N36 Aluminum or aluminum alloy construction materials are permitted only for halogenated hydrocarbons that will not react with aluminum.
- N37 This material may be shipped in an integrally-lined fiber drum (1G) which meets the general packaging requirements of subpart B of part 173 of this subchapter, the requirements of part 178 of this subchapter at the packing group assigned for the material and to any other special provisions of column 7 of the §172.101 table.
- N40 This material is not authorized in the following packagings:
- a. A combination packaging consisting of a 4G fiberboard box with inner receptacles of glass or earthenware;
  - b. A single packaging of a 4C2 sift-proof, natural wood box; or
  - c. A composite packaging 6PG2 (glass, porcelain or stoneware receptacles within a fiberboard box).
- N41 Metal construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material.
- N42 1A1 drums made of carbon steel with thickness of body and heads of not less than 1.3 mm (0.050 inch) and with a corrosion-resistant phenolic lining are authorized for stabilized benzyl chloride if tested and certified to the Packing Group I performance level at a specific gravity of not less than 1.8.
- N43 Metal drums are permitted as single packagings only if constructed of nickel or monel.
- N45 Copper cartridges are authorized as inner packagings if the hazardous material is not in dispersion.
- N65 Outage must be sufficient to prevent cylinders or spheres from becoming liquid full at 55 °C (130 °F). The vacant space (outage) may be charged with a nonflammable nonliquefied compressed gas if the pressure in the cylinder or sphere at 55 °C (130 °F) does not exceed 125 percent of the marked service pressure.
- N73 Packagings consisting of outer wooden or fiberboard boxes with inner glass, metal or other strong containers; metal or fiber drums; kegs or barrels; or strong metal cans are authorized and need not conform to the requirements of part 178 of this subchapter.
- N74 Packages consisting of tightly closed inner containers of glass, earthenware, metal or polyethylene, capacity not over 0.5 kg (1.1 pounds) securely cushioned and packed in outer wooden barrels or wooden or fiberboard boxes, not over 15 kg (33 pounds) net weight, are authorized and need not conform to the requirements of part 178 of this subchapter.
- N75 Packages consisting of tightly closed inner packagings of glass, earthenware or metal, securely cushioned and packed in outer wooden barrels or wooden or fiberboard boxes, capacity not over 2.5 kg (5.5 pounds) net weight, are authorized and need not conform to the requirements of part 178 of this subchapter.
- N76 For materials of not more than 25 percent active ingredient by weight, packages consisting of inner metal packagings not greater than 250 mL (8 ounces) capacity each, packed in strong outer packagings together with sufficient absorbent material to completely absorb the liquid contents are authorized and need not conform to the requirements of part 178 of this subchapter.
- N77 For materials of not more than two percent active ingredients by weight, packagings need not conform to the requirements of part 178 of this subchapter, if liquid contents are absorbed in an inert material.
- N78 Packages consisting of inner glass, earthenware, or polyethylene or other non-fragile plastic bottles or jars not over 0.5 kg (1.1 pounds) capacity each, or metal cans not over five pounds capacity each, packed in outer wooden boxes, barrels or kegs, or fiberboard boxes are authorized and need not conform to the requirements of part 178 of this subchapter. Net weight of contents in fiberboard boxes may not exceed 29 kg (64 pounds). Net weight of contents in wooden boxes, barrels or kegs may not exceed 45 kg (99 pounds).
- N79 Packages consisting of tightly closed metal inner packagings not over 0.5 kg (1.1 pounds) capacity each, packed in outer wooden or fiberboard boxes, or wooden barrels, are authorized and need not conform to the requirements of part 178 of this subchapter. Net weight of contents may not exceed 15 kg (33 pounds).
- N80 Packages consisting of one inner metal can, not over 2.5 kg (5.5 pounds) capacity, packed in an outer wooden or fiberboard box, or a wooden barrel, are authorized and need not conform to the requirements of part 178 of this subchapter.
- N82 See §173.115 of this subchapter for classification criteria for flammable aerosols.
- N83 This material may not be transported in quantities of more than 11.5 kg (25.4 lbs) per package.
- N84 The maximum quantity per package is 500 g (1.1 lbs.).

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N85 Packagings certified at the Packing Group I performance level may not be used.

N86 UN pressure receptacles made of aluminum alloy are not authorized.

N87 The use of copper valves on UN pressure receptacles is prohibited.

N88 Any metal part of a UN pressure receptacle in contact with the contents may not contain more than 65% copper, with a tolerance of 1%.

N89 When steel UN pressure receptacles are used, only those bearing the “H” mark are authorized.

N90 Metal packagings are not authorized. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in part 178 of this subchapter, are not considered metal packagings. Packagings of other material constructed with a small amount of metal must be designed such that the hazardous material does not contact the metal.

N91 The use of a non specification sift-proof, non-bulk, metal can with or without lid, or a non specification sift-proof, non-bulk fiber drum, with or without lid is authorized when transporting coal tar pitch compounds by motor vehicle or rail freight. The fiber drum must be fabricated with a three ply wall, as a minimum. The coal tar pitch compound must be in a solid mass during transportation.

N92 Notwithstanding the provisions of §173.24(g) of this subchapter, packagings shall be designed and constructed to permit the release of gas or vapor to prevent a build-up of pressure that could rupture the packagings in the event of loss of stabilization.

N95 UN1075, Liquefied petroleum gas and UN1978, Propane authorized for transport in DOT 4BA240 cylinders is not subject to the UN identification number and proper shipping name marking or the label requirements of this part subject to the following conditions:

- a. The cylinder must be transported in a closed motor vehicle displaying FLAMMABLE GAS placards in accordance with subpart F of part 172 of this subchapter.
- b. Shipping papers at all times must reflect a correct current accounting of all cylinders both full and expended.
- c. The cylinders are collected and transported by a private or a contract carrier for reconditioning, reuse or disposal.

(6) “R” codes. These provisions apply only to transportation by rail.

R1 A person who offers for transportation tank cars containing sulfur, molten or residue of sulfur, molten may reference the Sulfur Institute’s, “Molten Sulphur Rail Tank Car Guidance document” (see §171.7 of this subchapter) to identify tank cars that may pose a risk in transportation due to the accumulation of formed, solid sulfur on the outside of the tank.

(7) “T” codes. (i) These provisions apply to the transportation of hazardous materials in UN portable tanks. Portable tank instructions specify the requirements applicable to a portable tank when used for the transportation of a specific hazardous material. These requirements must be met in addition to the design and construction specifications in part 178 of this subchapter. Portable tank instructions T1 through T22 specify the applicable minimum test pressure, the minimum shell thickness (in reference steel), bottom opening requirements and pressure relief requirements. Liquefied compressed gases are assigned to portable tank instruction T50. Refrigerated liquefied gases that are authorized to be transported in portable tanks are specified in tank instruction T75.

(ii) The following table specifies the portable tank requirements applicable to “T” Codes T1 through T22. Column 1 specifies the “T” Code. Column 2 specifies the minimum test pressure, in bar (1 bar = 14.5 psig), at which the periodic hydrostatic testing required by §180.605 of this subchapter must be conducted. Column 3 specifies the section reference for minimum shell thickness or, alternatively, the minimum shell thickness value. Column 4 specifies the applicability of §178.275(g)(3) of this subchapter for the pressure relief devices. When the word “Normal” is indicated, §178.275(g)(3) of this subchapter does not apply. Column 5 references applicable requirements for bottom openings in part 178 of this subchapter. “Prohibited” means bottom openings are prohibited, and “Prohibited for liquids” means bottom openings are authorized for solid material only. The table follows:

TABLE OF PORTABLE TANK T CODES T1–T22

[Portable tank codes T1–T22 apply to liquid and solid hazardous materials of Classes 3 through 9 which are transported in portable tanks.]

Portable tank instruction (1)	Minimum test pressure (bar) (2)	Minimum shell thickness (in mm-reference steel) (See § 178.274(d)) (3)	Pressure-relief requirements (See § 178.275(g)) (4)	Bottom opening requirements (See § 178.275(d)) (5)
T1 .....	1.5	§ 178.274(d)(2)	Normal .....	§ 178.275(d)(2)
T2 .....	1.5	§ 178.274(d)(2)	Normal .....	§ 178.275(d)(3)
T3 .....	2.65	§ 178.274(d)(2)	Normal .....	§ 178.275(d)(2)
T4 .....	2.65	§ 178.274(d)(2)	Normal .....	§ 178.275(d)(3)
T5 .....	2.65	§ 178.274(d)(2)	§ 178.275(g)(3) .....	Prohibited
T6 .....	4	§ 178.274(d)(2)	Normal .....	§ 178.275(d)(2)
T7 .....	4	§ 178.274(d)(2)	Normal .....	§ 178.275(d)(3)
T8 .....	4	§ 178.274(d)(2)	Normal .....	Prohibited
T9 .....	4	6 mm	Normal .....	Prohibited for liquids.
T10 .....	4	6 mm	§ 178.275(g)(3) .....	Prohibited
T11 .....	6	§ 178.274(d)(2)	Normal .....	§ 178.275(d)(3)
T12 .....	6	§ 178.274(d)(2)	§ 178.275(g)(3) .....	§ 178.275(d)(3)
T13 .....	6	6 mm	Normal .....	Prohibited
T14 .....	6	6 mm	§ 178.275(g)(3) .....	Prohibited
T15 .....	10	§ 178.274(d)(2)	Normal .....	§ 178.275(d)(3)
T16 .....	10	§ 178.274(d)(2)	§ 178.275(g)(3) .....	§ 178.275(d)(3)
T17 .....	10	6 mm	Normal .....	§ 178.275(d)(3)
T18 .....	10	6 mm	§ 178.275(g)(3) .....	§ 178.275(d)(3)
T19 .....	10	6 mm	§ 178.275(g)(3) .....	Prohibited
T20 .....	10	8 mm	§ 178.275(g)(3) .....	Prohibited
T21 .....	10	10 mm	Normal .....	Prohibited for liquids.
T22 .....	10	10 mm	§ 178.275(g)(3) .....	§ 178.275(d)(2). Prohibited

(iii) T50 When portable tank instruction T50 is indicated in Column (7) of the § 172.101 Hazardous Materials Table, the applicable liquefied compressed gas and chemical under pressure descriptions are authorized to be transported in portable tanks in accordance with the requirements of § 173.313 of this subchapter.

(iv) T75. When portable tank instruction T75 is referenced in Column (7) of the § 172.101 Table, the applicable refrigerated liquefied gases are authorized to be transported in portable tanks in accordance with the requirements of § 178.277 of this subchapter.

(v) *UN and IM portable tank codes/special provisions.* When a specific portable tank instruction is specified by a “T” Code in Column (7) of the § 172.101 Table for a specific hazardous material, a specification portable tank conforming to an alternative tank instruction may be used if:

(A) The alternative portable tank has a higher or equivalent test pressure (for example, 4 bar when 2.65 bar is specified);

(B) The alternative portable tank has greater or equivalent wall thickness (for example, 10 mm when 6 mm is specified);

(C) The alternative portable tank has a pressure relief device as specified in the “T” Code. If a frangible disc is required in series with the reclosing pressure relief device for the specified portable tank, the alternative portable tank must be fitted with a frangible disc in series with the reclosing pressure relief device; and

(D) With regard to bottom openings—

(1) When two effective means are specified, the alternative portable tank is fitted with bottom openings having two or three effective means of closure or no bottom openings; or

(2) When three effective means are specified, the portable tank has no bottom openings or three effective means of closure; or

(3) When no bottom openings are authorized, the alternative portable tank must not have bottom openings.

(vi) Except when an organic peroxide is authorized under § 173.225(g), if a hazardous material is not assigned a portable tank “T” Code, the hazardous material may not be transported in a portable tank unless approved by the Associate Administrator.

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(8) “TP” codes. (i) These provisions apply to the transportation of hazardous materials in IM and UN Specification portable tanks. Portable tank special provisions are assigned to certain hazardous materials to specify requirements that are in addition to those provided by the portable tank instructions or the requirements in part 178 of this subchapter. Portable tank special provisions are designated with the abbreviation TP (tank provision) and are assigned to specific hazardous materials in Column (7) of the §172.101 Table.

(ii) The following is a list of the portable tank special provisions:

*Code/Special Provisions*

TP1 The maximum degree of filling must not exceed the degree of filling determined by the following:

$$\left( \text{Degree of filling} = \frac{97}{1 + \alpha(t_r - t_f)} \right).$$

Where:

$t_r$  is the maximum mean bulk temperature during transport, and  $t_f$  is the temperature in degrees celsius of the liquid during filling.

TP2 a. The maximum degree of filling must not exceed the degree of filling determined by the following:

$$\left( \text{Degree of filling} = \frac{95}{1 + \alpha(t_r - t_f)} \right).$$

Where:

$t_r$  is the maximum mean bulk temperature during transport,

$t_f$  is the temperature in degrees celsius of the liquid during filling, and

$\alpha$  is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling ( $t_f$ ) and the maximum mean bulk temperature during transportation ( $t_r$ ) both in degrees celsius.

b. For liquids transported under ambient conditions  $\alpha$  may be calculated using the formula:

$$\alpha = \frac{d_{15} - d_{50}}{35 d_{50}}$$

Where:

$d_{15}$  and  $d_{50}$  are the densities (in units of mass per unit volume) of the liquid at 15 °C (59 °F) and 50 °C (122 °F), respectively.

TP3 The maximum degree of filling (in %) for solids transported above their melting points and for elevated temperature liquids shall be determined by the following:

$$\left( \text{Degree of filling} = 95 \frac{d_r}{d_f} \right).$$

Where:  $d_r$  and  $d_f$  are the mean densities of the liquid at the mean temperature of the liquid during filling and the maximum mean bulk temperature during transport respectively.

TP4 The maximum degree of filling for portable tanks must not exceed 90%.

TP5 For a portable tank used for the transport of flammable refrigerated liquefied gases or refrigerated liquefied oxygen, the maximum rate at which the portable tank may be filled must not exceed the liquid flow capacity of the primary pressure relief system rated at a pressure not exceeding 120 percent of the portable tank's design pressure. For portable tanks used for the transport of refrigerated liquefied helium and refrigerated liquefied atmospheric gas (except oxygen), the maximum rate at which the tank is filled must not exceed the liquid flow capacity of the pressure relief device rated at 130 percent of the portable tank's design pressure. Except for a portable tank containing refrigerated liquefied helium, a portable tank shall have an outage of at least two percent below the inlet of the pressure relief device or pressure control valve, under conditions of incipient opening, with the portable tank in a level attitude. No outage is required for helium.

TP6 The tank must be equipped with a pressure release device which prevent a tank from bursting under fire engulfment conditions (the conditions prescribed in CGA pamphlet S-1.2 (see §171.7 of this subchapter) or alternative conditions approved by the Associate Administrator may be used to consider the fire engulfment condition), taking into account the properties of the hazardous material to be transported.

TP7 The vapor space must be purged of air by nitrogen or other means.

TP8 A portable tank having a minimum test pressure of 1.5 bar (150 kPa) may be used when the flash point of the hazardous material transported is greater than 0 °C (32 °F).

TP9 A hazardous material assigned to special provision TP9 in Column (7) of the §172.101 Table may only be transported in a portable tank if approved by the Associate Administrator.

TP10 A lead lining, not less than 5 mm thick, which shall be tested annually, or another suitable lining material approved by the competent authority, is required. A portable tank may be offered for transport after the date of expiry of the last lining inspection for a period not to exceed three months for purposes of performing the next required

test or inspection, after emptying but before cleaning.

TP12 This material is considered highly corrosive to steel.

TP13 Self-contained breathing apparatus must be provided when this hazardous material is transported by sea.

TP16 The portable tank must be protected against over and under pressurization which may be experienced during transportation. The means of protection must be approved by the approval agency designated to approve the portable tank in accordance with the procedures in part 107, subpart E, of this subchapter. The pressure relief device must be preceded by a frangible disk in accordance with the requirements in §178.275(g)(3) of this subchapter to prevent crystallization of the product in the pressure relief device.

TP17 Only inorganic non-combustible materials may be used for thermal insulation of the tank.

TP18 The temperature of this material must be maintained between 18 °C (64.4 °F) and 40 °C (104 °F) while in transportation. Portable tanks containing solidified methacrylic acid must not be reheated during transportation.

TP19 The calculated wall thickness must be increased by 3 mm at the time of construction. Wall thickness must be verified ultrasonically at intervals midway between periodic hydraulic tests (every 2.5 years). The portable tank must not be used if the wall thickness is less than that prescribed by the applicable T code in Column (7) of the Table for this material.

TP20 This hazardous material must only be transported in insulated tanks under a nitrogen blanket.

TP21 The wall thickness must not be less than 8 mm. Portable tanks must be hydraulically tested and internally inspected at intervals not exceeding 2.5 years.

TP22 Lubricants for portable tank fittings (for example, gaskets, shut-off valves, flanges) must be oxygen compatible.

TP24 The portable tank may be fitted with a device to prevent the build up of excess pressure due to the slow decomposition of the hazardous material being transported. The device must be in the vapor space when the tank is filled under maximum filling conditions. This device must also prevent an unacceptable amount of leakage of liquid in the case of overturning.

TP25 Sulphur trioxide 99.95% pure and above may be transported in tanks without an inhibitor provided that it is maintained at a temperature equal to or above 32.5 °C (90.5 °F).

TP26 The heating device must be exterior to the shell. For UN 3176, this requirement only applies when the hazardous material reacts dangerously with water.

TP27 A portable tank having a minimum test pressure of 4 bar (400 kPa) may be used provided the calculated test pressure is 4 bar or less based on the MAWP of the hazardous material, as defined in §178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.

TP28 A portable tank having a minimum test pressure of 2.65 bar (265 kPa) may be used provided the calculated test pressure is 2.65 bar or less based on the MAWP of the hazardous material, as defined in §178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.

TP29 A portable tank having a minimum test pressure of 1.5 bar (150.0 kPa) may be used provided the calculated test pressure is 1.5 bar or less based on the MAWP of the hazardous materials, as defined in §178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.

TP30 This hazardous material may only be transported in insulated tanks.

TP31 This hazardous material may only be transported in tanks in the solid state.

TP32 Portable tanks may be used subject to the following conditions:

a. Each portable tank constructed of metal must be fitted with a pressure-relief device consisting of a reclosing spring loaded type, a frangible disc or a fusible element. The set to discharge for the spring loaded pressure relief device and the burst pressure for the frangible disc, as applicable, must not be greater than 2.65 bar for portable tanks with minimum test pressures greater than 4 bar;

b. The suitability for transport in tanks must be demonstrated using test 8(d) in Test Series 8 (see UN Manual of Tests and Criteria, Part 1, Sub-section 18.7) (IBR, see §171.7 of this subchapter) or an alternative means approved by the Associate Administrator.

TP33 The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.

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TP36 For material assigned this portable tank special provision, portable tanks used to transport such material may be equipped with fusible elements in the vapor space of the portable tank.

TP37 IM portable tanks are only authorized for the shipment of hydrogen peroxide solutions in water containing 72% or less hydrogen peroxide by weight. Pressure relief devices shall be designed to prevent the entry of foreign matter, the leakage of liquid and the development of any dangerous excess pressure. In addition, the portable tank must be designed so that internal surfaces may be effectively cleaned and passivated. Each tank must be equipped with pressure relief devices conforming to the following requirements:

Concentration of hydrogen peroxide solution	Total <sup>1</sup>
52% or less .....	11
Over 52%, but not greater than 60% .....	22
Over 60%, but not greater than 72% .....	32

<sup>1</sup>Total venting capacity in standard cubic feet hour (S.C.F.H.) per pound of hydrogen peroxide solution.

TP38 Each portable tank must be insulated with an insulating material so that the overall thermal conductance at 15.5 °C (60 °F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials may not promote corrosion to steel when wet.

TP39 [Reserved]

TP40 The portable tank must not be transported when connected with spray application equipment.

TP41 [Reserved]

TP44 Each portable tank must be made of stainless steel, except that steel other than stainless steel may be used in accordance with the provisions of §173.24b(b) of this subchapter. Thickness of stainless steel for tank shell and heads must be the greater of 7.62 mm (0.300 inch) or the thickness required for a portable tank with a design pressure at least equal to 1.5 times the vapor pressure of the hazardous material at 46 °C (115 °F).

TP45 Each portable tank must be made of stainless steel, except that steel other than stainless steel may be used in accordance with the provisions of 173.24b(b) of this subchapter. Thickness of stainless steel for portable tank shells and heads must be the greater of 6.35 mm (0.250 inch) or the thickness required for a portable tank with a design pressure at least equal to 1.3 times the vapor pressure of the hazardous material at 46 °C (115 °F).

TP46 Portable tanks in sodium metal service are not required to be hydrostatically retested.

TP47 The 2.5 year internal examination may be waived or substituted by other test methods or inspection procedures specified

by the competent authority or its authorized body, provided that the portable tank is dedicated to the transport of the organometallic substances to which this tank special provision is assigned. However this examination is required when the conditions of §180.605(f) are met.

(9) “W” codes. These provisions apply only to transportation by water:

*Code/Special Provisions*

W1 This substance in a non friable prill or granule form is not subject to the requirements of this subchapter when tested in accordance with the UN Manual of Test and Criteria (IBR, *see* §171.7 of this subchapter) and is found to not meet the definition or criteria for inclusion in Division 5.1.

W7 Vessel stowage category for uranyl nitrate hexahydrate solution is “D” as defined in §172.101(k)(4).

W8 Vessel stowage category for pyrophoric thorium metal or pyrophoric uranium metal is “D” as defined in §172.101(k)(4).

W9 When offered for transportation by water, the following Specification packagings are not authorized unless approved by the Associate Administrator: woven plastic bags, plastic film bags, textile bags, paper bags, IBCs and bulk packagings.

W10 When offered for transportation by vessel, the use of Large Packagings (see §171.8 of this subchapter) is prohibited.

W31 Non-bulk packagings must be hermetically sealed.

W40 Non-bulk bags are not allowed.

W41 When offered for transportation by water, this material must be packaged in bales and be securely and tightly bound with rope, wire or similar means.

W100 Non-bulk flexible, fibreboard or wooden packagings must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.

[Amdt. 172–123, 55 FR 52582, Dec. 21, 1990]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §172.102, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.govinfo.gov](http://www.govinfo.gov).

EFFECTIVE DATE NOTE: At 88 FR 60375, Sept. 1, 2023, in §172.102, paragraph (c)(1) was amended by adding special provision 439, effective Oct. 31, 2023. For the convenience of the user, the added text is set forth as follows:

**§ 172.102 Special provisions.**

\* \* \* \* \*

(c) \* \* \*

(1) \* \* \*



439 UN1972 is not authorized for transportation by rail tank car until either issuance of a final rule concluding the rulemaking action proceeding under RIN 2137-AF54, or June 30, 2025, whichever occurs first. For information and the status of RIN 2137-AF54, please refer to the Office of Management and Budget's Office of Information and Regulatory Affairs at [www.reginfo.gov](http://www.reginfo.gov).

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### Subpart C—Shipping Papers

#### § 172.200 Applicability.

(a) *Description of hazardous materials required.* Except as otherwise provided in this subpart, each person who offers a hazardous material for transportation shall describe the hazardous material on the shipping paper in the manner required by this subpart.

(b) This subpart does not apply to any material, other than a hazardous substance, hazardous waste or marine pollutant, that is—

(1) Identified by the letter “A” in column 1 of the § 172.101 table, except when the material is offered or intended for transportation by air; or

(2) Identified by the letter “W” in column 1 of the § 172.101 table, except when the material is offered or intended for transportation by water; or

(3) A limited quantity package unless the material is offered for transportation by aircraft or vessel.

(4) Category B infectious substances prepared in accordance with § 173.199.

[Amdt. 172-29A, 41 FR 40677, Sept. 20, 1976, as amended by Amdt. 172-58, 45 FR 34697, May 22, 1980; Amdt. 172-74, 47 FR 43065, Sept. 30, 1982; Amdt. 172-112, 53 FR 17160, May 13, 1988; Amdt. 172-127, 57 FR 52938, Nov. 5, 1992; 71 FR 32258, June 2, 2006; 76 FR 3365, Jan. 19, 2011; 78 FR 1112, Jan. 7, 2013; 87 FR 79772, Dec. 27, 2022]

#### § 172.201 Preparation and retention of shipping papers.

(a) *Contents.* When a description of hazardous material is required to be included on a shipping paper, that description must conform to the following requirements:

(1) When a hazardous material and a material not subject to the requirements of this subchapter are described on the same shipping paper, the hazardous material description entries re-

quired by § 172.202 and those additional entries that may be required by § 172.203:

(i) Must be entered first, or

(ii) Must be entered in a color that clearly contrasts with any description on the shipping paper of a material not subject to the requirements of this subchapter, except that a description on a reproduction of a shipping paper may be highlighted, rather than printed, in a contrasting color (the provisions of this paragraph apply only to the basic description required by § 172.202(a)(1), (2), (3), and (4)), or

(iii) Must be identified by the entry of an “X” placed before the basic shipping description required by § 172.202 in a column captioned “HM.” (The “X” may be replaced by “RQ,” if appropriate.)

(2) The required shipping description on a shipping paper and all copies of the shipping paper used for transportation purposes must be legible and printed (manually or mechanically) in English.

(3) Unless it is specifically authorized or required in this subchapter, the required shipping description may not contain any code or abbreviation.

(4) A shipping paper may contain additional information concerning the material provided the information is not inconsistent with the required description. Unless otherwise permitted or required by this subpart, additional information must be placed after the basic description required by § 172.202(a).

(5) *Electronic shipping papers.* For transportation by rail, a rail carrier may accept shipping paper information either telephonically (i.e., voice communications and facsimiles) or electronically (EDI) from an offeror of a hazardous materials shipment in accordance with the provisions in paragraphs (a)(5)(i)–(a)(5)(iv) of this section. See § 171.8 for the EDI definition.

(i) When the information applicable to the consignment is provided under this requirement the information must be available to the offeror and carrier at all times during transport, and the carrier must have and maintain a printed copy of this information until delivery of the hazardous materials on the shipping paper is complete. When a