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as indicated in paragraph (b)(2) of this section.

[69 FR 76172, Dec. 20, 2004, as amended at 71 FR 33881, June 12, 2006; 74 FR 2263, Jan. 14, 2009]

§ 173.227 Materials poisonous by inhalation, Division 6.1, Packing Group I, Hazard Zone B.

(a) In packagings as authorized in § 173.226 and seamless and welded specification cylinders or UN seamless cylinders conforming to the requirements of § 173.40.

(b) 1A1, 1B1, 1H1, 1N1, 6HA1, or 6HH1 drums further packed in a 1A2 or 1H2 drum. Both the inner and outer drums must conform to the performance test requirements of subpart M of part 178 of this subchapter at the Packing Group I performance level. Both the inner and outer drums must conform to the performance test requirements of subpart M of part 178 of this subchapter at the Packing Group I performance level. The outer drums may be tested either as a package intended to contain inner packagings (combination package) or as a single packaging intended to contain solids or liquids at a mass corresponding to the mass of the assembled packaging system. The outer drum must have a minimum thickness of 1.35 mm (0.053 inches) for a 1A2 outer drum or 6.30 mm (0.248 inches) for a 1H2 outer drum. Outer 1A2 and 1H2 drums must withstand a hydrostatic test pressure of 100 kPa (15 psig). Capacity of the inner drum may not exceed 220 liters. In addition, the inner drum must conform to all of the following requirements:

(1) Satisfactorily withstand the leakproofness test in § 178.604 of this subchapter using an internal air pressure of at least two times the vapor pressure at 55 °C (131 °F) of the material to be packaged;

(2) Have screw closures that are—

(i) Closed and tightened to a torque prescribed by the closure manufacturer, using a properly calibrated device that is capable of measuring torque;

(ii) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation; and

(iii) Provided with a cap seal that is properly applied in accordance with the cap seal manufacturer's recommendations and is capable of withstanding an internal pressure of at least 100 kPa (15 psig).

(3) Have a minimum thickness as follows:

(i) For a 1A1 drum, 0.69 mm (0.027 inch);

(ii) For a 1B1 drum, 2.79 mm (0.110 inch);

(iii) For a 1H1 drum, 1.14 mm (0.045 inch); or

(iv) For a 6HA1 drum, the plastic inner container shall be 1.58 mm (0.0625 inch), the outer steel drum shall be 0.70 mm (0.027 inch).

(4) Be isolated from the outer drum by a shock-mitigating, non-reactive material which completely surrounds the inner packaging on all sides.

(5) Prior to reuse, all authorized inner drums must be leakproofness tested and marked in accordance with § 173.28 using a minimum test pressure as indicated in paragraph (b)(1) of this section.

(c) 1A1, 1B1, 1H1, 1N1, 6HA1 or 6HH1 drums described in paragraph (b) of this section may be used without being further packed in a 1A2 or 1H2 drum if the shipper loads the material, blocks and braces the drums within the transport vehicle and seals the transport vehicle used. Drums may not be stacked (double decked) within the transport vehicle. Shipments must be from one origin to one destination only without any intermediate pickup or delivery.

[70 FR 34398, June 14, 2005, as amended at 71 FR 33881, June 12, 2006; 73 FR 57006, Oct.1, 2008]

§ 173.228 Bromine pentafluoride or bromine trifluoride.

(a) Bromine pentafluoride and bromine trifluoride are authorized in packagings as follows:

(1) Specification 3A150, 3AA150, 3B240, 3BN150, 4B240, 4BA240, 4BW240, and 3E1800 cylinders.

(2) UN cylinders as specified in part 178 of this subchapter, except acetylene cylinders and non-refillable cylinders, with a minimum test pressure of 10 bar and a minimum outage of 8 percent by volume. The use of UN tubes and MEGCs is not authorized.

(3) The use of a pressure relief device is not authorized.

(b) A material in Hazard Zone A must be transported in a seamless specification cylinder conforming to the requirements of § 173.40. However, a welded cylinder filled before October 1, 2002, in accordance with the requirements of this subchapter in effect at the time of filling, may be transported for reprocessing or disposal of the cylinder's contents until December 31, 2003. No cylinder may be equipped with a pressure relief device.

[67 FR 51643, Aug. 8, 2002, as amended at 67 FR 61289, Sept. 30, 2002; 68 FR 24660, May 8, 2003, as amended at 71 FR 33881, June 12, 2006]

§ 173.229 Chloric acid solution or chlorine dioxide hydrate, frozen.

When the § 172.101 table specifies that a hazardous material be packaged in accordance with this section, only 4G fiberboard boxes, with inner packagings of polyethylene or other suitable material, are authorized. Fiberboard boxes must be reinforced and insulated and sufficient dry ice must be used to maintain the hydrate or acid in a frozen state during transportation. Each packaging must conform to the general packaging requirements of subpart B of part 173, and to the requirements of part 178 of this subchapter at the Packing Group I performance level. Transportation is authorized only by private or contract carrier by motor vehicle.

§ 173.230 Fuel cell cartridges containing hazardous material.

(a) *Requirements for Fuel Cell Cartridges*. Fuel cell cartridges, including when contained in or packed with equipment, must be designed and constructed to prevent fuel leakage under normal conditions of transportation. Fuel cell cartridge design types using liquids as fuels must pass an internal pressure test at a gauge pressure of 100 kPa (15 psig) without leakage. Except for fuel cell cartridges containing hydrogen in metal hydride which must be in conformance with paragraph (d) of this section, each fuel cell cartridge design type including when contained in or packed with equipment, must pass a 1.2 meter (3.9 feet) drop test onto an unyielding surface in the orientation most likely to result in the failure of the containment system with no loss of contents. Fuel cell cartridges installed in or integral to a fuel cell system are regarded as contained in equipment. Fuel cell cartridges containing a Division 2.1, Division 4.3 or Class 8 material must meet the following additional requirements.

(b) A fuel cell cartridge designed to contain a Division 4.3 or a Class 8 material may contain an activator provided it is fitted with two independent means of preventing unintended mixing with the fuel during transport.

(c) Each fuel cell cartridge designed to contain a liquefied flammable gas must:

(1) Be capable of withstanding, without leakage or bursting, a pressure of at least two times the equilibrium pressure of the contents at 55 °C (131 °F);

(2) Contain no more than 200 mL of liquefied flammable gas with a vapor pressure not exceeding 1,000 kPa (150 psig) at 55 °C (131 °F); and

(3) Pass the hot water bath test prescribed in accordance with § 173.306(a)(3)(v).

(d) Each fuel cell cartridge designed to contain hydrogen in a metal hydride must conform to the following:

(1) Each fuel cell cartridge must have a water capacity less than or equal to 120 mL (4 fluid ounces).

(2) Each fuel cell cartridge must be a design type that has been subjected, without leakage or bursting, a pressure of at least two times the design pressure of the cartridge at 55 °C (131 °F) or 200 kPa (30 psig) more than the design pressure of the cartridge at 55 °C (131 °F), whichever is greater. The pressure at which the test is conducted is referred to as the ''minimum shell burst pressure.'' The pressure within the fuel cell cartridge must not exceed 5 MPa (725 psig) at 55 °C (131 °F).

(3) Each fuel cell cartridge must be filled in accordance with the procedure provided by the manufacturer. The manufacturer must provide the following information with each fuel cell cartridge:

(i) Inspection procedures to be carried out before initial filling and before refilling of the fuel cell cartridge;