

**§ 178.354**

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §178.352-6, see the List of CFR Sections Affected in the Finding Aids section of the printed volume and on GPO Access.

**§ 178.354 Specification 6M; metal packaging.**

**§ 178.354-1 General requirements.**

(a) Each package must meet the applicable requirements of §173.24 of this chapter.

(b) [Reserved]

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

**§ 178.354-2 Rated capacity.**

(a) Rated capacity as marked (see §178.354-5). Not less than 10 gallons nor more than 110 gallons for the outer steel drum. Not less than 1.24 L for the inner containment vessel.

(b) [Reserved]

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990, as amended at 63 FR 37462, July 10, 1998; 66 FR 45387, Aug. 28, 2001]

Marked capacity		Maximum authorized gross weight		Minimum thickness of uncoated sheets and heads (gauge)	Minimum thickness of end insulation Inches	Cm
Gallons not over	Liters	Pounds	Kilograms			
15 .....	57	160	73	20	1.88	4.7
30 .....	114	480	219	18	3.75	9.5
55 .....	210	640	292	16	3.75	9.5
110 .....	420	640	292	16	3.75	9.5

(2) Each drum must have at least four 1.2 centimeter (0.5-inch) diameter vents near the top, each covered with a weatherproof tape or fusible plug; or equivalent device. A layer of porous refractory fiber may be placed behind the pressure-relief vent holes.

(b) Inner containment vessel must conform to specification 2R or equivalent (cast iron or brass are prohibited), with maximum usable inside diameter of 13.3 cm (5.25 inches), minimum usable inside diameter of 10 cm (4 inches), and minimum height of 15 cm (6 inches).

(c) Inner containment vessel must be fixed within the outer shell by one of the following types of solid centering media, with the sides of the inner ves-

**§ 178.354-3 General construction requirements.**

(a) The outer shell must be of straight-sided steel, with welded body seams, and may be either a single sheet of steel, or may be fabricated by welding together two appropriate lengths of drums with each length to contain 3 swedged or rolled rolling hoops as prescribed for either of these specifications. A removable head for a packaging of 210 L (55 gallons) or larger volume must have one or more corrugations in the cover near the periphery. For a packaging exceeding 57 L (15 gallons) volume, the head must be crowned (convexed), not extending beyond the level of the chime, with a minimum convexity of 1 cm (3/8-inch).

(1) The maximum authorized gross weight, metal thickness, and minimum end insulation thickness for the marked volume is as follows:

sel protected by at least 9.5 cm (3.75 inches) of insulation media, and the ends with at least the thickness as prescribed in paragraph (a)(1) of this section.

(1) Machined discs and rings made of solid industrial cane fiberboard having a density of at least 0.24 g/cc (15 pounds per cubic foot) fitted such that the radial clearances between the fiberboard, inner vessel, and shell do not exceed 6 mm (1/4-inch); or

(2) Hardwood or plywood at least 1.2 centimeter (1/2-inch) thick, having a density of at least 0.45 g/cc (28 pounds per cubic foot). There must be no gap or direct heat path from the shell to the inner vessel.

(d) Any radiation shielding material used must be placed within the inner containment vessel or must be protected in all directions by at least the thickness of the thermal insulating material prescribed in paragraph (a) of this section.

(e) For a packaging having an authorized gross weight in excess of 219 kg (480 pounds), a steel bearing plate, at least 6 mm (0.25-inch) thick or a plywood disc, at least 2.5 cm (1-inch) thick, and at least 25 cm (10 inches) in diameter must be provided at both ends and adjacent to the specification 2R inner containment vessel, to provide additional load-bearing surface against the insulation-centering medium.

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968, as amended by Amdt. 178-35, 39 FR 45246, Dec. 31, 1974; 40 FR 44327, Sept. 26, 1975. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990, as amended at 63 FR 37462, July 10, 1998; 66 FR 45387, Aug. 28, 2001; 67 FR 61016, Sept. 27, 2002]

#### § 178.354-4 Closure.

(a) The outer drum closure must be at least 16-gauge bolt-type locking ring having at least a  $\frac{5}{16}$ -inch steel bolt for drum sizes not over 15 gallons, or a 12-gauge bolted ring with drop-forged lugs, one of which is threaded, and a  $\frac{5}{8}$ -inch steel bolt for drum sizes over 15 gallons. Each bolt must be provided with a lock nut or equivalent device.

(b) The closure device must have means for the attachment of a temperproof lock wire and seal, or equivalent.

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990]

#### § 178.354-5 Markings.

(a) Marking must be as prescribed in §178.3.

(b) Marking on the outside of each package must be as follows: "DOT-6M Type B," "Radioactive Materials," or "Fissile Radioactive Materials," as appropriate; and the gauge of metal of the outer drum in the thinnest part, rated capacity of the outer drum in gallons, and year of manufacture (for example, 18-30-69). When the gauge of the metal in the drum wall differs from that in the head, both must be indicated with a slanting line between, and

with the gauge of the body indicated first (e.g., 18/16-55-69 for 18-gauge body and 16-gauge head).

[Amdt. 178-1, 33 FR 14935, Oct. 4, 1968. Redesignated by Amdt. 178-97, 55 FR 52716, Dec. 21, 1990, as amended at 63 FR 37462, July 10, 1998]

#### § 178.356 Specification 20PF phenolic-foam insulated, metal overpack.

##### § 178.356-1 General requirements.

(a) Each overpack must meet all of the applicable requirements of §173.24 of this subchapter.

(b) The maximum gross weight of the package, including the inner cylinder and its contents, must not exceed the following:

(1) Specification 20PF-1—138 kg (300 pounds).

(2) Specification 20PF-2—320 kg (700 pounds).

(3) Specification 20PF-3—455 kg (1000 pounds).

(c) The general configuration of the overpack must be a right cylinder, consisting of an insulated base section, a steel liner lid, and an insulated top section. The inner liner and outer shell must be at least 16-gauge and 18-gauge steel, respectively, with the intervening cavity filled with a molded-in-place, fire-resistant, phenolic-foam insulation interspersed with wooden members for bracing and support. Wood pieces must be securely attached to both the liner and shell. No hole is permitted in the liner. Each joint between sections must be stepped a minimum of 5 cm (2 inches) and gaps between mating surfaces must not exceed 5 mm (0.2 inch). Gaps between foam surface of top section and liner lid must not exceed 1 cm (0.4 inch) or 5 cm (2 inches) where taper is required for mold stripping. For the specification 20PF-1, the top section may consist of a plug of foam insulation and a steel cover. The liner and shell closures must each be gasketed against moisture penetration. The liner must have a bolted flange closure. Shell closure must conform to paragraph (d) of this section.

(d) Drums over 5 gallons capacity must be closed by means of 12-gauge bolted ring with drop forged lugs, one of which is threaded, and having  $\frac{3}{8}$  inch bolt and nut for drums not over 30 gallons capacity and  $\frac{5}{8}$  inch bolt and