square cm (0.42 square inch) cross-section. Each radial support must be welded at one end to the containment vessel by a continuous weld or to an inner steel band of at least 6 mm (¼-inch) by 2.5 cm (1 inch) by a continuous weld at radial positions not exceeding 60 degrees from the center of the package. The inner band, when used, must be welded to the inner containment vessel by at least 6 equally spaced 5 cm (2-inch) welds on each edge of the band. The opposite end of the radial support must be welded by a continuous weld to an outer steel band of at least 6 mm (¼-inch) by 2.5 cm (1 inch). The outer steel band must be welded to the outer shell by at least 6 equally spaced welds on each edge of the top band, such that the inner vessel is fixed at least 5.7 cm (2.25 inches) from the top and bottom of the drum. The spacer mechanism must be welded as specified near each end of the containment vessel so as not to interfere with the vessel closure. For a packaging greater than 210 L (55-gallon) capacity, the additional spacer mechanism must be located at approximately midpoint along the length of the inner vessel.

(d) The void between the inner containment vessel and the outer shell must be completely filled with bagged or tamped vermiculite (expanded mica), with a density of at least 0.072 g/cc (4.5 pounds per cubic foot). Loose, untamped vermiculite is not authorized.

[Amdt. 178–1, 33 FR 14934, Oct. 4, 1968, as amended by Amdt. 178–35, 39 FR 45246, Dec. 31, 1974; 40 FR 2435, Jan. 13, 1975; 40 FR 44327, Sept. 26, 1975. Redesignated by Amdt. 178–97,55 FR 52716, Dec. 21, 1990; 66 FR 45387, 45389, Aug. 28, 2001]

§ 178.352–4 Welding.

Welding must be of material having a melting point in excess of 800 °C (1475 °F) (except that for packages constructed prior to March 31, 1975, this temperature may be 540 °C (1000 °F)), with a joint efficiency of at least 0.85. This requirement applies to welding used in adding spacer rods to comply with § 178.352–3(c)(1).

[Amdt. 178–35, 39 FR 45246, Dec. 31, 1974. Redesignated by Amdt. 178–97, 55 FR 52716, Dec. 21, 1990, as amended at 63 FR 37462, July 10, 1998]

§ 178.352–5 Closure.

(a) The outer drum closure must be at least a 12-gauge bolted ring with drop forged lugs, one of which is threaded, and having at least a 1.6 centimeter (⅝-inch) diameter steel bolt and a lock nut, or equivalent device.

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

[Amdt. 178–1, 33 FR 14935, Oct. 4, 1968, as amended by Amdt. 178–35, 39 FR 45246, Dec. 31, 1974. Redesignated by Amdt. 178–97, 55 FR 52716, Dec. 21, 1990]

§ 178.352–6 Markings.

(a) Markings on each container, by die stamping on a metal plate attached to the outside of the outer container by spot welding, or other equally efficient method, in letters and figures of at least one-fourth inch in height, as follows:

(1) ''DOT–6L''.

(2) ''FISSILE RADIOACTIVE MATERIAL.''

(3) Name or symbol of person making the marks specified in paragraph (a) (1) of this section. Symbol, if used, must be registered with the Associate Administrator.

(4) Gauge of metal of the outer steel drum in the thinnest part, rated capacity of the outer steel drum in gallons, and the year of manufacture of the assembled package (e.g., 18–110–68). 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., 18/16–110–68 for 18-gauge body and 16-gauge head).

(b) [Reserved]

[Order 70, 31 FR 6496, Apr. 29, 1966. Redesignated at 32 FR 5606, Apr. 5, 1967. Redesignated by Amdt. 178–97, 55 FR 52716, Dec. 21, 1990; 66 FR 45386, Aug. 28, 2001]

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]

§ 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 (⅜-inch).

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

Marked capacity		Maximum authorized gross weight		Minimum thickness of uncoated sheets and heads (gauge)	Minimum thickness of end insulation	Cm
Gallons not over	Liters	Pounds	Kilograms		Inches	
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 vessel 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 (¼-inch); or

(2) Hardwood or plywood at least 1.2 centimeter (½-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.