

§ 179.220-7

§ 179.220-7 Materials.

(a) The plate material used to fabricate the inner container and nozzles must meet one of the following specifications and with the indicated minimum tensile strength and elongation in the welded condition.

(b) Carbon steel plate: The maximum allowable carbon content must be 0.31 percent when the individual specification allows carbon content greater than this amount. The plates may be clad with other approved materials.

Specifications	Minimum tensile strength (p.s.i.) welded condition ¹	Minimum elongation in 2 inches (percent) weld metal (longitudinal)
AAR TC 128, Gr. B	81,000	19
ASTM A 516, Gr. 70	70,000	20

¹ Maximum stresses to be used in calculations.

(c) Aluminum alloy plate: Aluminum alloy plate must be suitable for welding and comply with one of the following specifications:

Specifications	Minimum tensile strength (p.s.i.) welded condition ^{3,4}	Minimum elongation in 2 inches (percent) weld metal (longitudinal)
ASTM B 209, Alloy 5052 ¹	25,000	18
ASTM B 209, Alloy 5083 ²	38,000	16
ASTM B 209, Alloy 5086 ¹	35,000	14
ASTM B 209, Alloy 5154 ¹	30,000	18
ASTM B 209, Alloy 5254 ¹	30,000	18
ASTM B 209, Alloy 5454 ¹	31,000	18
ASTM B 209, Alloy 5652 ¹	25,000	18

¹ For fabrication, the parent plate material may be 0 H112, or H32 temper, but design calculations must be based on the minimum tensile strength shown.

² O temper only.

³ Weld filler metal 5556 must not be used.

⁴ Maximum stresses to be used in calculations.

(d) High alloy steel plate: High alloy steel plate must comply with one of the following specifications:

Specifications	Minimum tensile strength (p.s.i.) welded condition ¹	Minimum elongation in 2 inches (percent) weld metal (longitudinal)
ASTM A 240, Type 304	75,000	30
ASTM A 240, Type 304L	70,000	30
ASTM A 240, Type 316	74,000	30

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ASTM A 240, Type 316L	70,000	30

¹ Maximum stresses to be used in calculations.

(e) Manganese-molybdenum steel plate: Manganese-molybdenum steel plate must be suitable for fusion welding and must comply with the following specification:

Specifications	Minimum tensile strength (p.s.i.) welded condition ¹	Minimum elongation in 2 inches (percent) weld metal (longitudinal)
ASTM A 302, Gr. B	80,000	20

¹ Maximum stresses to be used in calculations.

(f) Plate materials used to fabricate the outer shell and heads must be those listed in paragraphs (b), (c), (d), or (e) of this section. The maximum allowable carbon content must be 0.31 percent when the individual specification allows carbon content greater than this amount. The plates may be clad with other approved materials.

(g) All appurtenances on the inner container in contact with the lading must be made of approved material compatible with the plate material of the inner container. These appurtenances must not be subject to rapid deterioration by the lading, or must be coated or lined with suitable corrosion resistant material. See AAR Specifications for Tank Cars, appendix M, M4.05 for approved material specifications for castings for fittings.

[Amdt. 179-9, 36 FR 21340, Nov. 6, 1971, as amended by Amdt. 179-28, 46 FR 49906, Oct. 8, 1981; Amdt. 179-40, 52 FR 13048, Apr. 20, 1987; Amdt. 179-52, 61 FR 28681, June 5, 1996; 66 FR 45186, Aug. 28, 2001]

§ 179.220-8 Tank heads.

(a) Tank heads of the inner container, inner container compartments and outer shell must be of approved contour, and may be flanged and dished or ellipsoidal for pressure on concave side.

(b) Flanged and dished heads must have main inside radius not exceeding 10 feet and inside knuckle radius must

be not less than 3/4 inches for steel and alloy steel tanks nor less than 5 inches for aluminum alloy tanks.

(c) Ellipsoidal heads must be an ellipsoid of revolution in which the major axis must equal the diameter of the shell and the minor axis must be one-half the major axis.

[Amdt. 179-9, 36 FR 21341, Nov. 6, 1971]

§ 179.220-9 Compartment tanks.

(a) The inner container may be divided into compartments by inserting interior heads, or by fabricating each compartment as a separate container and joining with a cylinder, or by fabricating each compartment as a separate tank without a joining cylinder. Each compartment must be capable of withstanding, without evidence of yielding or leakage, the required test pressure applied in each compartment separately, or in any combination of compartments.

(b) When the inner container is divided into compartments by fabricating each compartment as a separate container and joining with a cylinder, the cylinder must have a plate thickness not less than that required for the inner container shell and must be applied to the outside surface of the straight flange portion of the container head. The cylinder must fit the straight flange tightly for a distance of at least two times the plate thickness, or 1 inch, whichever is greater and must be joined to the straight flange by a full fillet weld. Distance from fillet weld seam to container head seam must be not less than 1½ inches or three times the plate thickness, whichever is greater.

[Amdt. 179-9, 36 FR 21341, Nov. 6, 1971]

§ 179.220-10 Welding.

(a) All joints must be fusion-welded in compliance with AAR Specifications for Tank Cars, appendix W. Welding procedures, welders, and fabricators shall be approved.

(b) Radioscopy of the outer shell is not a specification requirement.

(c) Welding is not permitted on or to ductile iron or malleable iron fittings.

[Amdt. 179-9, 36 FR 21341, Nov. 6, 1971]

§ 179.220-11 Postweld heat treatment.

(a) Postweld heat treatment of the inner container is not a specification requirement.

(b) Postweld heat treatment of the cylindrical portions of the outer shell to which the anchorage or draft sills are attached must comply with AAR Specifications for Tank Cars, appendix W.

(c) When cold formed heads are used on the outer shell they must be heat treated before welding to shell if postweld heat treatment is not practicable due to assembly procedures.

[Amdt. 179-9, 36 FR 21341, Nov. 6, 1971]

§ 179.220-13 Inner container manway nozzle and cover.

(a) Inner container manway nozzle must be of approved design with access opening at least 18 inches inside diameter, or at least 14 inches by 18 inches obround or oval.

(b) Manway covers must be of approved type. Design must provide a secure closure of the manway and must make it impossible to remove the cover while the tank interior is under pressure.

(c) All joints between manway covers and their seats must be made tight against leakage of vapor and liquid by use of suitable gaskets.

(d) Manway covers must be cast, forged, or fabricated metal complying with subsection §179.220-7(g) of this section.

(e) A seal must be provided between the inner container manway nozzle and the opening in the outer shell.

[Amdt. 179-9, 36 FR 21341, Nov. 6, 1971]

§ 179.220-14 Openings in the tanks.

Openings in the inner container and the outer shell must be reinforced in compliance with AAR Specifications for Tank Cars, appendix E. In determining the required reinforcement area for openings in the outer shell, *t* shall be one-fourth inch.

[Amdt. 179-9, 36 FR 21341, Nov. 6, 1971]