§ 179.100 General specifications applicable to pressure tank car tanks.

§ 179.100–1 Type.

(a) Tanks built under this specification shall be fusion-welded with heads designed convex outward. Except as provided in §179.103 they shall be circular in cross section, shall be provided with a manway nozzle on top of the tank of sufficient size to permit access to the interior, a manway cover to provide for the mounting of all valves, measuring and sampling devices, and a protective housing. Other openings in the tank are prohibited, except as provided in part 173 of this chapter, §§179.100–14, 179.101–1, 179.102 or §179.103.

(b) Head shields and shells of tanks built under this specification must be normalized. Tank car heads must be normalized after forming unless specific approval is granted for a facility’s equipment and controls.

§ 179.100–4 Insulation.

(a) If insulation is applied, the tank shell and manway nozzle must be insulated with an approved material. The entire insulation must be covered with a metal jacket of a thickness not less than 11 gauge (0.1196 inch) nominal (Manufacturers’ Standard Gauge) and flashed around all openings so as to be weather-tight. The exterior surface of a carbon steel tank, and the inside surface of a carbon steel jacket must be given a protective coating.

(b) If insulation is a specification requirement, it shall be of sufficient thickness so that the thermal conductance at 60 °F is not more than 0.075 Btu per hour, per square foot, per degree F temperature differential. If exterior heaters are attached to tank, the thickness of the insulation over each heater element may be reduced to one-half that required for the shell.

§ 179.100–6 Thickness of plates.

(a) The wall thickness after forming of the tank shell and heads must not be less than that specified in §179.101, nor that calculated by the following formula:

\[ t = \frac{Pd}{2SE} \]

Where:
- \( d \) = Inside diameter in inches;
- \( E \) = 1.0 welded joint efficiency; except for heads with seams=0.9;
- \( P \) = Minimum required bursting pressure in p.s.i.;
- \( S \) = Minimum tensile strength of plate material in p.s.i., as prescribed in §179.100–7;
- \( t \) = Minimum thickness of plate in inches after forming.

(b) If plates are clad with material having tensile strength properties at least equal to the base plate, the cladding may be considered a part of the base plate when determining thickness. If cladding material does not have tensile strength at least equal to the base plate, the base plate alone shall meet the thickness requirement.

(c) When aluminum plate is used, the minimum width of bottom sheet of tank shall be 60 inches, measured on the arc, but in all cases the width shall be sufficient to bring the entire width of the longitudinal welded joint, including welds, above the bolster.

§ 179.100–7 Materials.

(a) Steel plate: Steel plate materials used to fabricate tank shell and manway nozzle must comply with one of the following specifications with the indicated minimum tensile strength and elongation in the welded condition.
The maximum allowable carbon content must be 0.31 percent when the individual specification allows carbon greater than this amount. The plates may be clad with other approved materials.

(b) Aluminum alloy plate: Aluminum alloy plate material used to fabricate tank shell and manway nozzle must be suitable for fusion welding and must comply with one of the following specifications (IBR, see §171.7 of this subchapter) with its indicated minimum tensile strength and elongation in the welded condition. * * *

(c) High alloy steel plate. (1) High alloy steel plate must conform to the following specifications:

(d) All attachments welded to tank shell must be of approved material which is suitable for welding to the tank.

§ 179.100–8 Tank heads.

(a) The tank head shape shall be an ellipsoid of revolution in which the major axis shall equal the diameter of the shell adjacent to the head and the minor axis shall be one-half the major axis.

(b) Each tank head made from steel which is required to be “fine grain” by the material specification, which is hot formed at a temperature exceeding 1700 °F., must be normalized after forming by heating to a temperature between 1550° and 1700° F., by holding at that temperature for at least 1 hour per inch of thickness (30-minute minimum), and then by cooling in air. If the material specification requires quenching and tempering, the treatment specified in that specification...