

§ 179.400-5

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§ 179.400-5 Materials.

(a) Stainless steel of ASTM A 240/A 240M (IBR, see §171.7 of this subchapter), Type 304 or 304L must be used for the inner tank and its appurtenances, as specified in AAR Specifications for Tank Cars, appendix M (IBR, see §171.7 of this subchapter), and must be—

(1) In the annealed condition prior to fabrication, forming and fusion welding;

(2) Suitable for use at the temperature of the lading; and

(3) Compatible with the lading.

(b) Any steel casting, steel forging, steel structural shape or carbon steel plate used to fabricate the outer jacket or heads must be as specified in AAR Specifications for Tank Cars, appendix M.

(c) *Impact tests* must be—

(1) Conducted in accordance with AAR Specifications for Tank Cars, appendix W, W9.01;

(2) Performed on longitudinal specimens of the material;

(3) Conducted at the tank design service temperature or colder; and

(4) Performed on test plate welds and materials used for inner tanks and appurtenances and which will be subjected to cryogenic temperatures.

(d) Impact test values must be equal to or greater than those specified in AAR Specifications for Tank Cars, appendix W. The report of impact tests must include the test values and lateral expansion data.

[Amdt. 179-32, 48 FR 27708, June 16, 1983, as amended at 67 FR 51660, Aug. 8, 2002; 68 FR 75763, Dec. 31, 2003]

§ 179.400-6 Bursting and buckling pressure.

(a) [Reserved]

(b) The outer jacket of the required evacuated insulation system must be designed in accordance with §179.400-8(d) and in addition must comply with the design loads specified in Section 6.2 of the AAR Specifications for Tank Cars (IBR, see §171.7 of this subchapter). The designs and calculations must provide for the loadings trans-

ferred to the outer jacket through the support system.

[Amdt. 179-32, 48 FR 27708, June 16, 1983, as amended by Amdt. 179-51, 61 FR 18934, Apr. 29, 1996; 65 FR 58632, Sept. 29, 2000; 68 FR 75763, Dec. 31, 2003]

§ 179.400-7 Tank heads.

(a) Tank heads of the inner tank and outer jacket must be flanged and dished, or ellipsoidal.

(b) Flanged and dished heads must have—

(1) A main inside dish radius not greater than the outside diameter of the straight flange;

(2) An inside knuckle radius of not less than 6 percent of the outside diameter of the straight flange; and

(3) An inside knuckle radius of at least three times the head thickness.

§ 179.400-8 Thickness of plates.

(a) The minimum wall thickness, after forming, of the inner shell and any 2:1 ellipsoidal head for the inner tank must be that specified in §179.401-1, or that calculated by the following formula, whichever is greater:

$$t = Pd / 2SE$$

Where:

t = minimum thickness of plate, after forming, in inches;

P = minimum required bursting pressure in psig;

d = inside diameter, in inches;

S = minimum tensile strength of the plate material, as prescribed in AAR Specifications for Tank Cars, appendix M, Table M1 (IBR, see §171.7 of this subchapter), in psi;

E = 0.9, a factor representing the efficiency of welded joints, except that for seamless heads, E = 1.0.

(b) The minimum wall thickness, after forming, of any 3:1 ellipsoidal head for the inner tank must be that specified in §179.401-1, or that calculated by the following formula, whichever is greater:

$$t = 1.83 Pd / 2SE$$

Where:

t = minimum thickness of plate, after forming, in inches;

P = minimum required bursting pressure in psig;

d = inside diameter, in inches;