

## § 179.20

of this section shall be verified by analyzing the fire effects on the entire surface of the tank car. The analysis must consider the fire effects on and heat flux through tank discontinuities, protective housings, underframes, metal jackets, insulation, and thermal protection. A complete record of each analysis shall be made, retained, and upon request, made available for inspection and copying by an authorized representative of the Department. The procedures outlined in "Temperatures, Pressures, and Liquid Levels of Tank Cars Engulfed in Fires," DOT/FRA/OR&D-84/08.11, (1984), Federal Railroad Administration, Washington, DC (available from the National Technical Information Service, Springfield, VA) shall be deemed acceptable for analyzing the fire effects on the entire surface of the tank car.

(2) When the analysis shows the thermal resistance of the tank car does not conform to paragraph (a) of this section, the thermal resistance of the tank car must be increased by using a system listed by the Department under paragraph (c) of this section or by testing a new or untried system and verifying it according to appendix B of this part.

(c) *Systems that no longer require test verification.* The Department maintains a list of thermal protection systems that comply with the requirements of appendix B of this part and that no longer require test verification. Information necessary to equip tank cars with one of these systems is available in the RSPA Records Center, Research and Special Programs Administration, 400 Seventh Street, SW., Washington, DC 20590-0001.

[Amdt. 179-50, 60 FR 49077, Sept. 21, 1995, as amended by Amdt. 179-50, 61 FR 33256, June 26, 1996; 66 FR 45390, Aug. 28, 2001]

### § 179.20 Service equipment; protection systems.

If an applicable tank car specification authorizes location of filling or discharge connections in the bottom shell, the connections must be designed, constructed, and protected according to paragraphs E9.00 and E10.00 of the AAR Specifications for Tank Cars, M-1002.

[Amdt. 179-50, 60 FR 49077, Sept. 21, 1995]

## 49 CFR Ch. I (10-1-01 Edition)

### § 179.22 Marking.

In addition to any other marking requirement in this subchapter, the following marking requirements apply:

(a) Each tank car must be marked according to the requirements in Appendix C of the AAR Specifications for Tank Cars.

(b) Each tank car that requires a tank-head puncture-resistance system must have the letter "S" substituted for the letter "A" in the specification marking.

(c) Each tank car that requires a tank-head puncture-resistance system, a thermal protection system, and a metal jacket must have the letter "J" substituted for the letter "A" or "S" in the specification marking.

(d) Each tank car that requires a tank-head puncture-resistance system, a thermal protection system, and no metal jacket must have the letter "T" substituted for the letter "A" or "S" in the specification marking.

[Amdt. 179-50, 60 FR 49077, Sept. 21, 1995, as amended by Amdt. 179-50, 61 FR 33256, June 26, 1996]

### Subpart C—Specifications for Pressure Tank Car Tanks (Classes DOT-105, 109, 112, 114 and 120)

#### § 179.100 General specifications applicable to pressure tank car tanks.

##### § 179.100-1 Tanks built under these specifications shall comply with the requirements of §§ 179.100, 179.101 and when applicable, §§ 179.102 and 179.103.

##### § 179.100-3 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) [Reserved]

[29 FR 18995, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967, and amended by Amdt. 179-10, 36 FR 21344, Nov. 6, 1971; 65 FR 58632, Sept. 29, 2000]

**§ 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.

[29 FR 18995, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967, and amended by Amdt. 179-10, 36 FR 21344, Nov. 6, 1971; Amdt. 179-50, 60 FR 49077, Sept. 21, 1995]

**§ 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:

$$t = Pd / 2SE$$

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.

[29 FR 18995, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967, and amended by Amdt. 179-10, 36 FR 21344, Nov. 6, 1971]

**§ 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.

Specifications	Minimum tensile strength (p.s.i.) welded condition <sup>1</sup>	Minimum elongation in 2 inches (percent) welded condition (longitudinal)
AAR TC128, Gr. B .....	81,000	19
ASTM A 302, Gr. B .....	80,000	20
ASTM A 516 .....	70,000	20
ASTM A 537, Class 1 ...	70,000	23

<sup>1</sup> Maximum stresses to be used in calculations.

(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 with its indicated minimum tensile strength and elongation in the welded condition.

Specifications	Minimum tensile strength (p.s.i.) 0 temper, welded condition <sup>3,4</sup>	Minimum elongation in 2 inches (percent) 0 temper, welded condition (longitudinal)
ASTM B 209, Alloy 5052 <sup>1</sup>	25,000	18
ASTM B 209, Alloy 5083 <sup>2</sup>	38,000	16
ASTM B 209, Alloy 5086 <sup>1</sup>	35,000	14
ASTM B 209, Alloy 5154 <sup>1</sup>	30,000	18
ASTM B 209, Alloy 5254 <sup>1</sup>	30,000	18
ASTM B 209, Alloy 5454 <sup>1</sup>	31,000	18
ASTM B 209, Alloy 5652 <sup>1</sup>	25,000	18

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