

dome for Class DOT-103 and 104 type cars.

(b) For tank cars having an expansion dome, the expansion capacity is the total capacity of the tank and dome combined. The capacity of the dome shall be measured from the inside top of shell of tank to the inside top of dome or bottom of any vent pipe projecting inside of dome, except that when a pressure relief device is applied to side of dome, the effective capacity of the dome shall be measured from top of the pressure relief device opening inside of dome to inside top of shell of tank.

(c) The opening in the tank shell within the dome shall be at least 29 inches in diameter. When the opening in the tank shell exceeds 30 inches in diameter, the opening shall be reinforced in an approved manner. This additional reinforcement may be accomplished by the use of a dome opening of the flued-type as shown in appendix E, Figure E 10C of the AAR Specifications for Tank Cars or by the use of reinforcing as outlined in Appendix E, E3.04 and Figures E10K and E10L. When the opening in the tank shell is less than the inside diameter of the dome, and the dome pocket is not closed off in an approved manner, dome pocket drain holes shall be provided in the tank shell with nipples projecting inside the tank at least 1 inch.

(d) The dome head shall be of approved contour and shall be designed for pressure on concave side.

(e) Aluminum alloy domes: (1) The dome shell thickness shall be calculated by the formula in §179.200-6(a).

(2) The dome head may be an ellipsoid of revolution in which the major axis shall be equal to the diameter of the dome shell and the minor axis shall be one-half the major axis. The thickness in this case shall be determined by using formula in §179.200-6(a).

(3) The dome head, if dished, must be dished to a radius not exceeding 96 inches. Thickness of dished dome head must be calculated by the formula in §179.200-6(c).

(4) Tank shell shall be reinforced by the addition of a plate equal to or greater than shell in thickness and the cross sectional area shall exceed metal removed for dome opening, or tank

shell shall be reinforced by a seamless saddle plate equal to or greater than shell in thickness and butt welded to tank shell. The reinforcing saddle plate shall be provided with a fluid opening having a vertical flange of the diameter of the dome for butt welding shell of dome to the flange. The reinforcing saddle plate shall extend about the dome a distance measured along shell of tank at least equal to the extension at top of tank. Other approved designs may be used.

[29 FR 18995, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967, and amended by Amdt. 179-10, 36 FR 21350, Nov. 6, 1971; Amdt. 179-28, 46 FR 49906, Oct. 8, 1981; Amdt. 179-52, 61 FR 28680, June 5, 1996; 66 FR 45186, 45390, Aug. 28, 2001; 68 FR 48571, Aug. 14, 2003]

§ 179.200-15 Closures for manways.

(a) Manway covers must be of approved type.

(b) Manway covers shall be designed to provide a secure closure of the manway.

(c) Manway covers must be of approved cast, forged, or fabricated metals. Malleable iron, if used, must comply with ASTM A 47 (IBR, see §171.7 of this subchapter), Grade 35018. Cast iron manway covers must not be used.

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

(e) For other manway cover requirements see §179.201-1.

[29 FR 18995, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967, and amended by Amdt. 179-10, 36 FR 21350, Nov. 6, 1971; Amdt. 179-37, 50 FR 11066, Mar. 19, 1985; 68 FR 75762, Dec. 31, 2003]

§ 179.200-16 Gauging devices, top loading and unloading devices, venting and air inlet devices.

(a) When installed, these devices shall be of an approved design which will prevent interchange with any other fixture, and be tightly closed. Unloading pipes shall be securely anchored within the tank. Each tank or compartment may be equipped with one separate air connection.

(b) When the characteristics of the commodity for which the car is authorized are such that these devices must be equipped with valves or fittings to

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permit the loading and unloading of the contents, these devices, including valves, shall be of an approved design, and be provided with a protective housing except when plug or ball type valves with operating handles removed are used. Provision shall be made for closing pipe connections of valves.

(c) A tank may be equipped with a vacuum relief valve of an approved design. Protective housing is not required.

(d) When using a visual gauging device on a car with a hinged manway cover, an outage scale visible through the manway opening shall be provided. If loading devices are applied to permit tank loading with cover closed, a telltale pipe may be provided. Telltale pipe shall be capable of determining that required outage is provided. Pipe shall be equipped with ¼ inch minimum NPT control valve mounted outside tank and enclosed within a housing. Other approved devices may be used in lieu of outage scale or telltale pipe.

(e) Bottom of tank shell may be equipped with a sump or siphon bowl, or both, welded or pressed into the shell. Such sumps or siphon bowls, if applied are not limited in size and must be made of cast, forged, or fabricated metal. Each sump or siphon bowl must be of good welding quality in conjunction with the metal of the tank shell. When sump or siphon bowl is pressed in the bottom of the tank shell, the wall thickness of the pressed section must not be less than that specified for the shell. The section of a circular cross section tank to which a sump or siphon bowl is attached need not comply with the out-of-roundness requirement specified in appendix W, W14.06, of the AAR Specifications for Tank Cars. Any portion of a sump or siphon bowl not forming a part of a cylinder of revolution must have walls of such thickness and be so reinforced that the stresses in the walls caused by a given internal pressure are not greater than the circumferential stress which would exist under the same internal pressure in the wall of a tank of circular cross section designed in accordance with §179.200-6 (a) and (d). In no case shall the wall thickness be less than that specified in §179.201-1.

(f) When top loading and discharge devices, or venting and air inlet devices are installed with exposed piping to a removed location, shutoff valves must be applied directly to reinforcing pads or nozzles at their communication through the tank shell, and must be enclosed in a protective housing with provision for a seal. The piping must include breakage grooves, and suitable bracing. Relief valves must be applied to liquid lines for protection in case lading is trapped. Provision must be made to insure closure of the valves while the car is in transit.

(g) Protective housing, when required, must be fabricated of approved material and have cover and sidewalls not less than 0.119 inch in thickness.

[29 FR 18995, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967, and amended by Amdt. 179-10, 36 FR 21350, Nov. 6, 1971; Amdt. 179-52, 61 FR 28680, June 5, 1996; 69 FR 54047, Sept. 7, 2004]

§ 179.200-17 Bottom outlets.

(a) If indicated in §179.201-1, tank may be equipped with bottom outlet. Bottom outlet, if applied, must comply with the following requirements:

(1) The extreme projection of the bottom outlet equipment may not be more than that allowed by appendix E of the AAR Specifications for Tank Cars (IBR, see §171.7 of this subchapter). All bottom outlet reducers and closures and their attachments shall be secured to the car by at least ⅜-inch chain, or its equivalent, except that the bottom outlet closure plugs may be attached by ¼-inch chain. When the bottom outlet closure is of the combination cap and valve type, the pipe connection to the valve shall be closed by a plug, cap, or approved quick coupling device. The bottom outlet equipment should include only the valve, reducers and closures that are necessary for the attachment of unloading fixtures. The permanent attachment of supplementary exterior fittings shall be approved by the AAR Committee on Tank Cars.

(2) Bottom outlet must be of approved construction, and be provided with a liquid-tight closure at its lower end.

(3) On cars with center sills, a ball valve may be welded to the outside bottom of the tank or mounted on a pad or