

a visible location at or adjacent to the valve.

(4) The liquid level gauging device used as a primary control for filling must be designed and installed to accurately indicate the maximum filling level, at the point midway of the tank both longitudinally and laterally.

(b) *Pressure gauges.* Each cargo tank must be provided with a suitable pressure gauge indicating the lading pressure and located on the front of the jacket so it can be read by the driver in the rear view mirror. Each gauge must have a reference mark at the cargo tank design pressure or the start-to-discharge pressure of the safety relief valve or pressure control valve, whichever is less.

(c) *Orifices.* All openings for dip tube gauging devices, trycock lines, and pressure gauges must be restricted at or inside the jacket by orifices no larger than 0.060-inch diameter.

§ 178.338-15 Cleanliness.

A cargo tank constructed for oxygen service must be thoroughly cleaned to remove all foreign material in accordance with CCA Pamphlet G 4.1. All loose particles from fabrication such as weld beads, dirt, grinding wheel debris, and other loose contaminants must be removed prior to final closure of the manway or the tank. Chemical or solvent cleaning with a material compatible with the intended lading must be performed to remove any contaminants likely to react with the lading.

§ 178.338-16 Inspection and testing.

(a) *General.* The material of construction of a cargo tank, its appurtenances, and the jacket if evacuated, must be inspected for compliance with the ASME Code. The tank must be subjected to either a hydrostatic or pneumatic test in accordance with the following:

(1) *Hydrostatic test.* The hydrostatic test pressure must be one and one-half times the sum of the design pressure, plus static head of lading, plus 14.7 psi if subjected to external vacuum, except that for tanks constructed in accordance with Part UHT of the ASME Code the test pressure must be twice the design pressure.

(2) *Pneumatic test.* The pneumatic test may be used in place of the hydrostatic test. Due regard for protection of all personnel should be taken due to the potential hazard involved in a pneumatic test. The pneumatic test pressure must be one and one-half times the sum of the design pressure, plus static head of lading, plus 14.7 psi if subjected to external vacuum, except that for tanks constructed in accordance with Part UHT of the ASME Code, the test pressure must be twice the design pressure. The pneu-

matic test pressure in the vessel must be reached by gradually increasing the pressure to one-half of the test pressure. Thereafter, the test pressure must be increased in steps of approximately one-tenth of the test pressure until the required test pressure has been reached. Then the pressure must be reduced to a value equal to four-fifths of the test pressure and held for a sufficient time to permit inspection of the cargo tank for leaks.

(b) *Weld inspection.* All welds in or on the cargo tank shell or heads shall be radiographed in accordance with the ASME Code. A tank which has been subjected to examination by the magnetic particle method, the liquid penetrant method, or any method involving a material deposit on the interior tank surface may not be used for oxygen service.

(c) *Defect repair.* All cracks and other defects found must be repaired in accordance with the repair procedures prescribed by the ASME Code. The welder and the welding procedure must be qualified in accordance with the ASME Code. If any cutting is done by other than mechanical means, the cutter, the welder, and the combination of cutting and welding must be so qualified. After repair, the tank must again be post-weld heat-treated, if such heat treatment was previously performed, and the repaired areas must again be tested.

(d) A verification must be made of the interior cleanliness of a tank constructed for oxygen service by means that assure that all contaminants that are likely to react with the lading have been removed as required in § 178.338-15.

§ 178.338-17 Pumps.

See §§ 173.33(f) and 173.318(a)(4) of this subchapter.

§ 178.338-18 Marking.

(a) *Nameplate.* On the right side near the front of each tank a corrosion resistant metal nameplate must be permanently affixed by brazing or welding around its perimeter. If this nameplate is attached by welding, it must be welded before the tank is postweld heat-treated. The nameplate must be plainly marked by stamping, embossing, or other means of forming letters into the metal of the plate in characters at least $\frac{3}{8}$ -inches high. The following information, in addition to that required by the ASME Code, must be included (parenthetical abbreviations may be used):

- (1) DOT Specification number MC 338 (DOT MC 338);
- (2) Material specification number (Mat. Spec. No.);
- (3) Maximum density of lading for which the tank is designed (Max. Dens. of Lading);

(4) Water capacity in pounds net at 60°F. with the tank at its coldest operating temperature after deduction for the volume above the inlet to the safety relief device or pressure controlling valve, structural members, baffles, piping, and other appurtenances inside the tank (W. Cap.); and

(5) Original test date (Orig. Test Date);

(b) *Specification plate.* An additional plate, in the form specified in paragraph (a) of this section must be attached by welding, brazing, or riveting to the jacket on the right side near the front, or at the control station, in a position to be readily legible to operating personnel. It must be marked with the information specified in paragraph (a) of this section and in addition, in characters at least $\frac{3}{8}$ -inches high, the following (parenthetical abbreviations may be used):

- (1) Vehicle manufacturer (Veh. Mfr.);
- (2) Manufacturer's vehicle serial No. (Veh. No.);
- (3) Lining material, if any (Lining);
- (4) Date of manufacture (Date of Mfr.);
- (5) Certificate date (Cert. Date);
- (6) Design service temperature (Design Serv. Temp.);
- (7) "INSULATION FOR OXYGEN SERVICE" or "NOT AUTHORIZED FOR OXYGEN SERVICE", as appropriate;

(8) Marked rated holding time—hours and name of cryogen (MRHT— hrs., name of cryogen); and

(9) Maximum weight of lading for which designed—pounds (Max. Net Wgt.—lbs.).

(c) The design weight of lading used in determining the loading in §§ 178.338-3(b), 178.338-10(b) and (c), 178.338-13(b) and (e) of this section must be shown as the maximum weight of lading marking required by paragraph (b) of this section.

(d) The jacket must be plainly marked on the right side near the front, in letters, at least two inches high on a contrasting background "One-way Travel Time—hrs.," with the blank filled in according to the results of the computation prescribed in § 178.338-9(c).

§ 178.338-19 Certification.

(a) The manufacturer of a cargo tank vehicle shall furnish with the completed vehicle at or before the time of delivery, the tank manufacturer's data report required by the ASME Code, a photograph, pencil rub, or other facsimile of the plates required by paragraphs (a) and (b) of § 178.338-18, and a certificate bearing the manufacturer's vehicle serial number stating that the completed tank vehicle conforms to all applicable require-