

manufacturer and a Design Certifying Engineer certifying that the cargo tank motor vehicle design meets the applicable specifications; and

(2) For each variable specification cargo tank motor vehicle, a certificate signed by a responsible official of the manufacturer and a Registered Inspector certifying that the cargo tank motor vehicle is constructed, tested and completed in conformance with the applicable specifications. The certificate must include all the information required and marked on the variable specification plate.

(d) In the case of a cargo tank motor vehicle manufactured in two or more stages, each manufacturer who performs a manufacturing operation on the incomplete vehicle or portion thereof shall provide to the succeeding manufacturer, at or before the time of delivery, a certificate covering the particular operation performed by that manufacturer, including any certificates received from previous manufacturers, Registered Inspectors, and Design Certifying Engineers. Each certificate must indicate the portion of the complete cargo tank motor vehicle represented thereby, such as basic cargo tank fabrication, insulation, jacket, lining, or piping. The final manufacturer shall provide all applicable certificates to the owner.

(e) *Specification shortages.* If a cargo tank is manufactured which does not meet all applicable specification requirements, thereby requiring subsequent manufacturing involving the installation of additional components, parts, appurtenances or accessories, the cargo tank manufacturer may affix the name plate and specification plate, as required by §178.345-14 (b) and (c), without the original date of certification stamped on the specification plate. The manufacturer shall state the specification requirements not complied with on the manufacturer's Certificate of Compliance. When the cargo tank is brought into full compliance with the applicable specification, the Registered Inspector shall stamp the date of compliance on the specification plate. The Registered Inspector shall issue a Certificate of Compliance stating details of the particular operations performed on the cargo tank, and the

date and person (manufacturer, carrier, or repair organization) accomplishing the compliance.

[Amdt. 178-89, 55 FR 37063, Sept. 7, 1990, as amended by Amdt. 178-98, 58 FR 33306, June 16, 1993; Amdt. 178-105, 59 FR 55176, Nov. 3, 1994; Amdt. 178-118, 61 FR 51342, Oct. 1, 1996; 68 FR 75756, Dec. 31, 2003]

§ 178.346 Specification DOT 406; cargo tank motor vehicle.

§ 178.346-1 General requirements.

(a) Each Specification DOT 406 cargo tank motor vehicle must meet the general design and construction requirements in §178.345, in addition to the specific requirements contained in this section.

(b) *MAWP:* The MAWP of each cargo tank must be no lower than 2.65 psig and no higher than 4 psig.

(c) Vacuum loaded cargo tanks must not be constructed to this specification.

(d) Each cargo tank must be "constructed in accordance with Section VIII of the ASME Code" (IBR, see §171.7 of this subchapter) except as modified herein:

(1) The record-keeping requirements contained in the ASME Code Section VIII do not apply. Parts UG-90 through 94 in Section VIII do not apply. Inspection and certification must be made by an inspector registered in accordance with subpart F of part 107.

(2) Loadings must be as prescribed in §178.345-3.

(3) The knuckle radius of flanged heads must be at least three times the material thickness, and in no case less than 0.5 inch. Stuffed (inserted) heads may be attached to the shell by a fillet weld. The knuckle radius and dish radius versus diameter limitations of UG-32 do not apply. Shell sections of cargo tanks designed with a non-circular cross section need not be given a preliminary curvature, as prescribed in UG-79(b).

(4) Marking, certification, data reports, and nameplates must be as prescribed in §§178.345-14 and 178.345-15.

(5) Manhole closure assemblies must conform to §§178.345-5 and 178.346-5.

(6) Pressure relief devices must be as prescribed in §178.346-3.

(7) The hydrostatic or pneumatic test must be as prescribed in §178.346-5.

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(8) The following paragraphs in parts UG and UW in Section VIII of the ASME Code do not apply: UG-11, UG-12, UG-22(g), UG-32(e), UG-34, UG-35, UG-44, UG-76, UG-77, UG-80, UG-81, UG-96, UG-97, UW-13(b)(2), UW-13.1(f) and the dimensional requirements found in Figure UW-13.1.

(9) Single full fillet lap joints without plug welds may be used for arc or gas welded longitudinal seams without radiographic examination under the following conditions:

(i) For a truck-mounted cargo tank, no more than two such joints may be used on the top half of the tank and no more than two joints may be used on the bottom half. They may not be located farther from the top and bottom centerline than 16 percent of the shell's circumference.

(ii) For a self-supporting cargo tank, no more than two such joints may be used on the top of the tank. They may not be located farther from the top centerline than 12.5 percent of the shell's circumference.

(iii) *Compliance test.* Two test specimens of the material to be used in the manufacture of a cargo tank must be tested to failure in tension. The test specimens must be of the same thicknesses and joint configuration as the cargo tank, and joined by the same welding procedures. The test specimens may represent all the tanks that are made of the same materials and welding procedures, have the same joint configuration, and are made in the same facility within 6 months after the

tests are completed. Before welding, the fit-up of the joints on the test specimens must represent production conditions that would result in the least joint strength. Evidence of joint fit-up and test results must be retained at the manufacturers' facility.

(iv) *Weld joint efficiency.* The lower value of stress at failure attained in the two tensile test specimens shall be used to compute the efficiency of the joint as follows: Determine the failure ratio by dividing the stress at failure by the mechanical properties of the adjacent metal; this value, when multiplied by 0.75, is the design weld joint efficiency.

(10) The requirements of paragraph UW-9(d) in Section VIII of the ASME Code do not apply.

[Amdt. 178-89, 54 FR 25028, June 12, 1989, as amended at 55 FR 37063, Sept. 7, 1990; Amdt. 178-89, 56 FR 27877, June 17, 1991; Amdt. 178-105, 59 FR 55176, Nov. 3, 1994; 65 FR 58631, Sept. 29, 2000; 66 FR 45387, Aug. 28, 2001; 68 FR 19285, Apr. 18, 2003; 68 FR 75756, Dec. 31, 2003]

§ 178.346-2 **Material and thickness of material.**

The type and thickness of material for DOT 406 specification cargo tanks must conform to §178.345-2, but in no case may the thickness be less than that determined by the minimum thickness requirements in §178.320(a). The following Tables I and II identify the specified minimum thickness values to be employed in that determination.

TABLE I—SPECIFIED MINIMUM THICKNESS OF HEADS (OR BULKHEADS AND BAFFLES WHEN USED AS TANK REINFORCEMENT) USING MILD STEEL (MS), HIGH STRENGTH LOW ALLOY STEEL (HSLA), AUSTENITIC STAINLESS STEEL (SS), OR ALUMINUM (AL)—EXPRESSED IN DECIMALS OF AN INCH AFTER FORMING

Material	Volume capacity in gallons per inch of length								
	14 or less			Over 14 to 23			Over 23		
	MS	HSLA SS	AL	MS	HSLA SS	AL	MS	HSLA SS	AL
Thickness100	.100	.160	.115	.115	.173	.129	.129	.187

TABLE II—SPECIFIED MINIMUM THICKNESS OF SHELL USING MILD STEEL (MS), HIGH STRENGTH LOW ALLOY STEEL (HSLA), AUSTENITIC STAINLESS STEEL (SS), OR ALUMINUM (AL)—EXPRESSED IN DECIMALS OF AN INCH AFTER FORMING ¹

Cargo tank motor vehicle rated capacity (gallons)	MS	SS/HSLA	AL
More than 0 to at least 4,500	0.100	0.100	0.151
More than 4,500 to at least 8,000	0.115	0.100	0.160