

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—Continued

Cargo tank motor vehicle rated capacity (gallons)	MS	SS/HSLA	AL
More than 8,000 to at least 14,000	0.129	0.129	0.173
More than 14,000	0.143	0.143	0.187

¹Maximum distance between bulkheads, baffles, or ring stiffeners shall not exceed 60 inches.

[Amdt. 178-89, 54 FR 25028, June 12, 1989, as amended at 55 FR 37064, Sept. 7, 1990; Amdt. 178-105, 59 FR 55176, Nov. 3, 1994; 68 FR 19285, Apr. 18, 2003]

§ 178.346-3 Pressure relief.

(a) Each cargo tank must be equipped with a pressure relief system in accordance with §178.345-10 and this section.

(b) *Type and construction.* In addition to the pressure relief devices required in §178.345-10:

(1) Each cargo tank must be equipped with one or more vacuum relief devices;

(2) When intended for use only for lading meeting the requirements of §173.33(c)(1)(iii) of this subchapter, the cargo tank may be equipped with a normal vent. Such vents must be set to open at not less than 1 psig and must be designed to prevent loss of lading through the device in case of vehicle upset; and

(3) Notwithstanding the requirements in §178.345-10(b), after August 31, 1996, each pressure relief valve must be able to withstand a dynamic pressure surge reaching 30 psig above the design set pressure and sustained above the set pressure for at least 60 milliseconds with a total volume of liquid released not exceeding 1 L before the relief valve recloses to a leak-tight condition. This requirement must be met regardless of vehicle orientation. This capability must be demonstrated by testing. TTMA RP No. 81 (IBR, see §171.7 of this subchapter), cited at §178.345-10(b)(3)(i), is an acceptable test procedure.

(c) *Pressure settings of relief valves.* (1) Notwithstanding the requirements in §178.345-10(d), the set pressure of each primary relief valve must be not less than 110 percent of the MAWP or 3.3 psig, whichever is greater, and not more than 138 percent of the MAWP. The valve must close at not less than the MAWP and remain closed at lower pressures.

(2) Each vacuum relief device must be set to open at no more than 6 ounces vacuum.

(d) *Venting capacities.* (1) Notwithstanding the requirements in §178.345-10 (e) and (g), the primary pressure relief valve must have a venting capacity of at least 6,000 SCFH, rated at not greater than 125 percent of the tank test pressure and not greater than 3 psig above the MAWP. The venting capacity required in §178.345-10(e) may be rated at these same pressures.

(2) Each vacuum relief system must have sufficient capacity to limit the vacuum to 1 psig.

(3) If pressure loading or unloading devices are provided, the relief system must have adequate vapor and liquid capacity to limit the tank pressure to the cargo tank test pressure at maximum loading or unloading rate. The maximum loading and unloading rates must be included on the metal specification plate.

[Amdt. 178-89, 54 FR 25029, June 12, 1989, as amended at 55 FR 37064, Sept. 7, 1990; Amdt. 178-105, 59 FR 55176, Nov. 3, 1994. Redesignated by Amdt. 178-112, 61 FR 18934, Apr. 29, 1996; 66 FR 45389, Aug. 28, 2001; 68 FR 75756, Dec. 31, 2003]

§ 178.346-4 Outlets.

(a) All outlets on each tank must conform to §178.345-11 and this section.

(b) External self-closing stop-valves are not authorized as an alternative to internal self-closing stop-valves on loading/unloading outlets.

[Amdt. 178-89, 54 FR 25029, June 12, 1989. Redesignated by Amdt. 178-112, 61 FR 18934, Apr. 29, 1996]