(6) In addition to the internal self-closing stop valve, each filling and discharge line must be fitted with a stop valve located in the line between the internal self-closing stop valve and the hose connection. A back flow check valve or excess flow valve may not be used to satisfy this requirement.

(7) An excess flow valve may be designed with a bypass, not to exceed a 0.1016 centimeter (0.040 inch) diameter opening, to allow equalization of pressure.

(b) Inlets and discharge outlets on chlorine tanks. The inlet and discharge outlets on a cargo tank used to transport chlorine must meet the requirements of §178.337–1(c)(2) and must be fitted with an internal excess flow valve. In addition to the internal excess flow valve, the inlet and discharge outlets must be equipped with an external stop valve (angle valve). Excess flow valves must conform to the standards of The Chlorine Institute, Inc., as follows:

(1) A valve conforming to The Chlorine Institute, Inc., Dwg. 101–7 (IBR, see §171.7 of this subchapter), must be installed under each liquid angle valve.

(2) A valve conforming to The Chlorine Institute, Inc., Dwg. 106–6 (IBR, see §171.7 of this subchapter), must be installed under each gas angle valve.

(c) Discharge outlets on carbon dioxide, refrigerated liquid, cargo tanks. A discharge outlet on a cargo tank used to transport carbon dioxide, refrigerated liquid is not required to be fitted with an internal self-closing stop valve.

§178.337–9 Pressure relief devices, piping, valves, hoses, and fittings.

(a) Pressure relief devices. (1) See §173.315(1) of this subchapter.

(2) On cargo tanks for carbon dioxide or nitrous oxide see §173.315 (i) (9) and (10) of this subchapter.

(3) Each valve must be designed, constructed, and marked for a rated pressure not less than the cargo tank design pressure at the temperature expected to be encountered.

(b) Piping, valves, hose, and fittings. (1) The burst pressure of all piping, pipe fittings, hose and other pressure parts, except for pump seals and pressure relief devices, must be at least 4 times the design pressure of the cargo tank. Additionally, the burst pressure may not be less than 4 times any higher pressure to which each pipe, pipe fitting, hose or other pressure part may be subjected to in service. For chlorine service, see paragraph (b)(7) of this section.

(2) Pipe joints must be threaded, welded, or flanged. If threaded pipe is used, the pipe and fittings must be Schedule 80 weight or heavier, except for sacrificial devices. Malleable metal, stainless steel, or ductile iron must be used in the construction of primary valve body parts and fittings used in liquid filling or vapor equalization. Stainless steel may be used for internal components such as shutoff discs and springs except where incompatible with the lading to be transported. Where copper tubing is permitted, joints must be brazed or be of equally strong metal union type. The melting point of the brazing material may not be lower than 538 °C (1,000 °F). The method of joining tubing may not reduce the strength of the tubing.

(3) Each hose coupling must be designed for a pressure of at least 120 percent of the hose design pressure and so that there will be no leakage when connected.

(4) Piping must be protected from damage due to thermal expansion and contraction, jarring, and vibration. Slip joints are not authorized for this purpose.

(5) [Reserved]

(6) Cargo tank manufacturers and fabricators must demonstrate that all piping, valves, and fittings on a cargo tank are free from leaks. To meet this requirement, the piping, valves, and fittings must be tested after installation at not less than 80 percent of the design pressure marked on the cargo tank.

(7) A hose assembler must:

(i) Permanently mark each hose assembly with a unique identification number.

(ii) Demonstrate that each hose assembly is free from leaks by performing the tests and inspections in §180.416(f) of this subchapter.
(iii) Mark each hose assembly with the month and year of its original pressure test.

(8) Chlorine cargo tanks. Angle valves on cargo tanks intended for chlorine service must conform to the standards of the Chlorine Institute, Inc., Dwg. 104–8 or "Section 3, Pamphlet 166, Angle Valve Guidelines for Chlorine Bulk Transportation." (IBR, see §171.7 of this subchapter). Before installation, each angle valve must be tested for leakage at not less than 225 psig using dry air or inert gas.

(c) Marking inlets and outlets. Except for gauging devices, thermometer wells, and pressure relief valves, each cargo tank inlet and outlet must be marked "liquid" or "vapor" to designate whether it communicates with liquid or vapor when the cargo tank is filled to the maximum permitted filling density. A filling line that communicates with vapor may be marked "spray-fill" instead of "vapor."

(d) Refrigeration and heating coils. (1) Refrigeration and heating coils must be securely anchored with provisions for thermal expansion. The coils must be pressure tested externally to at least the cargo tank test pressure, and internally to either the tank test pressure or twice the working pressure of the heating/refrigeration system, whichever is higher. A cargo tank may not be placed in service if any leakage occurs or other evidence of damage is found. The refrigerant or heating medium to be circulated through the coils must not be capable of causing any adverse chemical reaction with the cargo tank lading in the event of leakage. The unit furnishing refrigeration may be mounted on the motor vehicle.

(2) Where any liquid susceptible to freezing, or the vapor of any such liquid, is used for heating or refrigeration, the heating or refrigeration system shall be arranged to permit complete drainage.

(9) Chlorine cargo tanks. Angle valves on cargo tanks intended for chlorine service must conform to the standards of the Chlorine Institute, Inc., Dwg. 104–8 or "Section 3, Pamphlet 166, Angle Valve Guidelines for Chlorine Bulk Transportation." (IBR, see §171.7 of this subchapter). Before installation, each angle valve must be tested for leakage at not less than 225 psig using dry air or inert gas.

(8) Chlorine cargo tanks. Angle valves on cargo tanks intended for chlorine service must conform to the standards of the Chlorine Institute, Inc., Dwg. 104–8 or "Section 3, Pamphlet 166, Angle Valve Guidelines for Chlorine Bulk Transportation." (IBR, see §171.7 of this subchapter). Before installation, each angle valve must be tested for leakage at not less than 225 psig using dry air or inert gas.

(c) Marking inlets and outlets. Except for gauging devices, thermometer wells, and pressure relief valves, each cargo tank inlet and outlet must be marked "liquid" or "vapor" to designate whether it communicates with liquid or vapor when the cargo tank is filled to the maximum permitted filling density. A filling line that communicates with vapor may be marked "spray-fill" instead of "vapor."

(d) Refrigeration and heating coils. (1) Refrigeration and heating coils must be securely anchored with provisions for thermal expansion. The coils must be pressure tested externally to at least the cargo tank test pressure, and internally to either the tank test pressure or twice the working pressure of the heating/refrigeration system, whichever is higher. A cargo tank may not be placed in service if any leakage occurs or other evidence of damage is found. The refrigerant or heating medium to be circulated through the coils must not be capable of causing any adverse chemical reaction with the cargo tank lading in the event of leakage. The unit furnishing refrigeration may be mounted on the motor vehicle.

(2) Where any liquid susceptible to freezing, or the vapor of any such liquid, is used for heating or refrigeration, the heating or refrigeration system shall be arranged to permit complete drainage.


EDITORIAL NOTE: For Federal Register citations affecting §178.337–9, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.fdsys.gov.