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will be visible on all sides. When at anchor, a vessel during transfer of bulk cargo shall display a red flag by day, placed so that it will be visible on all sides. This flag may be metallic.

Subpart 151.50—Special Requirements

EDITORIAL NOTE: Nomenclature changes to Subpart 151.50 appear at 60 FR 50465, Sept. 29, 1995 and at 61 FR 50732, Sept. 27, 1996.

§ 151.50–1 General.

Special requirements found in this subpart pertain to specific cargoes and to similar groups of cargoes. These requirements are in addition to and take precedence over any other requirements found in these regulations.

§ 151.50–5 Cargoes having toxic properties.

When table 151.05 refers to this section, the following apply:

(a) [Reserved]

(b) Independent tanks shall be designed and tested for a head of at least 8 feet above the top of the tank using the specific gravity of the product to be carried. In addition, tank design calculations shall demonstrate that the tank can withstand, without rupture, a single loading to the highest level to which the product may rise, if that exceeds 8 feet. In general, plate less than five-sixteenths inch in thickness shall not be used in the fabrication of independent tanks unless otherwise approved.

(c)(1) Cargo tanks transporting liquids having a Reid vapor pressure exceeding 14 pounds per square inch absolute or vented at a gauge pressure exceeding 4 pounds per square inch, or where air or water pressure is used to discharge the cargo, shall be fabricated as arc-welded unfired pressure vessels.

(2) Unfired pressure vessel cargo tanks shall be designed for a pressure not less than the vapor pressure, in pounds per square inch gauge, of the lading at 115°F., or the maximum air or water pressure used to discharge the cargo, whichever is greater, but in no case shall the design pressure of such tanks be less than 30 pounds per square inch gauge.

(d) *Piping.* (1) The pumps and piping used for cargo transfer shall be independent of all other piping.

(2) Where multiple cargoes are carried, and the cargo piping conveying cargoes covered under this section are led through cargo tanks containing other products, the piping shall be encased in a tunnel.

(3) Where cargo lines handling other products, or bilge and ballast piping are led through tanks containing cargoes covered by this section, the piping shall be enclosed in a tunnel.

(e) Gravity type cargo tanks shall be fitted with an approved pressure-vacuum relief valve of not less than 2½-inch size, which shall be set at a pressure of not less than 3 pounds per square inch gauge, but not in excess of the design pressure of the tank.

(f) The discharge fittings from each safety relief or pressure vacuum relief valve shall be directed in such a manner as to not impinge on another tank, piping or any other equipment which would increase the fire hazard should burning products be discharged from the safety or pressure vacuum relief valve as a result of a fire or other casualty. In addition, the discharges shall be directed away from areas where it is likely that persons might be working and as remote as practicable from ventilation inlets and ignition sources. A common discharge header may be employed if desired. The area near the discharge fittings shall be clearly marked as a hazardous area.

(g) A means shall be provided for either the reclamation or safe venting of vapors during the loading and unloading operations. For this purpose the safety relief or pressure vacuum relief valve shall be provided with a valved bypass to a vapor return line shore connection which shall be used whenever vapor return shore facilities are available. In the event vapors must be vented to the atmosphere, a vent riser shall extend at least 12 feet above the highest level accessible to personnel. The vent riser may be collapsible for ease of stowage when not in use. Vapor return lines or vent risers for tanks carrying the same class product may be connected to a common header system if desired. Tanks carrying cargoes covered by this section shall be vented

independent of tanks carrying other products.

(h) The pump room ventilation outlet duct exhausts shall terminate at a distance of at least 6 feet above the enclosed space or pump room and at least 6 feet from any entrance to the interior part of the vessel. The discharge end of the exhaust ducts shall be located so as to preclude the possibility of recirculating contaminated air through the pump room, or other spaces where personnel may be present.

[CGFR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 88–100, 54 FR 40040, Sept. 29, 1989]

§151.50–6 Motor fuel antiknock compounds.

When transporting motor fuel antiknock compounds containing tetraethyl lead and tetramethyl lead the requirements listed in this section shall be observed.

(a) Tanks used for these cargoes shall not be used for the transportation of any other cargo except those commodities to be used in the manufacture of tetraethyl lead and tetramethyl lead.

(b) Pump rooms shall be equipped with forced ventilation with complete air change every 2 minutes. Air analysis shall be run for lead content to determine if the atmosphere is satisfactory prior to personnel entering the pump room.

(c) Entry into cargo tanks used for the transportation of these cargoes is not permitted.

(d) No internal tank inspection is required. If it is desired to internally inspect tanks used for these cargoes, the Commandant must be notified in advance before such inspection is made.

(e) The provisions of §151.50–5 shall also be met as a requirement for shipping antiknock compounds containing tetraethyl lead and tetramethyl lead.

§151.50–10 Alkylene oxides.

(a) For the purpose of this part, alkylene oxides are considered to be ethylene oxide and propylene oxide.

(b) Alkylene oxides transported under the provisions of this part shall be acetylene free.

(c)(1) No other product may be transported in tanks certified for an alkylene oxide except that the Commandant may approve subsequent transportation of other products and return to alkylene oxide service if tanks, piping and auxiliary equipment are adequately cleaned to the satisfaction of the Marine Inspector.

(2) Unless authorized by the Commandant, no other kind of cargo except methane, ethane, propane, butane and pentane shall be on board a tank vessel certificated for the carriage of an alkylene oxide at the same time an alkylene oxide in either the liquid or vapor state is present in any cargo tank. Alkylene oxide tanks shall not be installed in tanks intended for any other cargo.

(d) All valves, flanges, fittings, and accessory equipment shall be of a type suitable for use with the alkylene oxides and shall be made of steel or stainless steel, or other materials acceptable to the Commandant. Impurities of copper, magnesium and other acetylide-forming metals shall be kept to a minimum. The chemical composition of all material used shall be submitted to the Commandant for approval prior to fabrication. Disks or disk faces, seats and other wearing parts of valves shall be made of stainless steel containing not less than 11 percent chromium. Mercury, silver, aluminum, magnesium, copper, and their alloys shall not be used for any valves, gauges, thermometers, or any similar devices. Gaskets shall be constructed of spirally wound stainless steel with ''Teflon'' or other suitable material. All packing and gaskets shall be constructed of materials which do not react spontaneously with or lower the autoignition temperature of the alkylene oxides.

(e) The pressure rating of valves, fittings, and accessories shall be not less than the maximum pressure for which the cargo tank is designed, or the shutoff head of the cargo pump, whichever is greater, but in no case less than 150 pounds per square inch. Welded fittings manufactured in accordance with A.N.S.I. Standards shall be used wherever possible, and the number of pipe joints shall be held to a minimum. Threaded joints in the cargo liquid and vapor lines are prohibited.

(f) The thermometer shall terminate in the liquid space and shall be attached to the shell by welding with the end of the fitting being provided with a gastight screwed plug or bolted cover.

(g) Automatic float continuous reading tape gauge, and similar types, shall be fitted with a shutoff valve located as close to the tank as practicable, which shall be designed to close automatically in the event of fracture of the external gauge piping. An auxiliary gauging device shall always be used in conjunction with an automatic gauging device.

(h) Filling and discharge piping shall extend to within 4 inches of the bottom of the tank or sump pit if one is provided.

(i) *Venting.* (1) The discharge fittings from each safety relief or pressure vacuum relief valve shall be directed in such a manner as to not impinge on another tank, piping or any other equipment which would increase the fire hazard should burning products be discharged from the safety or pressure vacuum relief valve as a result of a fire or other casualty. In addition, the discharges shall be directed away from areas where it is likely that persons might be working and as remote as practicable from ventilation inlets and ignition sources. A common discharge header may be employed if desired. The area near the discharge fittings shall be clearly marked as a hazardous area.

(2) A means shall be provided for either the reclamation or safe venting of vapors during the loading and unloading operations. For this purpose, the safety relief or pressure vacuum relief valve shall be provided with a valved bypass to a vapor return line shore connection which shall be used whenever vapor return shore facilities are available. In the event vapors must be vented to the atmosphere, a vent riser shall be connected to the vapor return line and extend at least 12 feet above the highest level accessible to personnel. The vent riser may be collapsible for ease of stowage when not in use. The vent riser shall not be connected to a safety relief or pressure vacuum valve. Vapor return lines or vent risers for tanks carrying the same class product may be connected to a common header system if desired. Tanks carrying alkylene oxides shall be vented independent of tanks carrying other products.

(3) The outlet of each vent riser shall be fitted with acceptable corrosion-resistant flame screen of suitable material or a flame arrester suitable for use with alkylene oxide.

(j) *Ventilation.* (1) All enclosed spaces within the hull shall be vented or ventilated in accordance with the provisions of this subchapter except as otherwise provided for in this subpart.

(2) The enclosed spaces in which the cargo tanks are located shall be inerted by injection of a suitable inert gas or shall be well ventilated.

(3) The enclosed spaces in which the cargo tanks are located, if an inerting system is not installed, shall be fitted with forced ventilation of such capacity to provide a complete change of air every three minutes and arranged in such a manner that any vapors lost into the space will be removed. The ventilation system shall be in operation at all times cargo is being loaded or discharged. No electrical equipment shall be fitted within the spaces or within ten feet of the ventilation exhaust from these spaces.

(4) All ventilation machinery shall be of nonsparking construction and shall not provide a source of vapor ignition.

(5) Each vent shall be fitted with a flame screen of corrosion resistant wire which is suitable for use with the alkylene oxide.

(k)(1) Flexible metal hose fabricated of stainless steel or other acceptable material, resistant to the action of the alkylene oxide, shall be fitted to the liquid and vapor lines during cargo transfer.

(2) The hose shall be marked with the maximum pressure guaranteed by the manufacturer, and with his certification with the words ''Certified for _____ Oxide.''

(3) Cargo hose intended for alkylene oxide service shall not be used for any other products except those which are compatible with the alkylene oxide.

(l) Vessel shall be electrically bonded to the shore piping prior to connecting the cargo hose. This electrical bonding shall be maintained until after the cargo hose has been disconnected and any spillage has been removed.

(m) Cargo shall be discharged by pumping or by displacement with nitrogen or other acceptable inert gas. In no case shall air be allowed to enter the system. During loading and unloading operations, the vapor shall not be discharged to the atmosphere. Provisions shall be made to return all displaced vapor to the loading facility. The loading rate and the pressure applied to the tank to discharge the cargo shall be so limited to prevent opening the safety relief valves.

(n) During cargo transfer, a water hose with pressure to the nozzle, when atmospheric temperatures permit, shall be connected to a water supply for immediate use during filling and discharge operations and any spillage of alkylene oxide shall be immediately washed away. This requirement can be met by facilities provided from shore.

(o) Prior to disconnecting shore lines, the pressure in the liquid and vapor lines shall be relieved through suitable valves installed at the loading header. The liquid and vapor discharged from these lines shall not be discharged to atmosphere.

(p) The safety relief valves shall be tested by liquid, gas, or vapor pressure at least once every 2 years to determine the accuracy of adjustment and, if necessary, shall be reset. Alkylene oxides shall not be used as the testing medium.

(q) The special requirements for ethylene oxide contained in §151.50–12 and for propylene oxide contained in §151.50–13 shall also be observed.

[CGFR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 85–061, 54 FR 50966, Dec. 11, 1989]

§ 151.50–12 Ethylene oxide.

(a)(1) Ethylene oxide shall be carried in fixed, independent, pressure vessel type cargo tanks, designed, constructed, arranged and, if necessary, equipped with machinery to maintain the cargo temperature below 90°F. except as otherwise provided for in paragraph (a)(3) of this section.

(2) Ethylene oxide shall be loaded at a temperature below 70°F.

(3) When ethylene oxide is to be transported at or near atmospheric pressure, the Commandant may permit the use of alternate methods of storage which are consistent with the minimum requirements of this subpart.

(b)(1) All cargo tanks shall be constructed of a carbon steel or stainless steel acceptable to the Commandant. Impurities of copper, magnesium and other acetylide-forming metals shall be kept to a minimum. The chemical composition of all steel used shall be submitted to the Commandant for approval prior to fabrication. Aluminum, copper and other acetylide-forming metals, such as silver, mercury, magnesium, and their alloys shall not be used as materials of construction for tanks or equipment used in handling ethylene oxide.

(2) Cargo tanks shall meet the requirements of Class I pressure vessels.

(3) Cargo tanks shall be designed for the maximum pressure of vapor or gas used in discharging the cargo but in no case shall the design pressure of such tanks be less than 75 pounds per square inch gauge. The tank shell and heads shall not be less than 5/16-inch thick.

(c)(1) Cargo tanks shall be located below deck in holds or enclosed spaces with the domes or trunks extended above the weather deck and terminating in the open. Provisions shall be made to maintain the watertightness of the deck by means of watertight seals around such domes or trunks. The holds or enclosed spaces, in which the ethylene oxide tanks are located, shall not be used for any other purpose. However, in open hopper type barges of a suitable design approved for such service, the weatherdeck may not be required to be watertight.

(2) All cargo tanks shall be installed with the manhole openings and all tank connections located above the weatherdeck in the open.

(3) Tanks shall be electrically bonded to the hull.

(4) No welding of any kind shall be done on cargo tanks or supporting structure unless authorized by the Commandant.

(d) All cargo tanks, piping, valves, fittings, and similar equipment which may contain ethylene oxide in either the liquid or vapor phase, including the vent risers, shall be insulated. Flanges need not be covered, but if covered, a small opening shall be left at the bottom of the flange cover to detect leaks.

Insulation shall be of an approved incombustible material suitable for use with ethylene oxide, which does not significantly lower the autoignition temperature and which does not react spontaneously with ethylene oxide. The insulation shall be of such thickness as to provide a thermal conductance of not more than 0.075 B.t.u. per square foot per degree Fahrenheit differential in temperature per hour.

(e)(1) When cooling systems are installed to maintain the temperature of the liquid below 90°F., at least two complete cooling plants, automatically regulated by temperature variations within the tanks shall be provided; each to be complete with the necessary auxiliaries for proper operation. The control system shall also be capable of being manually operated. An alarm shall be provided to indicate malfunctioning of the temperature controls. The capacity of each cooling system shall be sufficient to maintain the temperature of the liquid cargo at or below the design temperature of the system.

(2) An alternate arrangement may consist of three cooling plants, any two of which shall be sufficient to maintain the temperature of the liquid cargo at or below the design temperature of the system.

(3) Cooling systems requiring compression of ethylene oxide are prohibited.

(f) In addition to the shutoff valve required, all tank connections larger than one-half inch inside pipe size, except safety relief valves and liquid level gauging devices, shall be fitted with either internal back pressure check valves or internal excess flow valves in conjunction with a quick closing stop valve operable from at least two remote locations. The quick closing stop valve shall be of the ''fail safe'' type acceptable to the Commandant and shall be equipped with a fusible plug designed to melt between 208°F. and 220°F., which will cause the quick closing valve to close automatically in case of fire. The quick closing valve shall be located as close to the tank as possible.

(g) Piping systems intended for ethylene oxide service shall not be used for any other product and shall be completely separate from all other systems. The piping system shall be designed so that no cross connections may be made either through accident or design.

(h) Each safety relief valve shall be set to start to discharge at not less than 75 pounds per square inch gauge, nor more than the design pressure of the tank.

(i) The filling density shall not exceed 83 percent.

(j)(1) The cargo shall be shipped under a suitable protective inerting gas system, such as nitrogen. When nitrogen gas is used, the gas inerting system shall be so designed that the vapor space above the liquid cargo will be filled and maintained with a gas mixture of not less than 45 percent nitrogen. Other gases proposed for inerting use may be given consideration by the Commandant. Original charging only of protective inerting gas at the loading facility is not considered adequate. A sufficient amount of spare inerting gas as approved by the Commandant shall be provided on the vessel in order to maintain the proper concentration of the gas in the event of normal leakage or other losses.

(2) Any inerting gas selected should be at least 98 percent pure and free of reactive materials, such as ammonia, hydrogen sulfide, sulfur compounds, and acetylene.

(k) Prior to loading, a sample from the cargo tank will be taken to insure that the pad gas will meet the requirements of paragraph (j) of this section and that the oxygen content of the vapor space will be not more than 2 percent maximum. If necessary, a sample will be taken after loading to insure the vapor space meets this requirement.

(l) The cargo piping shall be inspected and tested at least once in each 2 calendar years.

(m) In those cases where the cargo transfer hose used is not part of the barge's equipment, the person in charge of the transfer operation shall determine that the provisions of §151.50–10(k) have been met before using this hose. A certificate of test, supplied by the transfer facility, will be considered as adequate for this determination.

(n) The provisions of § 151.50–10 shall be complied with as a requirement for shipping ethylene oxide.

(o) A hydrostatic test of 1½ times the design pressure shall be made on the cargo tanks at least once in each 4 years at the time the internal examination is made and at such other times as considered necessary by the Officer in Charge, Marine Inspection.

[CGFR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 85–061, 54 FR 50966, Dec. 11, 1989]

§ 151.50–13 Propylene oxide.

(a)(1) Pressure vessel cargo tanks shall meet the requirements of Class II pressure vessels.

(2) Cargo tanks shall be designed for the maximum pressure expected to be encountered during loading, storing and discharging the cargo but in no case shall the design pressure of pressure vessel tanks be less than thirty (30) pounds per square inch gauge. The tank shell and heads shall not be less than 5/16-inch thick.

(b) When propylene oxide is carried on board a vessel, piping systems in propylene oxide service shall not be used for any other product and shall be completely separate from all other systems. The piping system shall be designed so that no cross connection may be made through inadvertence.

(c) Each safety relief valve shall be set to start to discharge at not less than 30 pounds per square inch gauge, nor more than the design pressure of the tank.

(d) Filling density shall not exceed 80 percent.

(e)(1) The cargo shall be shipped under a suitable protective padding, such as nitrogen gas. Other gases proposed for use as padding may be given consideration by the Commandant. Original charging only of protective gas padding at the loading facility is not considered adequate. A sufficient amount of spare padding gas as approved by the Commandant shall be provided on the vessel in order to maintain the proper concentration of the gas in the event of normal leakage or other losses.

(2) Any padding gas selected should be at least 98 percent pure and free of reactive materials.

(f) Prior to loading, a sample from the cargo tank will be taken to insure that the pad gas will meet the requirements of paragraph (e) of this section and that the oxygen content of the vapor space will be not more than 2 percent maximum. If necessary, a sample will be taken after loading to insure the vapor space meets this requirement.

(g) The cargo piping shall be subjected to a hydrostatic test of 1½ times the maximum pressure to which they may be subjected in service.

(h) The Commandant may permit the transportation of propylene oxide in other than pressure vessel type tanks if it is shown to his satisfaction that a degree of safety is obtained consistent with the minimum requirements of this subpart.

(i) The provisions of § 151.50–10 shall be complied with as a requirement for shipping propylene oxide.

§ 151.50–20 Inorganic acids.

(a)(1) Gravity type cargo tanks shall be designed and tested to meet the rules of the American Bureau of Shipping for a head of water at least 8 feet above the tank top or the highest level the lading may rise, whichever is the greater. The plate thickness of any part of the tank shall not be less than three-eighths inch.

(2) Gravity tank vents. (i) The outlet end of the gravity tank vent shall terminate above the weatherdeck, clear of all obstructions and away from any source of ignition.

(ii) The gravity tank vent shall terminate in a gooseneck bend and shall be fitted with a single flame screen or two fitted flame screens as described in § 151.03–25. No shutoff valve or frangible disk shall be fitted in the vent lines.

(b)(1) Pressure vessel type cargo tanks shall be independent of the vessel's structure and shall be designed for the maximum pressure to which they may be subjected when compressed air is used to discharge the cargo, but in no case shall the design pressure be less than that indicated as follows:

Fluorosilicic Acid—50 pounds per square inch gauge.
Hydrochloric Acid—50 pounds per square inch gauge.
Hydrofluorosilicic Acid, see Fluorosilicic Acid.

Phosphoric Acid—30 pounds per square inch gauge.
Sulfuric Acid—50 pounds per square inch gauge.

(2) Pressure vessel type cargo tanks shall be of welded construction meeting the requirements for Class II or Class III given in Part 54 of this chapter.

(3) When compressed air is used to discharge the cargo, the tank shall be fitted with a vent led to the atmosphere in which a rupture disk shall be installed. The rupture disk shall be designed to burst at a pressure not exceeding the design pressure of the tank. An auxiliary vent to relieve the pressure or vacuum in the tank during the cargo transfer operation may be led from the vent line between the tank and the rupture disk. A shutoff valve may be fitted in the auxiliary vent.

(c) Openings in tanks are prohibited below deck, except for access openings used for inspection and maintenance of tanks, or unless otherwise specifically approved by the Commandant. Openings shall be fitted with bolted cover plates and acid-resistant gaskets.

(d) Where special arrangements are approved by the Commandant to permit a pump suction to be led from the bottom of the tank, the filling and discharge lines shall be fitted with shutoff valves located above the weatherdeck or operable therefrom.

(e) The outage shall not be less than 1 percent.

(f) All enclosed compartments containing cargo tanks and all machinery spaces containing cargo pumps shall be fitted with effective means of ventilation.

(g) A separator shall be fitted in compressed air lines to the tank when air pressure is used to discharge the cargo.

(h) Only installed electric or portable battery lights shall be used during the cargo transfer operations. Smoking is prohibited and the person in charge of cargo transfer shall post No Smoking signs during cargo transfer operations.

(i) Tanks approved for the transportation of acid cargoes subject to this section shall not be used for the transportation of any other commodity, except upon authorization by the Commandant (G–MSO).

(j) Each cargo tank shall be subjected to an internal examination at least once in every 4 years. If cargo tank lining is required and the lining of the cargo tank has deteriorated in service or is not in place, the Marine Inspector may require the tank to be tested by such nondestructive means as he may consider necessary to determine its condition.

(k) The special requirements for fluorosilicic acid in §151.50–77, for hydrochloric acid in §151.50–22, for *hydrofluorosilicic acid, see* fluorosilicic acid, for phosphoric acid in §151.50–23, and for sulfuric acid in §151.50–21 also apply to the carriage of those acids.

[CGFR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by GGD 80–001, 46 FR 63279, Dec. 31, 1981; CGD 82–063b, 48 FR 4781, Feb. 3, 1983; CGD 88–100, 54 FR 40040, Sept. 29, 1989; CGD 92–100, 59 FR 17028, Apr. 11, 1994]

§151.50–21 Sulfuric acid.

(a) *How sulfuric acid may be carried.* (1) Sulfuric acid of concentration of 77.5 percent (1.7019 specific gravity) (59.8° Baumé) or greater concentrations with or without an inhibitor, provided the corrosive effect on steel measured at 100°F. is not greater than that of 66° Baumé commercial sulfuric acid, may be transported in unlined gravity type cargo tanks or unlined pressure vessel type cargo tanks.

(2) Sulfuric acid of concentration of 65.25 percent (1.559 specific gravity) (52° Baumé) or greater concentrations, provided the corrosive effect on steel measured at 100°F. is not greater than that of 52° Baumé commercial sulfuric acid, may be transported in unlined pressure vessel type cargo tanks independent of the vessel's structure.

(3) Sulfuric acid of concentration not to exceed 65.25 percent (1.559 specific gravity) (52° Baumé) may be transported in gravity type cargo tanks or pressure-vessel type cargo tanks which are lined with lead or other equally suitable acid-resistant material acceptable to the Commandant.

(4) Sulfuric acid of concentration not to exceed 51 percent (1.408 specific gravity) (42° Baumé) and spent sulfuric acid resulting from the use of sulfuric acid in industrial processes may be transported in gravity type cargo tanks which are lined with rubber or

other equally suitable acid-resistant material acceptable to the Commandant. See §151.15–3(f)(2).

(5) Spent or sludge sulfuric acid resulting from the use of sulfuric acid in industrial processes may be transported in unlined gravity type cargo tanks or unlined pressure vessel type cargo tanks, provided the corrosive effect on steel is not greater than that of commercial sulfuric acid as prescribed in paragraph (a)(1) of this section.

(b) Heating coils will be the only acceptable means of liquefying frozen or congealed sulfuric acid.

(c) During cargo transfer, a water hose shall be connected to a water supply ready for immediate use and any leakage or spillage of acid shall be immediately washed down. This requirement can be met by facilities provided from shore.

(d) The requirements of §151.50–20 are also applicable to the shipment of sulfuric acid.

§151.50–22 Hydrochloric acid.

(a) Hydrochloric acid shall be carried in gravity or pressure type cargo tanks which are independent of the vessel's structure provided such tanks are lined with rubber or other equally suitable material acceptable to the Commandant. See §151.15–3(f)(2).

(b) Notwithstanding the provisions of §151.50–20(b)(3), compressed air may be used to discharge hydrochloric acid from gravity type cargo tanks only if the tanks are of cylindrical shape with dished heads, provided the air pressure does not exceed the design pressure of the tank but in no case shall it exceed 10 pounds per square inch gauge. Such tanks shall be fitted with pressure relief devices and need not be vented to the atmosphere as required by §151.50–20(b)(3).

(c) During cargo transfer, a water hose shall be connected to a water supply and be ready for immediate use. Any leakage or spillage of acid shall be immediately washed down. This requirement can be met by facilities provided from shore.

(d) Spent hydrochloric acid or hydrochloric acid adulterated by other chemicals, inhibitors, oils, solvents, water, etc., shall not be transported in bulk except upon authorization by the Commandant (G–MSO).

(e) The requirements of §151.50–20 are also applicable to the shipment of hydrochloric acid.

[CFGR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 88–100, 54 FR 40040, Sept. 29, 1989]

§151.50–23 Phosphoric acid.

(a) The term *phosphoric acid* as used in this subpart shall include, in addition to phosphoric acid, aqueous solutions of phosphoric acid, and super phosphoric acid.

(b) Phosphoric acid may be carried in either gravity or pressure type cargo tanks. The tanks shall be rubber-lined, or lined or clad with other suitable material acceptable to the Commandant, or shall be fabricated of a phosphoric acid resistant stainless steel. See §151.15–3(f)(2).

(c) The vessel's shell plating shall not be used as any part of the boundaries of gravity type cargo tanks.

(d) Cargo piping, including valves, fittings, and flanges where exposed to the acid, shall be rubber-lined, or lined, coated or clad with other corrosion-resistant material, or shall be fabricated of a phosphoric acid resistant stainless steel. Vent piping, including flanges and fittings, shall be similarly protected at least to the height of the flangible disk if such is installed.

(e) Phosphoric acid adulterated by other chemicals, inhibitors, oils, solvents, etc., shall not be transported in bulk cargo tanks except upon authorization by the Commandant (G–MSO).

(f) The requirements of §151.50–20 are also applicable to the shipment of phosphoric acid.

[CGFR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 82–063b, 48 FR 4781, Feb. 3, 1983]

§151.50–30 Compressed gases.

(a) All tank inlet and outlet connections, except safety relief valves, liquid level gauging devices, and pressure gauges shall be marked to designate whether they terminate in the vapor or liquid space. Labels, when used, shall be of corrosion-resistant materials and may be attached to valves.

(b) *Venting.* (1) Except as provided in paragraph (b)(2) of this section each

safety relief valve installed on a cargo tank shall be connected to a branch vent of a venting system which shall be constructed so that the discharge of gas will be directed vertically upward to a point at least 10 feet above the weatherdeck or the top of any tank or house located above the weatherdeck.

(2) Safety valves on cargo tanks in barges may be connected to individual or common risers which shall extend to a reasonable height above the deck. Where the escape of vapors from the venting system may interfere with towing operations, the installation shall be acceptable to the Commandant, and the arrangement shall be such as to minimize the hazard of escaping vapors. Arrangements specially provided for venting cargo tanks forming part of the hull on unmanned barges will be given special consideration by the Commandant.

(3) The capacity of branch vents or vent headers shall depend upon the number of cargo tanks connected to such branch or header as provided in Table 151.50–30(b)(3).

TABLE 151.50–30(b)(3)—CAPACITY OF BRANCH VENTS OR VENT HEADERS

Number of cargo tanks	*Percent of total valve discharge*
1 or 2	100
3	90
4	80
5	70
6 or more	60

(4) Return bends and restrictive pipe fittings are prohibited. Vents and headers shall be so installed as to minimize stresses on safety relief valves and their mounting nozzles.

(5) When vent discharge risers are installed, they shall be so located as to protect against physical damage and be fitted with loose raincaps.

(6) When vent discharge risers are installed and their installation in accordance with the provisions of this paragraph results in restrictions in the operation of the barge due to navigation clearances, the vents may be designed so as to be collapsible when passing under such low clearance obstacles.

(c) *Repairs involving welding or burning.* (1) Repairs involving welding or burning shall not be undertaken on the cargo tanks or piping while cargo in either the liquid or vapor state is present therein.

(2) Repairs involving welding or burning on parts of the barge other than cargo tanks or piping may be undertaken provided positive pressure is maintained in the tanks or the tanks have been vented or washed internally.

(d) *Respiratory equipment.* (1) At least one approved self-contained breathing apparatus shall be available in a readily accessible location off the barge at all times during the cargo transfer operations. This equipment shall not be considered to be part of the barge equipment, and the barge shall not be required to carry this equipment en route.

(2) The approved self-contained breathing apparatus, masks, and all respiratory protective devices shall be of types suitable for starting and operating at the temperatures encountered, and shall be maintained in good operating condition.

(3) Personnel involved in the cargo transfer operations shall be adequately trained in the use of the respiratory equipment.

(e) *Filling densities and container design pressure.* For compressed gases transported at or near ambient temperatures, the maximum filling densities and minimum design pressure of container as indicated in Table 151.50–30(e) shall apply. Deviations from the tabulated values shall be submitted to the Commandant for approval. Where cargo is to be carried at temperatures below ambient, the tank shall be designed in accordance with §151.15–3(b)(3) and the maximum amount of cargo shall be in accordance with §151.45–6(b).

TABLE 151.50–30(e)—FILLING DENSITIES AND CONTAINER DESIGN PRESSURES

Kind of gas	Maximum permitted filling density (percent by weight, see § 151.03–21)		Minimum design pressure of tank (pounds per square inch gauge)	
	Uninsulated tanks	Insulated tanks	Uninsulated tanks	Insulated tanks
Ammonia, anhydrous	57	58	250	215
Chlorine	125	125	300	300
Dichlorodifluoromethane	123	125	147	127
Dimethylamine	61	62	46	36
Methyl chloride	85	87	131	112
Monochlorodi-fluoromethane	110	113	243	211
Vinyl chloride	86	87	81	67

(f) The shell and head thickness of liquefied compressed cargo tanks shall not be less than five-sixteenths inch.

(g) The special requirements for ammonia (anhydrous) in § 151.50–32, for argon in § 151.50–36, for chlorine in § 151.50–31, for nitrogen in § 151.50–36, and for vinyl chloride in § 151.50–34 also apply to the carriage of those gases.

[CFGR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 88–100, 54 FR 40040, Sept. 29, 1989]

§ 151.50–31 Chlorine.

(a) *Chlorine barges.* Subparts 98.03 and 98.20 of Part 98 of this chapter have been revoked. However, chlorine barges that were certified in accordance with the requirements of subpart 98.20 of part 98 of this chapter and having hulls modified, if necessary, to comply with §§ 98.03–5(c) and 98.03–25(c) of this chapter, shall be considered as complying with this part.

(b) *Design and construction of cargo tanks.* (1) The cargo tanks shall meet the requirements of Class I pressure vessels.

(2) Tanks shall be designed for a pressure of not less than 300 pounds per square inch gauge. For the maximum allowable working pressure of tanks in service, see paragraph (q) of this section.

(3) Each tank shall be provided with one or more 24-inch inside diameter manhole, fitted with a cover located above the maximum liquid level and as close as possible to the top of the tank. There shall be no other openings in the tank.

(c) Tanks may be installed ''on deck'' or ''under deck'' with the tank protruding above deck. If a portion of the tank extends above the weatherdeck, provision shall be made to maintain the weathertightness on the deck. All tanks shall be installed with the manhole opening located above the weatherdeck. Hopper type barges operating on protected inland waters may have tanks located in the hopper space.

(d) All valves, flanges, fittings and accessary equipment shall be of a type suitable for use with chlorine and shall be made of metal, corrosion-resistant to chlorine in either the gas or liquid phase. Cast or malleable iron shall not be used. Valves, flanges, and flanged joints shall be 300 pounds A.N.S.I. standard minimum with tongue and groove or raised face. Joints shall be fitted with sheet lead or other suitable gasket material. Welded fittings shall be used wherever possible and the number of pipe joints held to a minimum. Threaded joints in cargo lines and vapor lines shall not be used in sizes above 1 inch internal diameter. Welded ''hammerlock'' unions or other unions approved by the Commandant may be used at terminal points of fixed barge piping.

(e) Each tank shall be provided with liquid and vapor connections fitted with manually operated shutoff valves and with safety relief valves. All valves shall be bolted to the cover or covers specified in paragraph (b)(3) of this section and shall be protected against mechanical damage by a suitable protective metal housing. A drain connection shall be provided from the protective housing.

(f) All liquid and vapor connections, except safety relief valves, shall be

fitted with automatic excess flow valves, which shall be located on the inside of the tank. Bypass openings are not permitted in excess flow valves.

(g) Chlorine barge cargo piping shall not be fitted with the nonreturn valves specified by § 151.20–20(b).

(h) Liquid level gauging devices of any type are prohibited on chlorine tanks.

(i) A pressure gauge shall be attached to the vapor shutoff valve or vapor line so as to indicate the pressure in the tank at all times during loading and unloading.

(j) Piping including connections between tank valves and fixed barge piping, shall be of a thickness of not less than Schedule 80.

(k) In multiple tank installations the tanks shall not be interconnected by piping or manifolds which may contain liquid chlorine. Manifolding of vapor lines of individual tanks into a common header for connection to shore is permitted. More than one cargo tank may be filled or discharged at a time, provided each tank is filled from or discharged to shore tanks through separate lines.

(l) Connections between fixed barge piping and shore piping shall be fabricated from one of the following:

(1) Schedule 80 seamless pipe, having flexible metallic joints.

(2) Corrosion-resistant metallic pipe (equivalent to Schedule 80) not subject to deterioration by chlorine, having flexible metallic joints.

(3) Flexible metallic hose acceptable to the Commandant. If paragraphs (k)(1) or (2) of this section are used, the flexible metallic joints shall meet the requirements for cargo hose. See § 151.04–5(h).

(m) Safety relief valves shall discharge into the protective housing surrounding the valves. Suitable provisions shall be made to vent the housing. The arrangement shall be such as to minimize the hazard of escaping vapors.

(n) *Cargo transfer operations.* (1) The amount of chlorine loaded into each cargo tank shall be determined by weight. Draft marks shall not be used as a means of weighing. Any chlorine vapors vented during the filling operation shall be disregarded when calculating the maximum amount of chlorine to be loaded into the cargo tanks.

(2) Prior to the start of filling operations, care shall be exercised to insure that the cargo tanks are empty, dry, and free from foreign matter.

(3) After the filling operation is completed, the vapor in each cargo tank shall be analyzed to determine the percentage of gaseous chlorine in the vapor space. If it should contain less than 80 percent chlorine by volume, vapors shall be withdrawn through the vent or vapor line until the vapor in the cargo tanks contains at least 80 percent chlorine by volume.

(4) After filling connections are removed, upon completion of the loading of a cargo tank, all connections at the tank shall be tested for leakage of chlorine by the aqua ammonia method.

(5) The chlorine in the cargo tanks shall be discharged by the pressure differential method. If the vapor pressure of the chlorine is not sufficient to force the liquid out of the tank, compressed air, or other nonreactive gas, may be used to secure the desired rate of discharge, provided the air or gas is oil-free and thoroughly dried by passing it over activated aluminum oxide, silica gel, or other acceptable drying agent, and provided the supply pressure is limited to 75 percent of maximum allowable pressure of chlorine tanks.

(6) After completion of cargo transfer, any liquid chlorine in the cargo piping shall be removed and cargo transfer piping shall be disconnected at the cargo tanks. After disconnecting the cargo piping, both ends of the line shall be closed and all inlet and outlet valves on the tank shall be plugged or fitted with blind flanges.

(o) During cargo transfer, every person on the barge shall carry on his person a respiratory protective device which will protect the wearer against chlorine vapors and will provide respiratory protection for emergency escape from a contaminated area resulting from cargo leakage. This respiratory protective equipment shall be of such size and weight that the person wearing it will not be restricted in movement or in the wearing of a life-saving device.

(p) During each internal inspection, each cargo tank must be tested

hydrostatically to 1½ times the maximum allowable pressure as determined by the safety relief valve setting.

(q) During each internal inspection, each cargo tank excess flow valve and safety relief valve must be inspected and tested in accordance with paragraphs (g) and (i) of §151.04–5 of this chapter.

(r) When periodic inspection indicates that a cargo tank has deteriorated in service, the maximum allowable pressure shall be recalculated, using the minimum thickness found by actual measurement. The recalculated maximum allowable pressure shall be not less than 275 pounds per square inch gauge. If the recalculated maximum allowable pressure is less than 275 pounds per square inch gauge, the cargo tanks shall be withdrawn from service.

(s) The following substances shall not be carried as stores on board barges transporting chlorine in bulk: hydrogen, methane, liquefied petroleum gases, coal gas, acetylene, ammonia, turpentine, compounds containing metallic powders, finely divided metals or finely divided organic materials.

(t) The requirements of §151.50–30 for compressed gases are also applicable to the shipment of chlorine.

[CGFR 70—10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 85–061, 54 FR 50966, Dec. 11, 1989; CGD 85–061, 55 FR 41918, Oct. 16, 1990]

§151.50–32 Ammonia, anhydrous.

(a) The anhydrous ammonia tanks may be installed in the bulk liquid cargo tanks provided the liquid surrounding the enclosed anhydrous ammonia tanks complies with the following chemical and physical properties:

(1) Boiling point above 125°F. atmospheric pressure.

(2) Inert to ammonia at 100°F. at atmospheric pressure.

(3) Noncorrosive in the liquid and vapor phase to the ammonia tanks and piping.

(b) Copper, copper alloys, and copper bearing alloys shall not be used as materials of construction for tanks, pipelines, valves, fittings, and other items of equipment that may come in contact with anhydrous ammonia liquid or vapor.

(c) Valves, flanges and pipe fittings shall be of the tongue and groove or raised-face type, fitted with suitable gasket material. Welded fittings shall be used wherever possible and the number of pipe joints shall be held to a minimum. Threaded joints are not permitted for pipe diameters exceeding 2 inches. Brazed joints are prohibited.

(d) All enclosed spaces containing cargo tanks fitted with bottom outlet connections shall be provided with mechanical ventilation of sufficient capacity to assure a change of air every 3 minutes.

(e) Each cargo tank shall be electrically grounded to the hull.

(f) When transferring cargo, a hose shall be connected to a water supply so that if leakage of anhydrous ammonia occurs the vapor may be dispersed by the use of water fog. This requirement can be met by facilities provided from shore.

(g) During cargo transfer operations, every person on the vessel shall carry on his person or have close at hand at all times a canister mask approved for ammonia or each person shall carry on his person a respiratory protective device which will protect the wearer against ammonia vapors and will provide respiratory protection for emergency escape from a contaminated area resulting from cargo leakage. This respiratory protective equipment shall be of such size and weight that the person wearing it will not be restricted in movement or in the wearing of a lifesaving device.

(h) [Reserved]

(i) The requirements of §151.50–30 for compressed gases are also applicable to the shipment of anhydrous ammonia.

[CGFR 70—10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 85–061, 54 FR 50966, Dec. 11, 1989]

§151.50–34 Vinyl chloride (vinyl chloride monomer).

(a) Copper, aluminum, magnesium, mercury, silver, and their alloys shall not be used as materials of construction for tanks, pipelines, valves, fittings, and other items of equipment that may come in contact with vinyl chloride liquid or vapor.

(b) Valves, flanges, and pipe fittings shall be of the tongue and groove or

raised-face type, fitted with suitable gasket material. Welded fittings shall be used wherever possible and the number of pipe joints shall be held to a minimum. Threaded joints are not permitted for pipe diameters exceeding 2 inches. Brazed joints are prohibited.

(c) Each cargo tank shall be electrically grounded to the hull.

(d) The vessel shall be electrically bonded to the shore piping prior to connecting the cargo hose. This electrical bonding shall be maintained until after the cargo hose has been disconnected and any spillage has been removed.

(e) To the extent he deems it necessary, the Officer in Charge, Marine Inspection, may require that sufficient insulation shall be removed from insulated tanks at least once in each 8 calendar years to permit spot external examination of the tanks and insulation in accordance with §151.04–5(c).

(f) The requirements of §151.50–30 for compressed gases are also applicable to the shipment of vinyl chloride.

(g) The person in charge of cargo transfer shall ensure that:

(1) Cargo vapors are returned to the cargo tank or shore disposition for reclamation or destruction during cargo transfer operations;

(2) Continuous monitoring for vinyl chloride vapor leaks is conducted aboard a tank barge undergoing vinyl chloride transfer operations. Fixed or portable instrumentation may be utilized to ensure that personnel are not exposed to vinyl chloride vapor concentrations in excess of 1 ppm averaged over any eight hour period of 5 ppm averaged over any period not exceeding 15 minutes. The method of monitoring and measurement shall have an accuracy (with a confidence level of 95 percent) of not less than plus or minus 50 percent from 0.25 through 0.5 ppm, plus or minus 35 percent from over 0.5 ppm through 1.0 ppm, and plus or minus 25 percent over 1.0 ppm;

(3) Cargo transfer operation is discontinued or corrective action is initiated by the person in charge to minimize exposure to personnel whenever a vinyl chloride vapor concentration in excess of 1 ppm is detected. If the vinyl chloride vapor concentration exceeds 5 ppm for over 15 minutes, action to reduce the leak can be continued only if the respiratory protection requirements of 29 CFR 1910.1017 are met by all personnel in the area of the leak;

(4) Those portions of cargo lines which will be open to the atmosphere after piping is disconnected are free of vinyl chloride liquid and that the vinyl chloride vapor concentration in the area of the cargo piping disconnect points is not greater than 5 ppm;

(5) Any restricted gauge fitted on a tank containing vinyl chloride is effectively out of service by locking or sealing the device so that it cannot be used; and

(6) A restricted gauge is not to be used as a ''check'' on the required closed gauge, nor as a means or sampling.

(h) The words ''CANCER—SUSPECT AGENT'' must be added to the warning signs required by 46 CFR 151.45–2(e).

(i) Signs bearing the legend:

CANCER—SUSPECT AGENT IN THIS AREA

PROTECTIVE EQUIPMENT REQUIRED

AUTHORIZED PERSONNEL ONLY

must be posted whenever hazardous operations, such as tank cleaning, are in progress.

(j) A tank barge undergoing cargo transfer operations must be designated a ''regulated area'' having access limited to authorized persons and requiring a daily roster of authorized persons who may board the barge.

(k) Employees engaged in hazardous operations, such as tank cleaning, must be provided, and be required to wear and use respiratory protection in accordance with the provisions of 29 CFR 1910.1017 and protective garments, provided clean and dry for each use, to prevent skin contact with liquid vinyl chloride.

[CGFR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 74–167R, 40 FR 17026, Apr. 16, 1975; CGD 88–100, 54 FR 40040, Sept. 29, 1989]

§151.50–36 Argon or nitrogen.

(a) A cargo tank that contains argon or nitrogen and that has a maximum allowable working pressure of 172 kPa (25 psig) or greater must have one of the following arrangements:

(1) A refrigeration system that keeps the tank pressure below the safety relief valve operating pressure when ambient temperatures are 46°C (115°F) air and 32°C (90°F) water.

(2) A relief valve or pressure control valve that maintains the tank pressure below the setting of the tank's required safety relief valve in ambient temperatures of 46°C (115°F) air and 32°C (90°F) water.

(b) A cargo tank with a maximum allowable working pressure of less than 172 kPa (25 psig) is approved by the Commandant (G–MSO) on a case by case basis.

(c) Section 151.50–30 also applies to the carriage of argon or nitrogen.

[CGD 88–100, 54 FR 40040, Sept. 29, 1989]

§151.50–40 Additional requirements for carbon disulfide (carbon bisulfide) and ethyl ether.

(a) The provisions of this section are applicable if specifically referenced in the Special Requirements column of Table 151.05.

(b) Cargo tanks shall be electrically bonded to the hull of the vessel. A vessel shall be electrically bonded to the shore piping prior to connecting the cargo hose. This electrical bonding shall be maintained until after the cargo hose has been disconnected and any spillage has been removed.

(c) Pumps may be used for discharging cargo: *Provided,* That they are the vertical submerged type designed to avoid liquid pressure against the shaft gland and are suitable for use with the cargo.

(d) Provisions shall be made to maintain an inert gas padding in the cargo tank during loading, unloading and during transit.

(e) Provisions shall be made to prevent any leakage being washed into the waterways at the loading and unloading points.

(f) The special requirements of §151.50–41 for carbon disulfide (*carbon bisulfide*) and §151.50–42 for ethyl ether shall also be observed.

[CFGR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 88–100, 54 FR 40029, Sept. 29, 1989]

§151.50–41 Carbon disulfide (carbon bisulfide).

(a) All openings shall be in the top of the tank.

(b) Loading lines shall terminate near the bottom of the tank.

(c) A standard ullage opening shall be provided for secondary and emergency sounding.

(d) If a cargo discharge pump is used, it shall be inserted through a cylindrical well extending from the tank top to a point near the tank bottom. A blanket of water shall be formed in this well before attempting pump removal.

(e) Water or inert gas displacement may be used for discharging cargo provided the cargo system is designed for the expected pressure and temperature. This method for discharging may be used with pressure type tanks only.

(f) Adequate natural ventilation shall be provided for the voids around the cargo tanks while the vessel is under way. During loading and unloading, forced ventilation shall be used. The forced ventilation shall be of sufficient capacity to provide a complete change of air within each void space every 5 minutes. The ventilating fan shall be of nonsparking construction.

(g) Because of its low ignition temperature and the close clearances required to arrest its flame propagation, carbon disulfide (*carbon bisulfide*) requires safeguards beyond those required for any electrical hazard groups.

(h) The requirements of §151.50–40 are also applicable to the shipment of carbon disulfide (*carbon bisulfide*).

[CFGR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 88–100, 54 FR 40040, Sept. 29, 1989]

§151.50–42 Ethyl ether.

(a)(1) Gravity tanks shall be designed and tested to meet the rules of the American Bureau of Shipping for a head of water at least 8 feet above the tank top or the highest level the lading may rise, whichever is greater. All openings shall be in the top of the tank.

(2) Pressure vessel type tanks shall be designed for the maximum pressure to which they may be subjected when pressure is used to discharge the cargo, but in no case shall the design pressure be less than 50 pounds per square inch

gauge. All openings shall be in the top of the tank.

(b) Adequate natural ventilation shall be provided for the voids around the cargo tanks while the vessel is underway. If a power ventilation system is installed, all blowers shall be of nonsparking construction. Power driven ventilation equipment shall not be located in the void spaces surrounding the cargo tanks.

(c) Pressure relief valve settings shall not be less than 3 pounds per square inch gauge for gravity tanks. For pressure vessels, the relief valve setting shall not exceed the design pressure of the tank.

(d) Inert gas displacement may be used for discharging cargo from pressure vessel tanks provided the cargo system is designed for the expected pressure and the discharge pressure does not exceed 50 pounds per square inch gauge or the design pressure of the tank, whichever is less.

(e) No electrical equipment except for approved lighting fixtures shall be installed in enclosed spaces adjacent to the cargo tanks. Lighting fixtures must be approved for use in Class I, Group C, hazardous locations. The installation of electrical equipment on the weather deck shall comply with the requirements of part 111, subpart 111.105 of this chapter.

(f) Copper, silver, mercury and magnesium or other acetylide forming metals and their alloys shall not be used as materials of construction for tanks, pipelines, valves, fittings and other items of equipment that may come in contact with the cargo vapor or liquid.

(g) Precautions shall be taken to prevent the contamination of ethyl ether by strong oxidizing agents.

(h) The requirements of § 151.50–40 are also applicable to the shipment of ethyl ether.

[CFGR 70–10, 35 FR 3714, Feb. 25, 1970, as amended by CGD 88–100, 54 FR 40040, Sept. 29, 1989]

§ 151.50–50 Elemental phosphorus in water.

(a) Tanks shall be designed and tested for a head equivalent to the design lading of phosphorus and its water blanket extended to 8 feet above the tank top. In addition, tank design calculations shall demonstrate that the tank can withstand, without rupture, a single loading to the highest level to which the water blanket may rise, if that exceeds 8 feet. Tanks shall not be less than 5/16-inch thick.

(b) When a water displacement method of discharge is used, pressure vessel type cargo tanks, designed and tested in accordance with Subchapter F of this chapter shall be employed. Such tanks shall be designed for the maximum pressure to which they may be subjected when water pressure is used to discharge the cargo.

(c) Each cargo tank shall be fitted with an approved pressure vacuum relief valve set to discharge at a pressure not exceeding 2 pounds per square inch. When transferring cargo, the vent discharge shall lead overboard above the waterline. When pressure vessel type tanks are used, each tank shall be fitted with a relief valve of suitable size.

(d) Sufficient outage shall be provided to prevent the tank from being liquid full at any time, but in no case shall the outage be less than 1 percent. When pressure vessel type tanks are used, outage need not be provided.

(e) The use of compressed air to discharge cargo is prohibited.

(f) Cargo shall be loaded at a temperature not exceeding 140°F., and then cooled until the water above the cargo has a temperature not exceeding 105°F. prior to the movement of the vessel. Upon presentation of satisfactory proof that procedures followed will provide adequate safety in transportation and handling, the Commandant may authorize movement of the vessel following cooling of the water above the cargo to a temperature exceeding 105°F.

(g) Coils in which steam or hot water is circulated to heat the cargo so that it may be pumped shall be located outside the cargo tanks.

(h) A fixed ballast piping system (including a power driven pump of ample capacity), or other means acceptable to the Commandant shall be installed so that any void space surrounding the tanks may be flooded.

(i) All openings shall be in the top of the tank and shall be fitted with bolted

cover plates and gaskets resistant to the attack of phosphorus pentoxide.

(j) All enclosed compartments containing cargo tanks shall be provided with effective means of ventilation.

(k) Cargo lines shall be traced with steam piping and secured thereto by lagging to prevent solidification of cargo during transfer operations.

(l) During cargo transfer, a water hose shall be connected to a water supply ready for immediate use, and any spillage of phosphorus shall be immediately washed down. This requirement can be met by facilities provided from shore.

(m) At least two fresh air masks or self-contained breathing apparatus shall be stowed on board the vessel at all times for use of personnel entering the tanks or adjacent spaces.

(n) Authorization from the Commandant (G–MSO) shall be obtained to transport lading other than phosphorus in the cargo tanks or to have on board any other cargo when phosphorus is laden in the tanks.

(o) Mechanical ventilation of sufficient capacity to insure a change of air within the cargo tanks every 3 minutes shall be provided during the inspection and maintenance of the cargo tanks.

(p) Cargo tanks shall be electrically bonded to the hull of the barge. A vessel shall be electrically bonded to the shore piping prior to connecting the cargo hose. This electrical bonding shall be maintained until after the cargo hose has been disconnected.

[CGFR 70–10, 35 FR 3714, Feb. 24, 1970, as amended by CGD 82–063b, 48 FR 4781, Feb. 3, 1983]

§151.50–55 Sulfur (molten).

(a) Ventilation (cargo tank):

(1) Cargo tank ventilation shall be provided to maintain the concentration of H_2S below one-half of its lower explosive limit throughout the cargo tank vapor space for all conditions of carriage; i.e., below 1.85 percent by volume.

(2) Where mechanical ventilation systems are used for maintaining low gas concentrations in cargo tanks, an alarm system shall be provided to give warning if the system fails.

(3) Connections shall be provided to enable sampling of the atmosphere over the cargo in each cargo tank for analysis.

(4) The ventilation system shall be designed and arranged to preclude the depositing of sulfur within the system.

(b) Void spaces:

(1) Openings to void spaces adjacent to cargo tanks shall be designed and fitted to prevent the entry of water, sulfur or cargo vapors.

(2) Connections shall be provided to enable sampling and analyzing vapors in void spaces.

(c) Temperature controls shall be provided in accordance with §151.20–10 and applicable sections of Subpart 151.40 of this part. Heat transfer media shall be steam, and alternate media will require specific approval of the Commandant.

[CGFR 70—10, 35 FR 3714, Feb. 25, 1970]

§151.50–60 Benzene.

The person in charge of a Coast Guard inspected barge must ensure that the provisions of part 197, subpart C, of this chapter are applied.

[CGD 88–040, 56 FR 65006, Dec. 13, 1991]

§151.50–70 Cargoes requiring inhibition or stabilization.

When table 151.05 refers to this section, that cargo must be—

(a) Inhibited; or

(b) Stabilized.

[CGD 88–100, 54 FR 40040, Sept. 29, 1989]

§151.50–73 Chemical protective clothing.

When table 151.05 refers to this section, the following apply:

(a) The person in charge of cargo handling operations shall ensure that the following chemical protective clothing constructed of materials resistant to permeation by the cargo being handled is worn by all personnel engaged in an operation listed in paragraph (b) of this section:

(1) Splash protective eyewear.

(2) Long-sleeved gloves.

(3) Boots or shoe covers.

(4) Coveralls or lab aprons.

NOTE: ''Guidelines for the Selection of Chemical Protective Clothing'', Third Edition, 1987, available from the American Conference of Governmental Industrial Hygienists, 6500 Glenway Ave., Cincinnati, OH 45211–4438, provides information on the proper clothing for the cargo being handled.

(b) The section applies during the following operations:

(1) Sampling cargo.

(2) Transferring cargo.

(3) Making or breaking cargo hose connections.

(4) Gauging a cargo tank, unless gauging is by closed system.

(5) Opening cargo tanks.

(c) Coveralls or lab aprons may be replaced by splash suits or aprons constructed of light weight or disposable materials if, in the judgment of the person in charge of cargo handling operations,

(1) Contact with the cargo is likely to occur only infrequently and accidentally; and

(2) The splash suit or apron is disposed of immediately after contamination.

(d) Splash protective eyewear must be tight-fitting chemical-splash goggles, face shields, or similar items intended specifically for eye protection from chemical splashing or spraying.

(e) The person in charge of cargo handling operations shall ensure that each person in the vicinity of an operation listed in the paragraph (b) of this section or in the vicinity of tanks, piping, or pumps being used to transfer the cargo wears splash protective eyewear under paragraph (d) of this section.

[CGD 88–100, 54 FR 40040, Sept. 29, 1989]

§ 151.50–74 Ethylidene norbornene.

When Table 151.05 refers to this section, the following apply:

(a) 151.50–5 (g) and (h)

(b) Rubber hoses or fittings may not be used in transfer operations.

[CGD 80–001, 46 FR 63279, Dec. 31, 1981]

§ 151.50–75 Ferric chloride solution.

A containment system (cargo tank piping system, venting system, and gauging system) carrying this solution must be lined with rubber, corrosion resistant plastic, or a material approved by the Commandant (G–MSO).

[CGD 80–001, 46 FR 63279, Dec. 31, 1981, as amended by CGD 82–063b, 48 FR 4781, Feb. 3, 1983; CGD 88–100, 54 FR 40041, Sept. 29, 1989; 55 FR 17276, Apr. 24, 1990]

§ 151.50–76 Hydrochloric acid, spent (NTE 15%).

(a)(1) Gravity type cargo tanks must be designed and tested to meet the rules of the American Bureau of Shipping for a head of water at least 8 feet above the tank top or the highest level the lading may rise, whichever is greater. The plate thickness of any part of the tank may not be less than three-eighths inch. A shell plating of a barge may not be on the boundary of any part of the cargo tank.

(2) Gravity tank vents must:

(i) Terminate above the weatherdeck, clear of all obstructions and away from any from any source of ignition; and

(ii) Be fitted with a single flame screen or two fitted flame screens as described in § 151.03–25. Neither a shutoff valve nor a frangible disk may be fitted in the vent lines.

(b) Openings in the tanks are prohibited below deck, except for access openings used for inspection and maintenance of tanks, or unless otherwise specifically approved by the Commandant (G–MSO). Openings must be fitted with bolted cover plates and acid-resistant gaskets.

(c) Where special arrangements are approved by the Commandant (G–MSO) to permit a pump suction to be led from the bottom of the tank, the filling and discharge lines must be fitted with shutoff valves located above the weatherdeck or operable from it.

(d) The outage may not be less than 1 percent.

(e) An enclosed compartment containing, or a compartment adjacent to, a cargo tank:

(1) May have no electrical equipment that does not meet or exceed class I–B electrical requirements; and

(2) Must have at least one gooseneck vent of 2.5 inch diameter or greater. The structural arrangement of the compartment must provide for the free passage of air and gases to the vent or vents.

(f) No lights may be used during the cargo transfer operations, except installed electric or portable battery lights. Smoking is prohibited and the person in charge of cargo transfer shall ensure that ''No Smoking'' signs are displayed during cargo transfer operations.

(g) Tanks approved for the transportation of acid cargoes subject to this section may not be used for the transportation of any other commodity, except upon authorization by the Commandant (G–MSO).

(h) Each cargo tank must be examined internally at least once in every 4 years. If the lining of the cargo tank has deteriorated in service or is not in place, the Marine Inspector may require the tank to be tested by such nondestructive means as he may consider necessary to determine its condition.

[CGD 80–001, 46 FR 63279, Dec. 31, 1981, as amended by CGD 82–063b, 48 FR 4781, Feb. 3, 1983]

§ 151.50–77 Fluorosilicic acid (30% or less) (hydrofluorosilicic acid).

(a) Hydrofluorosilicic acid must be carried in gravity or pressure type cargo tanks independent of the vessel's structure. The tanks must be lined with rubber or other equally suitable material approved by the Commandant (G–MSO). See § 151.15–3(f)(2).

(b) Notwithstanding the provisions of § 151.50–20(b)(3), no compressed air may be used to discharge hydrofluorosilicic acid from gravity type cargo tanks unless:

(1) The tanks are of cylindrical shape with dished heads, and

(2) The air pressure does not exceed:

(i) The design pressure of the tank, and

(ii) 10 pounds per square inch gauge. The tanks must be fitted with pressure relief devices.

(c) During cargo tansfer, a water hose must be connected to a water supply and be ready for immediate use. Any leakage or spillage of acid must be immediately washed down. This requirement can be met by facilities provided from shore.

[CGD 80–001, 46 FR 63279, Dec. 31, 1981, as amended by CGD 82–063b, 48 FR 4781, Feb. 3, 1983; CGD 92–100, 59 FR 17028, Apr. 11, 1994]

§ 151.50–79 Methyl acetylene-propadiene mixture.

(a) The composition of the methyl acetylene-propadiene mixture at loading must be within one of the following sets of composition limits:

(1) Composition 1 is:

(i) Maximum methyl acetylene to propadiene molar ratio of 3 to 1;

(ii) Maximum combined concentration of methyl acetylene and propadiene of 65 mole percent;

(iii) Minimum combined concentration of propane, butane, and isobutane of 24 mole percent, of which at least one-third (on a molar basis) must be butanes and one-third propane; and

(iv) Maximum combined concentration of propylene and butadiene of 10 mole percent.

(2) Composition 2 is:

(i) Maximum methyl acetylene and propadiene combined concentration of 30 mole percent;

(ii) Maximum methyl acetylene concentration of 20 mole percent;

(iii) Maximum propadiene concentration of 20 mole percent;

(iv) Maximum propylene concentration of 45 mole percent;

(v) Maximum butadiene and butylenes combined concentration of 2 mole percent;

(vi) Minimum saturated C_4 hydrocarbon concentration of 4 mole percent; and

(vii) Minimum propane concentration of 25 mole percent.

(b) A barge carrying a methyl acetylene-propadiene mixture must have a refrigeration system that does not compress the cargo vapor or have a refrigeration system with the following features:

(1) A vapor compressor that does not raise the temperature and pressure of the vapor above 60°C (140°F) and 1.72 MPa guage (250 psig) during its operations, and that does not allow vapor to stagnate in the compressor while it continues to run.

(2) At the discharge piping from each compressor stage or each cylinder in the same stage of a reciprocating compressor:

(i) Two temperature actuated shutdown switches set to operate at 60°C (140°F) or less;

(ii) A pressure actuated shutdown switch set to operate at 1.72 MPa gauge (250 psig) or less; and

(iii) A safety relief valve set to relieve at 1.77 MPa gauge (256 psig) or less anywhere except into the compressor suction line.

(c) The piping system, including the cargo refrigeration system, for tanks to be loaded with methyl acetylene-propadiene mixture must be completely separate from piping and refrigeration systems for other tanks. If the piping system for the tanks to be loaded with methyl acetylene-propadiene mixture is not independent, the required piping separation must be accomplished by the removal of spool pieces, valves or other pipe sections and the installation of blank flanges at these locations. The required separation applies to all liquid and vapor piping, liquid and vapor vent lines and any other possible connections, such as common inert gas supply lines.

[CGD 80–001, 46 FR 63279, Dec. 31, 1981]

§ 151.50–80 Nitric acid (70% or less).

(a) Tanks, cargo piping, valves, fittings, and flanges (where exposed to the acid) must be lined with nitric acid resistant rubber or fabricated from nitric acid resistant stainless steel. See § 151.15–3(f)(2).

(b) During cargo transfer, a water hose must be connected to a water supply, ready for immediate use. Any leakage or spillage of acid must be immediately washed down. This requirement can be met by facilities provided from shore.

(c) Nitric acid contaminated by other chemicals, oils, solvents, etc. may not be transported in bulk without an authorization from the Commandant (G–MSO).

[CGD 80–001, 46 FR 63280, Dec. 31, 1981, as amended by CGD 82–063b, 48 FR 4781, Feb. 3, 1983; CGD 88–100, 54 FR 40041, Sept. 29, 1989]

§ 151.50–81 Special operating requirements for heat sensitive cargoes.

When table 151.05 refers to this section, the following apply to the cargo:

(a) Must not be carried in a tank equipped with heating coils unless the heating supply to the coils is disconnected.

(b) Must not be carried in a tank adjacent to another tank containing an elevated temperature cargo.

(c) Must not be carried in a deck tank.

[CGD 80–001, 46 FR 63280, Dec. 31, 1981, as amended by CGD 88–100, 54 FR 40041, Sept. 29, 1989]

§ 151.50–84 Sulfur dioxide.

(a) Sulfur dioxide that is transported under the provisions of this part may not contain more than 100 ppm of water.

(b) Cargo piping must be at least Schedule 40 pipe.

(c) Flanges must be 150 lb. A.N.S.I. Standard minimum with tongue and groove or raised face.

(d) A cargo tank must:

(1) Meet the requirements of a Class I welded pressure vessel;

(2) Be designed for a maximum allowable working pressure of at least 125 psig;

(3) Be hydrostatically tested every two years to at least 188 psig;

(4) Be provided with one or more manholes that are fitted with a cover sized not less than 15 inches by 23 inches or 13 inches nominal diameter, located above the maximum liquid level, and as close as possible to the top of the tank;

(5) Have no openings other than those required in paragraph (d)(4) of this section;

(6) Have no liquid level gauges other than closed or indirect gauges;

(7) Have all valves and the closed gauge that is required by Table 151.05 bolted to the cover or covers that are required in paragraph (d)(4) of this section;

(8) Have a metal housing that is fitted with a drain and vent connection protecting all valves and the closed gauge within this housing against mechanical damage;

(9) Have all safety relief valves discharging into the protective housing;

(10) Not be interconnected with another cargo tank by piping or manifold that carriers cargo liquid, except vapor lines connected to a common header, and

(11) Have an excess flow valve that is located on the inside of the tank for

every liquid and vapor connection, except the safety relief valve;

(12) Have no bypass opening on any excess flow valve.

(e) Cargo transfer operations:

(1) May not be conducted with more than one cargo tank at a time unles each tank is filled from or discharged to shore tanks through separate lines;

(2) Must be conducted with connections between fixed barge piping and shore piping of either Schedule 40 pipe having flexible metallic joints that meet §151.04–5(h) or of flexible metallic hose that is acceptable to the Commandant (G–MSO);

(3) From barge to shore must be by pressurization with an oil free, non-reactive gas that has a maximum of 100 ppm moisture;

(4) Must be conducted with vapor return to shore connections that ensure that all vapor is returned to shore; and

(5) Must be conducted with every person on the barge carrying a respiratory protective device that protects the wearer against sulfur dioxide vapors and provides respiratory protection for emergency escape from a contaminated area that results from cargo leakage.

(f) Respiratory protective equipment must be of a size and weight that allows unrestricted movement and wearing of a lifesaving device.

(g) After the completion of cargo transfer, all liquid sulfur dioxide in the cargo piping must be removed and cargo transfer piping must be disconnected at the cargo tanks. After the cargo piping is disconnected, both ends of the line must be plugged or fitted with blind flanges.

[CGD 80–001, 46 FR 63280, Dec. 31, 1981, as amended by CGD 82–063b, 48 FR 4781, Feb. 3, 1983; CGD 88–100, 54 FR 40041, Sept. 29, 1989; 55 FR 17276, Apr. 24, 1990]

§ 151.50–86 Alkyl (C7–C9) nitrates.

(a) The carriage temperature of octyl nitrates must be maintained below 100°C (212°F) in order to prevent the occurrence of a self-sustaining exothermic decomposition reaction.

(b) Octyl nitrates may not be carried in a deck tank unless the tank has a combination of insulation and a water deluge system sufficient to maintain the tank's cargo temperature below 100°C (212°F) and the cargo temperature rise at or below 1.5°C (2.7°F)/hour, for a fire of 650°C (1200°F).

[CGD 88–100, 54 FR 40040, Sept. 29, 1989; CGD 92–100, 59 FR 17028, Apr. 11, 1994]

Subpart 151.55—Special Requirements for Materials of Construction

§ 151.55–1 General.

(a) This section provides special requirements for the materials of construction of equipment that may come into contact with various cargoes. Table 151.05 contains specific requirements for various cargoes.

(b) Copper, copper alloys, zinc, and aluminum shall not be used as materials of construction for tanks, pipelines, valves, fittings, and other items of equipment that may come in contact with the cargo liquid or vapor. (Equivalent to §151.56–1(a),(b), and (c).)

(c) Copper, copper alloys, zinc, galvanized steel, and mercury shall not be used as materials of construction for tanks, pipelines, valves, fittings, and other items of equipment that may come in contact with the cargo liquid or vapor. (Equivalent to §151.56–1(b),(c), and (g).)

(d) Aluminum, magnesium, zinc, and lithium shall not be used as materials of construction for tanks, pipelines, valves, fittings, and other items of equipment that may come in contact with the cargo liquid or vapor. (Equivalent to §151.56–1(a),(c), and (d).)

(e) Copper and copper bearing alloys shall not be used as materials of construction for tanks, pipelines, valves, fittings, and other items of equipment that may come in contact with the cargo liquid or vapor. (Equivalent to §151.56–1(b).)

(f) Aluminum or copper or alloys of either shall not be used as materials of construction for tanks, pipelines, valves, fittings, and other items of equipment that may come in contact with the cargo vapor or liquid. (Equivalent to §151.56–1(a) and (b).)

(g) Aluminum, stainless steel, or steel covered with a suitable protective lining or coating shall be used as materials of construction for tanks, pipelines, valves fittings, and other items of equipment that may come in contact