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(ii) One or more 0.625 inch diameter holes in the flange located midway between bolt holes and in line with the bolt hole pattern;

(6) Be abrasion resistant and resistant to kinking; and

(7) Have the last 1.0 meter (3.3 feet) of each end of the vapor hose marked in accordance with paragraph (b) of this section.

(e) Vapor hose handling equipment must be provided with hose saddles which provide adequate support to prevent kinking or collapse of hoses.

(f) Fixed vapor collection arms must:

(1) Meet the requirements of paragraphs (d)(1) through (d)(5) of this section;

(2) Have the last 1.0 meter (3.3 feet) of the arm marked in accordance with paragraph (b) of this section.

(g) The facility vapor connection must be electrically insulated from the vessel vapor connection in accordance with section 6.10 of the OCIMF International Safety Guide for Oil Tankers and Terminals.

(h) A vapor collection system fitted with an enriching system that operates at a positive gauge pressure at the facility vapor connection must be fitted with:

(1) A manual isolation valve between each facility vapor connection and the remotely operated cargo vapor shutoff valve required by paragraph (a) of this section; and

(2) A means to prevent backflow of enriched vapor to the vessel's vapor collection system.

§ 154.812 Facility requirements for vessel liquid overfill protection.

(a) Each facility which receives cargo vapor from a tank barge which is fitted with overfill protection in accordance with 46 CFR 39.20-9(a) as its only means of overfill protection must provide a 120 volt, 20 amp explosion proof receptacle which meets:

(1) ANSI/NEMA WD6;

(2) NFPA 70, Articles 410-57 and 501-12; and

(3) 46 CFR 111.105-9.

(b) Each facility that receives cargo vapor from a tank barge fitted with an intrinsically safe cargo tank level sensor system complying with 46 CFR 39.20-9(b) as its only means of overfill

protection must have an overfill control panel on the dock capable of powering and receiving an alarm and shutdown signal from the cargo tank level sensor system that:

(1) Closes the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart and activates the emergency shutdown system required by § 154.550 of this part when:

(i) A tank overfill signal is received from the barge, or

(ii) Electrical continuity of the cargo tank level sensor system is lost;

(2) Activates an alarm which is audible and visible to barge personnel and facility personnel when a tank overfill signal, or an optional high level signal corresponding to a liquid level lower than the tank overfill sensor setting, is received from the barge;

(3) Has a means to electrically and mechanically test the alarms and automatic shutdown systems prior to transferring cargo to or ballasting the tank barge;

(4) Has suitable means, such as approved intrinsic safety barriers able to accept passive devices, to ensure that the overfill and optional alarm circuits on the barge side of the overfill control panel, including cabling, normally closed switches, and pin and sleeve connectors, are intrinsically safe;

(5) Is labeled with the maximum allowable inductance and capacitance to be connected to the panel, as specified by the equipment manufacturer; and

(6) Has a female connecting plug for the tank barge level sensor system with a 5 wire, 16 amp connector body meeting IEC 309-1/309-2 which is:

(i) Configured with pins S2 and R1 for the tank overfill sensor circuit, pin G connected to the cabling shield, and pins N and T3 reserved for an optional high level alarm connection;

(ii) Labeled "Connector for Barge Overflow Control System"; and

(iii) Connected to the overfill control panel by a shielded flexible cable.

§ 154.814 Facility requirements for vessel vapor overpressure and vacuum protection.

(a) A facility's vapor collection system must have the capacity for collecting cargo vapor at a rate of not less than 1.25 times the facility's maximum

liquid transfer rate for cargo for which vapor collection is required plus any inerting, diluting, or enriching gas which may be added to the system, unless the vapor growth for turbulent loading of the most volatile liquid handled by the facility is less than 25 percent.

(b) A facility vapor collection system must maintain the pressure in a vessel's cargo tanks between 80 percent of the highest setting of any of the vessel's vacuum relief valves and 80 percent of the lowest setting of any of the vessel's pressure relief valves for a non-inerted tank vessel, and between 0.2 psig and 80 percent of the lowest setting of any of the vessel's pressure relief valves for an inerted tank vessel. The system must be capable of maintaining the pressure in the vessel's cargo tanks within this range at any cargo transfer rate less than or equal to the maximum transfer rate determined at the pre-transfer conference required by § 156.120(w) of this chapter.

(c) The pressure measured at the facility vapor connection must be corrected for pressure drops across the vessel's vapor collection system and the vapor collection hose or arm.

(d) A pressure sensing device must be provided which activates an alarm when the pressure at the facility vapor connection exceeds either the pressure corresponding to the upper pressure determined in paragraph (b) of this section or a lower pressure agreed upon at the pre-transfer conference required by § 156.120(w) of this chapter.

(e) A pressure sensing device must be provided which activates an alarm when the pressure at the facility vapor connection falls below either the pressure corresponding to the lower pressure determined in paragraph (b) of this section or a higher pressure agreed upon at the pre-transfer conference required by § 156.120(w) of this chapter.

(f) A pressure sensing device must be provided which activates the emergency shutdown system required by § 154.550 of this part and closes the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart when the pressure at the facility vapor connection exceeds 2.0 psi, or a lower pressure agreed upon at the pre-transfer conference required by

§ 156.120(w) of this chapter. The sensing device must be independent of the device used to activate the alarm required by paragraph (d) of this section.

(g) A pressure sensing device must be provided which closes the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart when the vacuum at the facility vapor connection is more than 1.0 psi, or a lesser vacuum set at the pre-transfer conference required by § 156.120(w) of this chapter. The sensing device must be independent of the device used to activate the alarm required by paragraph (e) of this section.

(h) The pressure sensing devices required by paragraphs (d) and (f) of this section must be located in the vapor collection line between the facility vapor connection and the manual isolation valve, if required by § 154.810(h) of this subpart, unless an interlock is provided which prevents operation of the system when the isolation valve is closed.

(i) A pressure indicating device must be provided which indicates the pressure in the vapor collection line.

(j) If a compressor, blower, or eductor capable of drawing more than 1.0 psi vacuum is used to draw vapor from the vessel, a vacuum relief valve must be installed in the vapor collection line between the compressor, blower, or eductor and the facility vapor connection, which:

(1) Relieves at a pressure such that the pressure in the vapor collection system at the facility vapor connection does not exceed 1.0 psi vacuum;

(2) Has a relieving capacity equal to or greater than the capacity of the compressor, blower, or eductor;

(3) Has a flame screen fitted at the vacuum relief opening; and

(4) Has been tested for relieving capacity in accordance with paragraph 1.5.1.3 of API 2000 with a flame screen fitted.

(k) When a facility collects cargo vapor through an undersea pipeline from a vessel moored offshore, the vacuum relief valve may be set at a vacuum greater than 1.0 psi vacuum provided the pressure controls take into account the pressure drop across the vessel's vapor collection system, any

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vapor collection hoses, and the under-sea pipeline as a function of the actual transfer rate.

(l) If the pressure in the vapor collection system can exceed 2.0 psig due to a malfunction in an inerting, enriching, or diluting system a pressure relief valve must:

(1) Be installed between the point where inerting, enriching, or diluting gas is introduced into the vapor collection system and the facility vapor connection;

(2) Relieve at a pressure such that the pressure in the vapor collection system at the facility vapor connection does not exceed 2.0 psig;

(3) Have a relieving capacity equal to or greater than the maximum capacity of the facility inerting, enriching, or diluting gas source;

(4) If not designed to insure a minimum vapor discharge velocity of 30 meters (98.4 ft.) per second, have a flame screen fitted at the discharge opening; and

(5) Have been tested for relieving capacity in accordance with paragraph 1.5.1.3 of API 2000.

(m) The relieving capacity test required by paragraph (l)(5) must be carried out with a flame screen fitted at the discharge opening if the pressure relief valve is not designed to insure a minimum vapor discharge velocity of 30 meters (98.4 ft.) per second.

[CGD 88-102, 55 FR 25429, June 21, 1990, as amended by USCG-1998-3799, 63 FR 35531, June 30, 1998]

§ 154.820 Fire, explosion, and detonation protection.

(a) A vapor control system with a single facility vapor connection that receives vapor only from a vessel with inerted cargo tanks and processes vapor with a vapor recovery unit must:

(1) Be capable of inerting the vapor collection line in accordance with § 154.824(a) of this subpart prior to receiving vapors from the vessel;

(2) Have at least one oxygen analyzer that samples the vapor concentration continuously at a point not more than 6 meters (19.7 ft.) from the facility vapor connection; and

(3) Meet § 154.824 (f)(1), (f)(2), (g), (h)(2), and (h)(3) of this subpart.

(b) A vapor control system with a single facility vapor connection that receives vapor only from a vessel with inerted cargo tanks and processes vapor with a vapor destruction unit must:

(1) Have a detonation arrester located not more than 6 meters (19.7 ft.) from the facility vapor connection; or

(2) Have an inerting system that meets the requirements of § 154.824 of this subpart.

(c) A vapor control system with a single facility vapor connection that receives vapor from a vessel with cargo tanks that are not inerted and processes vapor with a vapor recovery unit must:

(1) Have a detonation arrester located not more than 6 meters (19.7 ft.) from the facility vapor connection; or

(2) Have an inerting, enriching, or diluting system that meets the requirements of § 154.824 of this subpart.

(d) A vapor control system with a single facility vapor connection that receives vapor from a vessel with cargo tanks that are not inerted and processes the vapor with a vapor destruction unit must:

(1) Have a detonation arrester located not more than 6 meters (19.7 ft.) from the facility vapor connection; and

(2) Have an inerting, enriching, or diluting system that meets the requirements of § 154.824 of this subpart.

(e) A vapor control system with multiple facility vapor connections that processes vapor with a vapor recovery unit must have a detonation arrester located not more than 6 meters (19.7 ft.) from each facility vapor connection.

(f) A vapor control system with multiple facility vapor connections that processes vapor with a vapor destruction unit must:

(1) Have a detonation arrester located not more than 6 meters (19.7 ft.) from each facility vapor connection; and

(2) Have an inerting, enriching, or diluting system that meets the requirements of § 154.824 of this subpart.

(g) A vapor control system that uses a vapor balancing system in which cargo vapor from a vessel is transferred through the facility vapor collection system to facility storage tanks must: