top of the flange face, midway between boltholes, and in line with the bolthole pattern.

(d) Each hose that transfers vapors must—

(1) Have a design burst pressure of at least 25 pounds per square inch gauge (psig);

(2) Have a maximum allowable working pressure no less than 5 psig;

(3) Be capable of withstanding at least a 2 pounds per square inch (psi) vacuum without collapsing or constricting;

(4) Be electrically continuous with a maximum resistance of 10,000 ohms;

(5) Have flanges with—

(i) A bolthole arrangement complying with the requirements for 150 pound class flanges, ANSI B16.5 (incorporated by reference, see 33 CFR 154.106); and

(ii) One or more 15.9 millimeter (0.625 inch) diameter holes in the flange face, located midway between boltholes, and in line with the bolthole pattern;

(6) Be resistant to abrasion and kinking;

(7) Be compatible with vapors being controlled; and

(8) Have the last 1 meter (3.3 feet) of each end of the vapor hose marked in accordance with paragraph (b) of this section.

(e) Vapor hoses must be adequately supported to prevent kinking, collapse, or contact with any metal of the vessel or facility to prevent unintentional electrical bypassing of the insulating flange or the single length of non-conducting hose required by paragraph (g) of this section.

(f) Fixed vapor collection arms must—

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

(2) Have the last 1 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 OCIMF ISGOTT section 17.5 (incorporated by reference, see 33 CFR 154.106). In order to prevent electrical arcing during connection and disconnection of the transfer hose/arm, the transfer hose/arm must be fitted with an insulating flange or a single length of non-conducting hose to ensure electrical discontinuity between the vessel and facility. The insulating flange/hose should be inserted at the jetty end and must not be electrically bypassed. The installation, inspection, and testing of the insulating flange/hose must be in accordance with 46 CFR 35.35–4. For each vapor hose, only one insulting flange or non-conductive hose must be provided. See 46 CFR 35.35–4.

(h) A vapor collection system, fitted with a gas injection system that operates at a positive gauge pressure at the facility vapor connection, must be fitted with a means to prevent backflow of vapor to the vessel's vapor collection system during loading.

(i) Electrical bonding between vessel and shore must be in accordance with 46 CFR 35.35–.5.

§ 154.2102 Facility requirements for vessel liquid overfill protection.

This section does not apply to facilities collecting vapors emitted from vessel cargo tanks while inerting, padding, or purging the cargo tanks with an inert gas and not loading cargo into the cargo tank.

(a) Each facility that receives cargo vapor from a tank barge that is fitted with overfill protection, in accordance with 46 CFR 39.2009(a)(1)(iii), must provide a 120-volt, 20-amp explosion-proof receptacle for the overfill protection system that meets—

(1) ANSI NEMA WD–6 (incorporated by reference, see 33 CFR 154.106);

(2) NFPA 70 (2011), Articles 406.9 and 501.145 (incorporated by reference, see 33 CFR 154.106); and

(3) 46 CFR 111.105–9.

(b) Each facility that receives cargo vapor from a tank barge that is fitted with an intrinsically safe cargo tank level sensor system complying with 46 CFR 39.2009(a)(2), as a means of overfill protection, must have an overfill control system 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 33 CFR 154.2101(a) and activates the

emergency shutdown system required by 33 CFR 154.550 when—

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

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

(2) Activates an audible and visible alarm that warns barge 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 mechanism to test the alarms and automatic shutdown systems electrically and mechanically before operating the vapor control system (VCS);

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

(5) Is labeled at the dock with the maximum allowable inductance (in millihenrys) and capacitance (in microfarads) to be connected to the facility overfill protection system as specified by the equipment manufacturer; and

(6) Has a female connecting plug for the tank barge level sensor system with a five-wire, 16-ampere connector body meeting IEC 60309–1 and IEC 60309–2 (both incorporated by reference, see 33 CFR 154.106), that is—

(i) Configured with pins S2 (N) and R1 (L3) for the tank overfill sensor circuit, pin G connected to the cabling shield, and pins N (L2) and T3 (L1) reserved for an optional high-level alarm connection;

(ii) Labeled ''Connector for Barge Overfill Control System''; and

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

§ 154.2103 Facility requirements for vessel vapor overpressure and vacuum protection.

In this section, the requirements of having a flame arrester or a flame screen at the opening of a pressure relief valve or a vacuum relief valve apply only to facilities collecting vapors of flammable, combustible, or non-high flash point liquid cargoes.

(a) A facility's vapor control system (VCS) must have the capacity for collecting cargo vapor at a rate of not less than the facility's maximum liquid transfer rate for cargoes that are vapor controlled plus the vapor growth for the cargoes and any inerting, diluting, or enriching gas that may be added to the system. Vapor growth must be considered as 25 percent of the cargo's saturated vapor pressure in pounds per square inch absolute (psia) at 115 °F, divided by 12.5 psia (the vapor pressure of gasoline at 115 °F), times the facility's maximum liquid transfer rate, unless there is experimental data for actual vapor growth for turbulent transferring under the most severe conditions for vapor growth. If the cargo is transferred at temperatures above 115 °F, the cargo's true vapor pressure (in psia) at the transferring temperature must be used when determining the vapor growth.

(b) A facility VCS must be designed to prevent the pressure in a vessel's cargo tanks from going below 80 percent of the highest setting of any of the vessel's vacuum relief valves or exceeding 80 percent of the lowest setting of any of the vessel's pressure relief valves for a non-inerted tank vessel. A facility VCS also must be designed to prevent the pressure in a vessel's cargo tanks from going below 0.2 pounds per square inch gauge (psig) or exceeding 80 percent of the lowest setting of any of the vessel's pressure relief valves for an inerted tank vessel. The system must sustain 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.

(c) The pressure measured at the facility vapor connection must be corrected for pressure drops across the vessel's vapor collection system, vapor collection hose or arm, and vapor line up to the location of the pressure sensor.

(d) The facility vapor connection must have a pressure-sensing device that meets the installation requirements of paragraph (h) of this section, which activates an alarm that meets 33 CFR 154.2100(e) when the pressure at