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§ 111.105-15 Additional methods of protection.

Each item of electrical equipment that is—

- (a) A sand-filled apparatus must meet IEC 79-5;
- (b) An oil-immersed apparatus must meet either IEC 79-6 or NEC article 500-2;
- (c) Type of protection “e” must meet IEC 79-7;
- (d) Type of protection “n” must meet IEC 79-15; and
- (e) Type of protection “m” must meet IEC 79-18.

[CGD 94-108, 61 FR 28284, June 4, 1996]

§ 111.105-17 Wiring methods for hazardous locations.

(a) Through runs of marine shipboard cable meeting subpart 111.60 of this part are required for all hazardous locations. Armored cable may be used to enhance ground detection capabilities. Additionally, Type MC cable may be used subject to the restrictions in § 111.60-23.

(b) Where conduit is installed, the applicable requirements of either the NEC or IEC 79 must be followed.

(c) Each cable entrance into explosionproof or flameproof equipment must be made with approved seal fittings, termination fittings, or glands that meet the requirements of § 111.105-9.

(d) Each cable entrance into Class II and Class III (Zone 10, 11, Z, or Y) equipment must be made with dust-tight cable entrance seals approved for the installation.

[CGD 94-108, 61 FR 28284, June 4, 1996, as amended at 62 FR 23909, May 1, 1997]

§ 111.105-19 Switches.

A switch that is explosionproof or flameproof, or that controls any explosionproof or flameproof equipment, under § 111.105-19 must have a pole for each ungrounded conductor.

[CGD 94-108, 61 FR 28284, June 4, 1996]

§ 111.105-21 Ventilation.

A ventilation duct which ventilates a hazardous location has the classification of that location. Each fan for ven-

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tilation of a hazardous location must be nonsparking.

[CGD 94-108, 61 FR 28285, June 4, 1996]

§ 111.105-27 Belt drives.

Each belt drive in a hazardous location must have:

- (a) A conductive belt; and
- (b) Pulleys, shafts, and driving equipment grounded to meet NFPA No. 77.

§ 111.105-29 Combustible liquid cargo carriers.

(a) Each vessel that carries combustible liquid cargo with a closed-cup flashpoint of 60 degrees C (140 degrees F) or higher must have:

- (1) Only intrinsically safe electric systems in cargo tanks; and
- (2) No storage battery in any cargo handling room.

(b) If a submerged cargo pump motor is in a cargo tank, it must meet the requirements of § 111.105-31(d).

(c) Where the cargo is heated to within 15°C of its flashpoint, the cargo pumproom must meet the requirements of § 111.105-31(f) and the weather locations must meet § 111.105-31(l).

[CGD 74-125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 94-108, 61 FR 28285, June 4, 1996; 61 FR 36787, July 12, 1996; 61 FR 39695, July 30, 1996]

§ 111.105-31 Flammable or combustible cargo with a flashpoint below 60 degrees C (140 degrees F), liquid sulphur carriers and inorganic acid carriers.

(a) *Applicability.* Each vessel that carries combustible or flammable cargo with a closed-cup flashpoint lower than 60 degrees C (140 degrees F) or liquid sulphur cargo, or inorganic acid cargo must meet the requirements of this section, except—

(1) A vessel carrying bulk liquefied flammable gases as a cargo, cargo residue, or vapor which must meet the requirements of § 111.105-32; and

(2) A vessel carrying carbon disulfide must have only intrinsically safe electric equipment in the locations listed in paragraphs (e) through (l) of this section.

(b) *Cable location.* Electric cable must be as close as practicable to the centerline and must be away from cargo tank openings.

(c) *Lighting circuits.* An enclosed hazardous space that has explosionproof lighting fixtures must:

(1) Have at least two lighting branch circuits;

(2) Be arranged so that there is light for relamping any deenergized lighting circuit; and

(3) Not have the switch within the space for those spaces containing explosionproof lighting fixtures under paragraphs (g), (i) and (j) of this section.

(d) *Submerged cargo pump motors.* If a submerged cargo pump motor is in a cargo tank:

(1) Low liquid level, motor current, or pump discharge pressure must automatically shutdown power to the motor if the pump loses suction;

(2) An audible and visual alarm must be actuated by the shutdown of the motor; and

(3) There must be a lockable circuit breaker or lockable switch that disconnects power to the motor.

(e) *Cargo tanks.* A cargo tank is a Class I, Division 1 (IEC Zone 0) location which has additional electrical equipment restrictions outlined in IEEE Std 45 and IEC 92-502. Cargo tanks must not contain any electrical equipment except the following:

(1) Intrinsically safe equipment.

(2) Submerged cargo pump motors and their associated cable.

(f) *Cargo handling rooms.* A cargo handling room must not have any electric cable or other electric equipment, except:

(1) Intrinsically safe equipment;

(2) Explosionproof lighting fixtures;

(3) Cables supplying intrinsically safe equipment in the cargo handling room; and

(4) Marine shipboard cables that supply explosionproof lighting fixtures that are in the cargo handling room.

(g) *Lighting of cargo handling rooms.* Lighting for a cargo handling room except a cargo handling room under paragraph (h) of this section, must be lighted through fixed glass lenses in the bulkhead or overhead. Each fixed glass lens must be wire-inserted glass that is at least .025 inches (6.35 mm) thick and arranged to maintain the watertight and gastight integrity of the structure. The fixed glass lens may form a part of

a listing fixture if the following are met:

(1) There is no access to the interior of the fixture from the cargo handling room.

(2) The fixture is vented to the engineroom or a similar nonhazardous area.

(3) The fixture is wired from outside the cargo handling room.

(4) The temperature on the cargo handling room surface of the glass lens, based on an ambient temperature of 40 degrees C, is not higher than 180 degrees C.

(h) A cargo handling room which precludes the lighting arrangement of paragraph (g) of this section, or where the lighting arrangement of paragraph (g) of the section does not give the required light, must have explosionproof lighting fixtures.

(i) *Enclosed spaces.* An enclosed space that is immediately above, below, or next to a cargo tank must not contain any electric equipment except equipment allowed for cargo handling rooms in paragraphs (f) and (g), and:

(1) Through runs of marine shipboard cable; and

(2) Watertight enclosures with bolted and gasketed covers containing only:

(i) Depth sounding devices;

(ii) Log devices; and

(iii) Impressed-current cathodic protection system electrodes.

(j) *Cargo hose stowage space.* A cargo hose stowage space must not have any electrical equipment except explosionproof lighting fixtures and through runs of marine shipboard cable.

(k) *Cargo piping in a space.* A space that has cargo piping must not have any electrical equipment except explosionproof lighting fixtures and through runs of marine shipboard cable.

(l) *Weather locations.* The following locations in the weather are Class I, Division 1 (Zone 1) locations (except the open deck area on an inorganic acid carrier which is considered a non-hazardous location) and may have only approved intrinsically safe, explosionproof, or purged and pressurized electrical equipment, and through runs of marine shipboard cable if the location is—

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- (1) Within 10 feet (3 m) of:
 - (i) A cargo tank vent outlet;
 - (ii) A cargo tank ullage opening;
 - (iii) A cargo pipe flange;
 - (iv) A cargo valve;
 - (v) A cargo handling room entrance;or

- (vi) A cargo handling room ventilation opening; or

- (2) On a tankship and on the open deck over the cargo area and 10 feet (3 m) forward and aft of the cargo area on the open deck and up to 8 feet (2.4 m) above the deck.

- (3) Within 5 meters (16 ft) of cargo pressure/vacuum valves with an unlimited height; or

- (4) Within 10 meters (33 ft) of vent outlets for free flow of vapor mixtures and high velocity vent outlets for the passage of large amounts of vapor, air or inert gas mixtures during cargo loading and ballasting or during discharging.

- (m) *Other spaces.* Except for those spaces listed in paragraphs (e) through (k), a space that has a direct opening to any space listed in paragraphs (e) through (l) must have only the electric installations that are allowed for the space to which it opens.

- (n) *Duct keel ventilation or lighting.* (1) The lighting and ventilation system for each pipe tunnel, double bottom, or duct keel must meet ABS Rules for Building and Classing Steel Vessels, section 4/5E1.15.

- (2) If a fixed gas detection system is installed, it must meet the requirements of SOLAS 74 and ABS Rules for Building and Classing Steel Vessels, section 4/5.

[CGD 74-125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 82-096, 49 FR 4947, Feb. 9, 1984; CGD 94-108, 61 FR 28285, June 4, 1996; 61 FR 33045, June 26, 1996; 62 FR 23909, May 1, 1997]

§ 111.105-32 Bulk liquefied flammable gas and ammonia carriers.

- (a) Each vessel that carries bulk liquefied flammable gases or ammonia as a cargo, cargo residue, or vapor must meet the requirements of this section.

- (b) As used in this section:

- (1) The terms “gas-safe” and “gas-dangerous” spaces are used as defined in § 154.7 of this chapter.

- (2) The term “gas-dangerous” does not include the weather deck of an ammonia carrier.

- (c) Each submerged cargo pump motor design must receive concept approval by the Commandant (G-MSE) and its installation must receive plan approval by the Commanding Officer, Marine Safety Center.

- (d) Electrical equipment must not be installed in a gas-dangerous space or zone, except:

- (1) Intrinsically safe electrical equipment and wiring, and

- (2) Other equipment as allowed in this section.

- (e) A submerged cargo pump motor, if installed in a cargo tank, must meet § 111.105-31(d).

- (f) Electrical equipment must not be installed in a hold space that has a tank that is not required to have a secondary barrier under § 154.459 of this chapter, except:

- (1) Through runs of marine shipboard cable;

- (2) Explosionproof lighting fixtures;

- (3) Depth sounding devices in gastight enclosures;

- (4) Log devices in gastight enclosures;

- (5) Impressed current cathodic protection system electrodes in gastight enclosures; and

- (6) Armored or MI type cable for a submerged cargo pump motor.

- (g) Electrical equipment must not be installed in a space that is separated by a gastight steel boundary from a hold space that has a tank that must have a secondary barrier under the requirements of § 154.459 of this chapter, except:

- (1) Through runs of marine shipboard cable;

- (2) Explosionproof lighting fixtures;

- (3) Depth sounding devices in gastight enclosures;

- (4) Log devices in gastight enclosures;

- (5) Impressed current cathodic protection system electrodes in gastight enclosures;

- (6) Explosionproof motors that operate cargo system valves or ballast system valves;

- (7) Explosionproof bells for general alarm systems; and