

(d) If the installation of the electrical equipment does not ensure a positive ground to the metal hull or equivalent conducting body, the apparatus must be grounded to the hull with a grounding conductor.

**§ 111.05-7 Armored and metallic sheathed cable.**

When installed, the metallic armor or sheath must meet the installation requirements of Section 25 of IEEE 45-2002 (incorporated by reference; see 46 CFR 110.10-1).

[USCG-2003-16630, 73 FR 65196, Oct. 31, 2008]

**§ 111.05-9 Masts.**

Each nonmetallic mast and topmast must have a lightning-ground conductor in accordance with section 10 of IEC 92-401 (incorporated by reference; see 46 CFR 110.10-1).

[USCG-2003-16630, 73 FR 65196, Oct. 31, 2008]

SYSTEM GROUNDING

**§ 111.05-11 Hull return.**

(a) A vessel's hull must not carry current as a conductor except for the following systems:

- (1) Impressed current cathodic protection systems.
- (2) Limited and locally grounded systems, such as a battery system for engine starting that has a one-wire system and the ground lead connected to the engine.
- (3) Insulation level monitoring devices if the circulation current does not exceed 30 milliamperes under the most unfavorable conditions.
- (4) Welding systems with hull return except vessels subject to 46 CFR Subchapter D.

**§ 111.05-13 Grounding connection.**

Each grounded system must have only one point of connection to ground regardless of the number of power sources operating in parallel in the system.

**§ 111.05-15 Neutral grounding.**

(a) Each propulsion, power, lighting, or distribution system having a neutral bus or conductor must have the neutral grounded.

(b) The neutral of a dual-voltage system must be solidly grounded at the generator switchboard.

**§ 111.05-17 Generation and distribution system grounding.**

The neutral of each grounded generation and distribution system must:

(a) Be grounded at the generator switchboard, except the neutral of an emergency power generation system must be grounded with:

- (1) No direct ground connection at the emergency switchboard;
- (2) The neutral bus permanently connected to the neutral bus on the main switchboard; and

(3) No switch, circuit breaker, or fuse in the neutral conductor of the bus-tie feeder connecting the emergency switchboard to the main switchboard; and

(b) Have the ground connection accessible for checking the insulation resistance of the generator to ground before the generator is connected to the bus.

**§ 111.05-19 Tank vessels; grounded distribution systems.**

(a) If the voltage of a distribution system is less than 1,000 volts, line to line, a tank vessel must not have a grounded distribution system.

(b) If the voltage of a distribution system on a tank vessel is 1,000 volts or greater, line to line, and the distribution system is grounded (including high-impedance grounding), any resulting current must not flow through a hazardous (classified) location.

[CGD 94-108, 61 FR 28276, June 4, 1996, as amended at 62 FR 23907, May 1, 1997]

GROUND DETECTION

**§ 111.05-21 Ground detection.**

There must be ground detection for each:

- (a) Electric propulsion system;
- (b) Ship's service power system;
- (c) Lighting system; and
- (d) Power or lighting distribution system that is isolated from the ship's service power and lighting system by transformers, motor generator sets, or other devices.