

## § 110.30-5

and the approved plans. The inspection also is to determine that the workmanship of all equipment and apparatus and the installation is satisfactory.

### § 110.30-5 Inspection for certification.

Electric installations and electric equipment must be inspected at the inspection for certification and periodic inspection to determine mechanical and electrical condition and performance. Particular note must be made of circuits added or modified after the original issuance of the Certificate of Inspection.

[USCG 1999-4976, 65 FR 6504, Feb. 9, 2000]

### § 110.30-7 Repairs or alterations.

The Officer in Charge, Marine Inspection must be notified before—

(a) Alterations or modifications that deviate from approved plans; or

(b) Repairs, alterations, or modifications that affect the safety of the vessel.

[CGD 94-108, 61 FR 28275, June 4, 1996]

## PART 111—ELECTRIC SYSTEMS— GENERAL REQUIREMENTS

### Subpart 111.01—General

Sec.

- 111.01-1 General.
- 111.01-3 Placement of equipment.
- 111.01-5 Protection from bilge water.
- 111.01-7 Accessibility and spacing.
- 111.01-9 Degrees of protection.
- 111.01-11 Corrosion-resistant parts.
- 111.01-13 Limitations on porcelain use.
- 111.01-15 Temperature ratings.
- 111.01-17 Voltage and frequency variations.
- 111.01-19 Inclination of the vessel.

### Subpart 111.05—Equipment Ground, Ground Detection, and Grounded Systems

- 111.05-1 Purpose.

#### EQUIPMENT GROUND

- 111.05-3 Design, construction, and installation; general.
- 111.05-7 Armored and metallic-sheathed cable.
- 111.05-9 Masts.

#### SYSTEM GROUNDING

- 111.05-11 Hull return.
- 111.05-13 Grounding connection.
- 111.05-15 Neutral grounding.

## 46 CFR Ch. I (10-1-05 Edition)

- 111.05-17 Generation and distribution system grounding.
- 111.05-19 Tank vessels; grounded distribution systems.

#### GROUND DETECTION

- 111.05-21 Ground detection.
- 111.05-23 Location of ground indicators.
- 111.05-25 Ungrounded systems.
- 111.05-27 Grounded neutral alternating current systems.
- 111.05-29 Dual voltage direct current systems.

#### GROUNDED CONDUCTORS

- 111.05-31 Grounding conductors for systems.
- 111.05-33 Equipment safety grounding (bonding) conductors.
- 111.05-37 Overcurrent devices.

### Subpart 111.10—Power Supply

- 111.10-1 Definitions.
- 111.10-3 Two generating sources.
- 111.10-4 Power requirements, generating sources.
- 111.10-5 Multiple energy sources.
- 111.10-7 Dead ship.
- 111.10-9 Ship's service supply transformers; two required.

### Subpart 111.12—Generator Construction and Circuits

- 111.12-1 Prime movers.
- 111.12-3 Excitation.
- 111.12-5 Generator construction and testing.
- 111.12-7 Voltage regulation and parallel operation.
- 111.12-9 Generator cables.
- 111.12-11 Generator protection.
- 111.12-13 Propulsion generator protection.

### Subpart 111.15—Storage Batteries and Battery Chargers: Construction and Installation

- 111.15-1 General.
- 111.15-2 Battery construction.
- 111.15-3 Battery categories.
- 111.15-5 Battery installation.
- 111.15-10 Ventilation.
- 111.15-20 Conductors.
- 111.15-25 Overload and reverse current protection.
- 111.15-30 Battery chargers.

### Subpart 111.20—Transformer Construction, Installation, and Protection

- 111.20-1 General requirements.
- 111.20-5 Temperature rise.
- 111.20-10 Autotransformers.
- 111.20-15 Transformer overcurrent protection.

**Subpart 111.25—Motors**

- 111.25-1 General requirements
- 111.25-5 Marking.
- 111.25-15 Duty cycle.

**Subpart 111.30—Switchboards**

- 111.30-1 Location and installation.
- 111.30-3 Accessibility of switchboard components and connections.
- 111.30-4 Circuit breakers removable from the front.
- 111.30-5 Construction.
- 111.30-11 Deck coverings.
- 111.30-15 Nameplates.
- 111.30-17 Protection of instrument circuits.
- 111.30-19 Buses and wiring.
- 111.30-24 Generation systems greater than 3000 kw.
- 111.30-25 Alternating-current ship's service switchboards.
- 111.30-27 Direct current ship's service switchboards.
- 111.30-29 Emergency switchboards.

**Subpart 111.33—Power Semiconductor Rectifier Systems**

- 111.33-1 General.
- 111.33-3 Nameplate data.
- 111.33-5 Installation.
- 111.33-7 Alarms and shutdowns.
- 111.33-9 Ventilation exhaust.
- 111.33-11 Propulsion systems.

**Subpart 111.35—Electric Propulsion**

- 111.35-1 Electrical propulsion installations.

**Subpart 111.40—Panelboards**

- 111.40-1 Panelboard standard.
- 111.40-5 Enclosure.
- 111.40-7 Location.
- 111.40-9 Locking device.
- 111.40-11 Numbered switching unit and panelboard directory.
- 111.40-13 Rating.
- 111.40-15 Overcurrent device.

**Subpart 111.50—Overcurrent Protection**

- 111.50-1 Protection of equipment.
- 111.50-2 Systems integration.
- 111.50-3 Protection of conductors.
- 111.50-5 Location of overcurrent protective devices.
- 111.50-7 Enclosures.
- 111.50-9 Disconnecting and guarding.

**Subpart 111.51—Coordination of Overcurrent Protective Devices**

- 111.51-1 Purpose.
- 111.51-3 Protection of vital equipment.

**Subpart 111.52—Calculation of Short-Circuit Currents**

- 111.52-1 General.
- 111.52-3 Systems below 1500 kilowatts.
- 111.52-5 Systems 1500 kilowatts or above.

**Subpart 111.53—Fuses**

- 111.53-1 General.

**Subpart 111.54—Circuit Breakers**

- 111.54-1 Circuit breakers.
- 111.54-3 Remote control.

**Subpart 111.55—Switches**

- 111.55-1 General.
- 111.55-3 Circuit connections.

**Subpart 111.59—Busways**

- 111.59-1 General.
- 111.59-3 No mechanical cooling.

**Subpart 111.60—Wiring Materials and Methods**

- 111.60-1 Cable construction and testing.
- 111.60-2 Specialty cable for communication and RF applications.
- 111.60-3 Cable application.
- 111.60-4 Minimum cable conductor size.
- 111.60-5 Cable installation.
- 111.60-6 Fiber optic cable.
- 111.60-7 Demand loads.
- 111.60-9 Segregation of vital circuits.
- 111.60-11 Wire.
- 111.60-13 Flexible electric cord and cables.
- 111.60-17 Connections and terminations.
- 111.60-19 Cable splices.
- 111.60-21 Cable insulation tests.
- 111.60-23 Metal-clad (Type MC) cable.

**Subpart 111.70—Motor Circuits, Controllers, and Protection**

- 111.70-1 General.
- 111.70-3 Motor controllers and motor control centers.
- 111.70-5 Heater circuits.
- 111.70-7 Remote control, interlock, and indicator circuits.

**Subpart 111.75—Lighting Circuits and Protection**

- 111.75-1 Lighting feeders.
- 111.75-5 Lighting branch circuits.
- 111.75-15 Lighting requirements.
- 111.75-16 Lighting of survival craft and rescue boats.
- 111.75-17 Navigation lights.
- 111.75-18 Signaling lights.
- 111.75-20 Lighting fixtures.

**Pt. 111**

**46 CFR Ch. I (10–1–05 Edition)**

**Subpart 111.77—Appliances and  
Appliance Circuits**

- 111.77–1 Overcurrent protection.
- 111.77–3 Appliances.

**Subpart 111.79—Receptacles**

- 111.79–1 Receptacle outlets; general.
- 111.79–3 Grounding pole.
- 111.79–9 Transmitting power between receptacles.
- 111.79–11 Lifeboat receptacles.
- 111.79–13 Different voltages and power types.
- 111.79–15 Receptacles for refrigerated containers.

**Subpart 111.81—Outlet Boxes and Junction  
Boxes**

- 111.81–1 Outlet boxes and junction boxes; general.
- 111.81–3 Cables entering boxes.

**Subpart 111.83—Shore Connection Boxes**

- 111.83–1 General.
- 111.83–5 Bottom entrance and protected enclosures.

**Subpart 111.85—Electric Oil Immersion  
Heaters**

- 111.85–1 Electric oil immersion heaters.

**Subpart 111.87—Electric Air Heating  
Equipment**

- 111.87–1 Applicability.
- 111.87–3 General requirements.

**Subpart 111.91—Elevators and  
Dumbwaiters**

- 111.91–1 Power, control, and interlock circuits.

**Subpart 111.95—Electric Power-Operated  
Boat Winches**

- 111.95–1 Applicability.
- 111.95–3 General requirements.
- 111.95–7 Wiring of boat winch components.

**Subpart 111.97—Electric Power-Operated  
Watertight Door Systems**

- 111.97–1 Applicability.
- 111.97–3 General requirements.
- 111.97–5 Electric and hydraulic power supply.
- 111.97–7 Distribution.
- 111.97–9 Overcurrent protection.

**Subpart 111.99—Fire Door Holding and  
Release Systems**

- 111.99–1 Applicability.
- 111.99–3 Definitions.
- 111.99–5 General.

**Subpart 111.101—Submersible Motor-  
Driven Bilge Pumps**

- 111.101–1 Applicability.
- 111.101–3 General requirements.

**Subpart 111.103—Remote Stopping  
Systems**

- 111.103–1 Power ventilation systems except machinery space ventilation systems.
- 111.103–3 Machinery space ventilation.
- 111.103–7 Ventilation stop stations.
- 111.103–9 Machinery stop stations.

**Subpart 111.105—Hazardous Locations**

- 111.105–1 Applicability.
- 111.105–3 General requirements.
- 111.105–5 System integrity.
- 111.105–7 Approved equipment.
- 111.105–9 Explosionproof and flameproof equipment.
- 111.105–11 Intrinsically safe systems.
- 111.105–15 Additional methods of protection.
- 111.105–17 Wiring methods for hazardous locations.
- 111.105–19 Switches.
- 111.105–21 Ventilation.
- 111.105–27 Belt drives.
- 111.105–29 Combustible liquid cargo carriers.
- 111.105–31 Flammable or combustible cargo with a flashpoint below 60 degrees C (140 degrees F), liquid sulphur carriers and inorganic acid carriers.
- 111.105–32 Bulk liquefied flammable gas and ammonia carriers.
- 111.105–33 Mobile offshore drilling units.
- 111.105–35 Vessels carrying coal.
- 111.105–37 Flammable anesthetics.
- 111.105–39 Additional requirements for vessels carrying vehicles with fuel in their tanks.
- 111.105–40 Additional requirements for RO/RO vessels.
- 111.105–41 Battery rooms.
- 111.105–43 Paint stowage or mixing spaces.
- 111.105–45 Vessels carrying agricultural products.

**Subpart 111.107—Industrial Systems**

- 111.107–1 Industrial systems.

AUTHORITY: 46 U.S.C. 3306, 3703; Department of Homeland Security Delegation No. 0170.1.

SOURCE: CGD 74–125A, 47 FR 15236, Apr. 8, 1982, unless otherwise noted.

**Subpart 111.01—General****§ 111.01-1 General.**

(a) Electric installations on vessels must ensure:

(1) Maintenance of services necessary for safety under normal and emergency conditions.

(2) Protection of passengers, crew, other persons, and the vessel from electrical hazards.

(3) Maintenance of system integrity through compliance with the applicable system requirements (IEEE, NEC, IEC, etc.) to which plan review has been approved.

(b) Combustible material should be avoided in the construction of electrical equipment.

[CGD 74-125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 94-108, 61 FR 28275, June 4, 1996; 62 FR 23907, May 1, 1997]

**§ 111.01-3 Placement of equipment.**

(a) Electric equipment must be arranged, as far as practicable, to prevent mechanical damage to the equipment from the accumulation of dust, oil vapors, steam, or dripping liquids.

(b) Apparatus that may arc must be ventilated or be in ventilated compartments in which flammable gases, acid fumes, and oil vapors cannot accumulate. Skylights and ventilators must be arranged to prevent flooding of the apparatus.

**§ 111.01-5 Protection from bilge water.**

Each of the following in or around the bilge area must be arranged or constructed so that it cannot be damaged by bilge water:

- (a) Generators.
- (b) Motors.
- (c) Electric coupling.
- (d) Electric cable.

[CGD 94-108, 61 FR 28275, June 4, 1996]

**§ 111.01-7 Accessibility and spacing.**

(a) The design and arrangement of electric apparatus must afford accessibility to each part as needed to facilitate proper inspection, adjustment, maintenance, or replacement.

(b) Within an enclosure, the spacing between energized components (or between an energized component and ground) must be to the appropriate in-

dustry standard for the voltage and current utilized in the circuit. Additionally, spacing within any enclosure must be sufficient to facilitate servicing.

[CGD 94-108, 61 FR 28275, June 4, 1996]

**§ 111.01-9 Degrees of protection.**

(a) Interior electrical equipment exposed to dripping liquids or falling solid particles must be manufactured to at least NEMA 250 Type 2 or IEC IP 22 degree of protection as appropriate for the service intended.

(b) Electrical equipment in locations requiring exceptional degrees of protection as defined in §110.15-1 of this chapter must be enclosed to meet at least the minimum degrees of protection in ABS Rules for Building and Classing Steel Vessels, table 4/5B.1, or appropriate NEMA 250 Type for the service intended. Each enclosure must be designed in such a way that the total rated temperature of the equipment inside the enclosure is not exceeded.

(c) Central control consoles and similar control enclosures must be manufactured to at least NEMA 250 Type 2 or IEC IP 22 degree of protection regardless of location.

(d) Equipment for interior locations not requiring exceptional degrees of protection must be manufactured to at least NEMA 250 Type 1 with dripshield or IEC IP 11.

NOTE TO §111.01-9: The degrees of protection specified in this section are described in NEMA Standards Publication No. 250 and IEC IP Code 529 and designated in ABS Rules for Building and Classing Steel Vessels, table 4/5B.1.

[CGD 94-108, 61 FR 28275, June 4, 1996, as amended at 62 FR 23907, May 1, 1997]

**§ 111.01-11 Corrosion-resistant parts.**

Each enclosure and part of electric equipment that can be damaged by corrosion must be made of corrosion-resistant materials or of materials having a corrosion resistant finish.

**§ 111.01-13 Limitations on porcelain use.**

Porcelain must not be used for lamp sockets, switches, receptacles, fuse blocks, or other electric equipment where the item is solidly mounted by