

(3) If the overcurrent device that protects the larger conductors also protects the smaller conductors, an overcurrent device is not required at the supply to the smaller conductors.

(4) If the overcurrent device protecting the primary side of a single phase transformer (two wire with single-voltage secondary) also protects the conductors connected to the secondary side, as determined by multiplying the current-carrying capacity of the secondary conductor by the secondary to primary transformer voltage ratio, and this protection meets § 111.20-15 of this chapter, an overcurrent device is not required at the supply to the secondary side conductors.

(b) *Location on vessel.* Each overcurrent device:

(1) Must be:

(i) Readily accessible; and
(ii) In a distribution panelboard, switchboard, motor controller, or similar enclosure; and

(2) Must not be:

(i) Exposed to mechanical damage; and
(ii) Near an easily ignitable material or where explosive gas or vapor may accumulate.

§ 111.50-7 Enclosures.

(a) Each enclosure of an overcurrent protective device must meet Sections 240-30 and 240-33 of the National Electrical Code.

(b) No enclosure may be exposed to the weather unless accepted by the Commandant.

§ 111.50-9 Disconnecting and guarding.

Disconnecting and guarding of overcurrent protective devices must meet Part D of Article 240 of the National Electrical Code.

Subpart 111.51—Coordination of Overcurrent Protective Devices

§ 111.51-1 Purpose.

The purpose of this subpart is to provide continuity of service for equipment vital to the propulsion, control or safety of the vessel under short-circuit conditions through coordination and selective operation of overcurrent protective devices.

§ 111.51-3 Protection of vital equipment.

(a) The coordination of overcurrent protective devices must be demonstrated for all potential plant configurations.

(b) Overcurrent protective devices must be installed so that:

(1) A short-circuit on a circuit that is not vital to the propulsion, control, or safety of the vessel does not trip equipment that is vital; and

(2) A short-circuit on a circuit that is vital to the propulsion, control, or safety of the vessel is cleared only by the protective device that is closest to the point of the short-circuit.

[CGD 74-125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 94-108, 62 FR 23908, May 1, 1997]

Subpart 111.52—Calculation of Short-Circuit Currents

§ 111.52-1 General.

The available short-circuit current must be computed—

(a) From the aggregate contribution of all generators that can simultaneously operate in parallel;

(b) From the largest probable motor load; and

(c) With a three phase fault on the load terminals of the protective device.

[CGD 74-125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 94-108, 61 FR 28279, June 4, 1996]

§ 111.52-3 Systems below 1500 kilowatts.

The following short-circuit assumptions must be made for a system with an aggregate generating capacity below 1500 kilowatts, unless detailed computations in accordance with § 111.52-5 are submitted:

(a) The maximum short-circuit current of a direct current system must be assumed to be 10 times the aggregate normal rated generator currents plus six times the aggregate normal rated currents of all motors that may be in operation.

(b) The maximum asymmetrical short-circuit current for an alternating current system must be assumed to be 10 times the aggregate normal rated generator currents plus four times the

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aggregate normal rated currents of all motors that may be in operation.

(c) The average asymmetrical short-circuit current for an alternating-current system must be assumed to be 8½ times the aggregate normal rated generator currents plus 3½ times the aggregate normal rated currents of all motors that may be in operation.

§ 111.52-5 Systems 1500 kilowatts or above.

Short-circuit calculations must be submitted for systems with an aggregate generating capacity of 1500 kilowatts or more by utilizing one of the following methods:

(a) Exact calculations using actual impedance and reactance values of system components.

(b) Estimated calculations using the Naval Sea Systems Command Design Data Sheet DDS 300-2.

(c) Estimated calculations using IEC 363.

(d) The estimated calculations using a commercially established analysis procedure for utility or industrial applications.

[CGD 94-108, 61 FR 28279, June 4, 1996]

Subpart 111.53—Fuses

§ 111.53-1 General.

(a) Each fuse must—

(1) Meet the general provisions of article 240 of the NEC or IEC 92-202 as appropriate;

(2) Have an interrupting rating sufficient to interrupt the asymmetrical RMS short-circuit current at the point of application; and

(3) Be listed by an independent laboratory.

(b) Renewable link cartridge-type fuses must not be used.

(c) Each fuse installation must provide for ready access to test the condition of the fuse.

[CGD 94-108, 61 FR 28279, June 4, 1996; 61 FR 33045, June 26, 1996]

Subpart 111.54—Circuit Breakers

§ 111.54-1 Circuit breakers.

(a) Each Circuit breaker must—

(1) Meet the general provision of article 240 of the NEC or IEC 92-202, as appropriate;

(2) Meet subpart 111.55 of this part; and

(3) Have an interrupting rating sufficient to interrupt the maximum asymmetrical short-circuit current available at the point of application.

(b) Molded case circuit breakers must not be used in circuits having a nominal voltage of more than 600 volts (1,000 volts for circuits containing circuit breakers manufactured to IEC requirements). Each molded case circuit breaker must meet UL 489 and its marine supplement 489 SA or IEC 947-2 Part 2, except as noted in paragraph (e) of this section.

(c) Circuit breakers, other than the molded case type, that are for use in one of the following systems must meet the following requirements:

(1) An alternating current system having a nominal voltage of 600 volts or less, or 1,000 volts for IEC standard circuit breakers must meet—

- (i) IEEE C37.13;
- (ii) IEEE Std 331; or
- (iii) IEC 947-2, Part 2.

(2) A direct current system of 3,000 volts or less must meet ANSI C37.14 or IEC 947-2, Part 2.

(3) An alternating current system having a nominal voltage greater than 600 volts, or greater than 1,000 volts for IEC standard circuit breakers must meet—

- (i) ANSI/IEEE C37.04 including all referenced supplements, IEEE Std 320 including all referenced supplements, and ANSI C37.12; or
- (ii) IEC 56.

(d) A circuit breaker must not:

(1) Be dependent upon mechanical cooling to operate within its rating; or

(2) Have a long-time-delay trip element set above the continuous current rating of the trip element or of the circuit breaker frame.

(e) Each circuit breaker located in an engineroom, boilerroom, or machinery space must be calibrated for a 50 degree C ambient temperature. If the circuit breaker is located in an environmentally controlled machinery control room where provisions are made for ensuring an ambient temperature of 40 degree C or less, a circuit breaker must