

§ 111.50-2 Systems integration.

The electrical characteristics of each overcurrent protective device must be compatible with other devices and its coordination must be considered in the design of the entire protective system.

NOTE TO § 111.50-2: The electrical characteristics of overcurrent protective devices may differ between standards. The interchangeability and compatibility of components complying with differing standards cannot be assumed.

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

§ 111.50-3 Protection of conductors.

(a) *Purpose.* The purpose of overcurrent protection for conductors is to open the electric circuit if the current reaches a value that will cause an excessive or dangerous temperature in the conductor or conductor insulation. A grounded conductor is protected from overcurrent if a protective device of a suitable rating or setting is in each ungrounded conductor of the same circuit.

(b) *Overcurrent protection of conductors.* Each conductor must be protected in accordance with its current carrying capacity, except a conductor for the following circuits which must meet the following listed subparts of this chapter:

- (1) Propulsion circuits, Subpart 111.35.
- (2) Steering circuits, subchapter F of this chapter.
- (3) Motor circuits, Subpart 111.70.
- (4) Flexible cord and fixture wire for lighting circuits, Subpart 111.75.
- (5) Switchboard circuits, Subpart 111.30.

(c) *Fuses and circuit breakers.* If the allowable current carrying capacity of the conductor does not correspond to a standard fuse or circuit breaker rating which meets article 240-6 of the NEC or IEC 92-202 and the next larger standard fuse or circuit breaker rating is used, it must not be larger than 150 percent of the current carrying capacity of the conductor. The effect of temperature on the operation of fuses and thermally controlled circuit breakers must be taken into consideration.

(d) *Parallel overcurrent protective devices.* An overcurrent protective device must not be connected in parallel with another overcurrent protective device.

(e) *Thermal devices.* A thermal cutout, thermal relay, or other device not designed to open a short circuit, must not be used for protection of a conductor against overcurrent due to a short circuit or ground, except in a motor circuit as described in Article 430 of the National Electrical Code or in IEC 92-202.

(f) *Ungrounded conductors.* A fuse or overcurrent trip unit of a circuit breaker must be in each ungrounded conductor. A branch switch or circuit breaker must open all conductors of the circuit, except grounded conductors.

(g) *Grounded conductor.* An overcurrent device must not be in a permanently grounded conductor, except:

- (1) An overcurrent device that simultaneously opens all conductors of the circuit, unless prohibited by § 111.05-17 for the bus-tie feeder connecting the emergency and main switchboards; and
- (2) For motor-running protection described in Article 430 of the National Electrical Code or in IEC 92-202.

[CGD 74-125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 94-108, 61 FR 28279, June 4, 1996; CGD 97-057, 62 FR 51047, Sept. 30, 1997]

§ 111.50-5 Location of overcurrent protective devices.

(a) *Location in circuit.* Overcurrent devices must be at the point where the conductor to be protected receives its supply, except as follows:

- (1) The generator overcurrent protective device must be on the ship's service generator switchboard. (See § 111.12-11(g) for additional requirements.)
- (2) The overcurrent protection for the shore connection conductors must meet § 111.30-25.

(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