

(k) Supply piping that conveys fuel oil or lubricating oil to equipment and is in close proximity of equipment or lines having an open flame or having parts operating above 260 °C (500 °F) must be of seamless steel.

(1) Existing fuel oil piping may remain in service as long as it is serviceable to the satisfaction of the Coast Guard Representative. Any replacement, alterations, modifications or new installations to the fuel oil piping system must be made in accordance with the material requirements of this section.

**§ 28.840 Means for stopping pumps, ventilation, and machinery.**

All electrically driven fuel oil transfer pumps, fuel oil unit and service pumps, and ventilation fans shall be fitted with remote controls from a readily accessible position outside of the space concerned so that they may be stopped in the event of fire occurring in the compartment in which they are located. These controls shall be suitably protected against accidental operation or tampering and shall be suitably marked.

**§ 28.845 General requirements for electrical systems.**

(a) Electrical equipment exposed to the weather or in a location exposed to seas must be waterproof or watertight, or enclosed in a watertight housing.

(b) Aluminum must not be used for current carrying parts of electrical equipment or wiring.

(c) As far as practicable, electrical equipment must not be installed in lockers used to store paint, oil, turpentine, or other flammable or combustible liquids. If electrical equipment, such as lighting, is necessary in these spaces, it must be explosion-proof or intrinsically safe.

(d) Explosion-proof and intrinsically safe equipment must meet the requirements of § 111.105 of this chapter.

(e) Metallic enclosures and frames of electrical equipment must be grounded.

**§ 28.850 Main source of electrical power.**

(a) Applicability: Each vessel that relies on electricity to power any of the

following essential loads must have at least two electrical generators to supply:

(1) The propulsion system and its necessary auxiliaries and controls;

(2) Interior lighting;

(3) Steering systems;

(4) Communication systems;

(5) Navigation equipment and navigation lights;

(6) Fire protection or detection equipment;

(7) Bilge pumps; and

(8) General alarm system.

(b) Each generator must be attached to an independent prime mover.

**§ 28.855 Electrical distribution systems.**

(a) Each electrical distribution system which has a neutral bus or conductor must have the neutral bus or conductor grounded.

(b) A grounded electrical distribution system must have only one connection to ground. This ground connection must be at the switchboard.

**§ 28.860 Overcurrent protection and switched circuits.**

(a) Each power source must be protected against overcurrent. Overcurrent devices for generators must be set at a value not exceeding 115 percent of the generator's full load rating.

(b) Except for a steering circuit, each circuit must be protected against both overload and short circuit. Each overcurrent device in a steering system power and control circuit must provide protection only.

(c) Each ungrounded current carrying conductor must be protected in accordance with its current carrying capacity by a circuit breaker or fuse at the connection to the switchboard or distribution panel bus.

(d) Each circuit breaker and each switch must simultaneously open all ungrounded conductors.

(e) The grounded conductor of a circuit must not be disconnected by a switch or an overcurrent device unless all ungrounded conductors of the circuit are simultaneously disconnected.

(f) Navigation light circuits must be separate, switched circuits having fused disconnect switches or circuit