§ 111.12–7 Voltage regulation and parallel operation.

Voltage regulation and parallel operation must meet:

(a) For AC systems: sections 4–2–3/7.5.2, 4–2–4/7.5.2, 4–8–3/3.13.2, and 4–8–3/3.13.3 of the ABS Steel Vessel Rules (incorporated by reference; see 46 CFR 110.10–1);

(b) For DC systems: section 4–8–3/3.13.3(c) of the ABS Steel Vessel Rules, and IEC 92–202 and IEC 92–301 (both incorporated by reference; see 46 CFR 110.10–1); and

(c) For mobile offshore drilling units: Part 4, Chapter 3, section 4/3.21.2, 4/3.21.3, 4/3.23.2, and 4/3.23.3 of the ABS MODU Rules (incorporated by reference; see 46 CFR 110.10–1).

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

§ 111.12–9 Generator cables.

(a) The current-carrying capacity of generator cables must not be:

(1) Less than 115 percent of the continuous generator rating; or

(2) Less than 115 percent of the overload for a machine with a 2 hour or greater overload rating.

(b) Generator cables must not be in the bilges.

§ 111.12–11 Generator protection.

(a) *Applicability*. This section applies to each generator except a propulsion generator.

(b) *General*. Each ship's service generator and emergency generator must be protected by an individual, tripfree, air circuit breaker whose tripping characteristics can be set or adjusted to closely match the generator capabilities and meet the coordination requirements of Subpart 111.51. Each circuit breaker must contain the trips required by this section.

(c) *Type of trips*. A circuit breaker for a generator must:

(1) Open upon the shutting down of the prime mover;

(2) Have longtime overcurrent trips or relays set as necessary to coordinate with the trip settings of the feeder circuit breakers; and

(3) Not have an instantaneous trip with the exception that an instantaneous trip is required if:

(i) Three or more alternating-current generators can be paralleled; or

(ii) The circuit breaker is for a direct current generator.

(d) *Setting of longtime overcurrent trips*. The pickup setting of the longtime overcurrent trip of a generator circuit breaker must not be larger than:

(1) 115 percent of the generator rating for a continuous rated machine; or

(2) 115 percent of the overload rating for a machine with a 2-hour or greater overload rating.

(e) *Setting of instantaneous trips*. The instantaneous trip of a generator circuit breaker must be set above, but as close as practicable to, the maximum asymmetrical short circuit available from any one of the generators that can be paralleled.

(f) *Reverse-power and reverse-current trips*. Each generator arranged for parallel operation must have reverse-power or reverse-current trips.

(g) *Location*. A ship's service generator overcurrent protective device must be on the ship's service generator switchboard. The generator and its switchboard must be in the same space. (For the purposes of this section, the following are not considered separate from the machinery space: (1) A control room that is inside of the machinery casing and (2) a dedicated switchgear and semiconductor rectifier (SCR) compartment on a mobile offshore drilling unit that is separate from but directly adjacent to and on the same level as the generator room).

(h) *Three-wire, single-phase and four-wire, three-phase generators*. There must be circuit breaker poles for each generator lead, except in the neutral lead.

(i) *Three-wire, direct-current generators*. Each three-wire, direct current generator must meet the following requirements:

(1) *Circuit breaker poles*. There must be separate circuit breaker poles for the positive and negative leads, and, unless the main poles provide protection, for each equalizer lead. If there are equalizer poles for a three-wire generator, each overload trip must be of the ''Algebraic'' type. If there is a neutral pole in the generator circuit breaker, there must not be an overload trip element for the neutral pole. In

this case, there must be a neutral overcurrent relay and alarm system that is set to function at a current value not more than the neutral rating.

(2) *Equalizer buses.* For each three-wire generator, the circuit breaker must protect against a short circuit on the equalizer bus.

(j) *Circuit breaker reclosing.* Generator circuit breakers must not automatically close after tripping.

[CGD 74–125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 81–030, 53 FR 17847, May 18, 1988; CGD 94–108, 61 FR 28277, June 4, 1996; 62 FR 23908, May 1, 1997]

§ 111.12–13 Propulsion generator protection.

For general requirements, see § 111.35–1 of this chapter.

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

§ 111.15–1 General.

Each battery must meet the requirements of this subpart.

[CGD 94–108, 61 FR 28277, June 4, 1996]

§ 111.15–2 Battery construction.

(a) A battery cell, when inclined at 40 degrees from the vertical, must not spill electrolyte.

(b) Each fully charged lead-acid battery must have a specific gravity that meets section 22 of IEEE 45–2002 (incorporated by reference; see 46 CFR 110.10–1).

(c) Batteries must not evolve hydrogen at a rate exceeding that of a similar size lead-acid battery under similar charging condition.

(d) Batteries must be constructed to take into account the environmental conditions of a marine installation, including temperature, vibration, and shock.

[CGD 94–108, 61 FR 28277, June 4, 1996, as amended by USCG–2003–16630, 73 FR 65196, Oct. 31, 2008]

§ 111.15–3 Battery categories.

(a) A battery installation is classified as one of three types, based upon power output of the battery charger, as follows:

(1) *Large.* A large battery installation is one connected to a battery charger that has an output of more than 2 kw computed from the highest possible charging current and the rated voltage of the battery installation.

(2) *Moderate.* A moderate battery installation is one connected to a battery charger that has an output of between 0.2 kw and 2 kw computed from the highest possible charging current and the rated voltage of the battery installation.

(3) *Small.* A small battery installation is one connected to a battery charger that has an output of less than 0.2 kw computed from the highest possible charging current and the rated voltage of the battery installation.

(b) Batteries that generate less hydrogen under normal charging and discharging conditions than an equivalent category of lead-acid batteries (e.g., sealed batteries) may have their battery category reduced to an equivalent category of lead-acid batteries.

[CGD 74–125A, 47 FR 15236, Apr. 8, 1982, as amended by CGD 94–108, 61 FR 28278, June 4, 1996]

§ 111.15–5 Battery installation.

(a) *Large batteries.* Each large battery installation must be in a room that is only for batteries or a box on deck. Installed electrical equipment must meet the hazardous location requirements in subpart 111.105 of this part.

(b) *Moderate batteries.* Each moderate battery installation must be in a battery room, in a box on deck, or in a box or locker in another space such as an engineroom, storeroom, or similar space, except if a moderate battery installation is in a ventilated compartment such as the engineroom and is protected from falling objects, a box or locker is not required. A moderate battery installation must not be in a sleeping space. An engine cranking battery for one or more engines must be as close as possible to the engine or engines.

(c) *Small batteries.* Small size battery installations must not be located in poorly-ventilated spaces, such as closets, or in living spaces, such as staterooms.

(d) *Battery trays.* Each battery tray must be chocked with wood strips or