§ 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


§ 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 long-time 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 long-time overcurrent trips. The pickup setting of the long-time 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.
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this case, there must be a neutral over-
current 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 automati-
cally close after tripping.

§ 111.12–13 Propulsion generator pro-
tection.
For general requirements, see
§ 111.35–1 of this chapter.

Subpart 111.15—Storage Batteries
and Battery Chargers: Con-
struction and Installation

§ 111.15–1 General.
Each battery must meet the require-
ments of this subpart.

§ 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 bat-
tery must have a specific gravity that
meets section 22 of IEEE 45–2002 (incor-
porated by reference; see 46 CFR 110.10–
1).
(c) Batteries must not evolve hydro-
gen at a rate exceeding that of a simi-
lar size lead-acid battery under similar
charging condition.
(d) Batteries must be constructed to
take into account the environmental
conditions of a marine installation, in-
cluding temperature, vibration, and
shock.

§ 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 fol-
lows:

(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 in-
stallation 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 instal-
lation.
(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 hy-
drogen under normal charging and dis-
charging conditions than an equivalent
category of lead-acid batteries (e.g.,
sealed batteries) may have their bat-
tery category reduced to an equivalent
category of lead-acid batteries.

§ 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. In-
stalled 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 bat-
tery 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 in-
stallation is in a ventilated compart-
ment such as the engineroom and is
protected from falling objects, a box or
locker is not required. A moderate bat-
tery installation must not be in a
sleeping space. An engine cranking bat-
tery for one or more engines must be as
close as possible to the engine or en-
gines.

(c) Small batteries. Small size battery
installations must not be located in
poorly-ventilated spaces, such as clos-
ets, or in living spaces, such as state-
rooms.

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