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.

[CGD 74–125A, 47 FR 15236, Apr. 8, 1982, as
amended by CGD 81–030, 53 FR 17847, May 18,
FR 23908, May 1, 1997]

§ 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.

[CGD 94–108, 61 FR 28277, June 4, 1996, as
amended by USCG–2003–16630, 73 FR 63106,
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 fol-

(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.

[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. 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-
sets, or in living spaces, such as state-
rooms.

(d) Battery trays. Each battery tray
must be chocked with wood strips or
their equivalent to prevent movement, and each tray must have non-absorbent insulating supports on the bottom and similar spacer blocks at the sides, or equivalent provisions for air circulation space all around each tray. Each battery tray must provide adequate accessibility for installation, maintenance, and removal of the batteries.

(e) Nameplates. Each battery must be provided with the name of its manufacturer, model number, type designation, either the cold cranking amp rating or the amp-hour rating at a specific discharge and, for a lead-acid battery, the fully charged specific gravity value. This information must be permanently fixed to the battery.

(f) Lining in battery rooms and lockers. (1) Each battery room and locker must have a watertight lining that is—
   (i) On each shelf to a height of at least 76 mm (3 inches); or
   (ii) On the deck to a height of at least 152 mm (6 inches).

(2) For lead-acid batteries, the lining must be 1.6 mm (1/8 inch) thick lead or other material that is corrosion-resistant to the electrolyte of the battery.

(3) For alkaline batteries, the lining must be 0.8 mm (1/32 inch) thick steel or other material that is corrosion-resistant to the electrolyte of the battery.

(g) Lining of battery boxes. Each battery box must have a watertight lining to a height of at least 76 mm (3 inches) that meets paragraphs (f)(2) and (f)(3) of this section.

§ 111.15–10 Ventilation.

(a) General. Each room, locker, and box for storage batteries must be arranged or ventilated to prevent accumulation of flammable gas.

(b) Power ventilation. If power ventilation is required, the following must be met:

(1) The power ventilation system must be separate from ventilation systems for other spaces.

(2) Electric motors must be outside the duct and compartment and:
   (i) Have an explosion-proof motor for a Class I, Division 1, Group B location; or
   (ii) Be at least 10 ft. (3 m) from the exhaust end of the duct.

(3) Each blower must have a non-sparking fan.

(4) The power ventilation system must be interlocked with the battery charger so that the battery cannot be charged without ventilation.

(c) Large battery installations. Each battery room for large battery installations must have a power exhaust ventilation system and have openings for intake air near the floor that allow the passage of the quantity of air that must be expelled. The quantity of the air expelled must be at least:

\[ q = 3.89(i)(n) \]

where: \( q \) = quantity of expelled air in cubic feet per hour.

\( i \) = Maximum charging current during gas formation, or one-fourth of the maximum obtainable charging current of the charging facility, whichever is greater.

\( n \) = Number of cells.

(d) Moderate and small battery installations. Each battery room or battery locker for moderate or small battery installations must have louvers near the bottom of the room or locker for air, and must be ventilated by:

(1) Ventilation that meets paragraph (c) of this section;

(2) An exhaust duct:
   (i) That ends in a mechanically ventilated space or in the weather;
   (ii) That extends from the top of the room or locker to at least 3 ft. (1 m) above the top of the room or locker;
   (iii) That is at an angle of 45 degrees or less from the vertical; and
   (iv) That has no appliances, such as flame arresters, that impede free passage of air or gas mixtures; or

(3) A duct from the top of the room or locker to an exhaust ventilation duct.

(e) Deck boxes. Except for a deck box for a small battery installation, each deck box must have a duct from the top of the box to at least 4 ft. (1.2 m) above the box ending in a gooseneck or mushroom head that prevents entrance of water. Holes for air must be on at least two parallel sides of each box.

(f) Weathertight. Each deck box must be weathertight.

(g) Boxes for small battery installations. Each box for a small battery installation must have openings near the top