

ARTICLE 555

MARINAS, BOATYARDS, COMMERCIAL AND NONCOMMERCIAL DOCKING FACILITIES

Introduction to Article 555—Marinas, Boatyards, and Docking Facilities

Water levels are not constant. Ocean tides rise and fall, while lakes and rivers vary in depth in response to rain. To provide power to a marina, boatyard, or docking facility, you must allow for these variations in water level between the point of use and the electric power source. Article 555 addresses this issue.

This article begins with the concept of the electrical datum plane. You might think of it as the border of a “demilitarized zone” for electrical equipment. Or, you can think of it as a line that marks the beginning of a “no man’s land” where you simply do not place electrical equipment. Once you determine where this plane is, do not place transformers, connections, or receptacles below that line.

555.35 Ground-Fault Protection of Equipment (GFPE) and Ground-Fault Circuit-Interrupter (GFCI) Protection

This section was relocated from 550.3 and divided into two subsections. New Informational Notes were added to both.

Analysis



RELOCATED

To clarify the requirements for ground-fault protection, this section was divided into two subsections. Subsection (A) addresses the

shore power receptacles, as well as the feeders and branch circuits supplying the receptacles from shore and (B) covers a new requirement to be able to measure leakage current where more than three receptacles supply shore power to boats. The Informational Notes were added to address the concerns regarding vessel testing to alleviate potential leakage current which contributes to electrical shock drowning (ESD).

555.35 Ground-Fault Protection of Equipment (GFPE) and Ground-Fault Circuit-Interrupter (GFCI) Protection

(A) Ground-Fault Protection. For other than floating buildings, ground-fault protection for docking facilities must be provided in accordance with the following:

(1) GFPE Protection. Receptacles installed in accordance with 555.33(A) can have individual GFPEs set to open at currents not exceeding 30 mA.

(2) GFCI Protection. All 15A and 20A, 125V receptacles for other than shore power must be protected in accordance with 555.19(B)(1) and (B)(2).

(3) Feeder and Branch-Circuit Conductors with GFPE. Feeder and branch-circuit conductors that are installed on docking facilities must be provided with GFPEs set to open at currents not exceeding 100 mA.

Ex to (3): Transformer secondary conductors of a separately derived system that do not exceed 10 ft and are installed in a raceway are permitted to be installed without ground-fault protection. This exception also applies to the supply terminals of the equipment supplied by the transformer secondary conductors.

(B) Leakage Current Measurement Device. Where more than three receptacles supply shore power to boats, a leakage current measurement device must be available and be used to determine leakage current from each boat that will utilize shore power.



Scan this QR code for a video of Mike explaining this topic; it's a sample from the videos that accompany this textbook.

Note 1: Leakage current measurement will provide the capability to determine when an individual boat has defective wiring or other problems contributing to hazardous voltage and current. The use of this test device will allow the facility operator to identify a boat that is creating an electrical hazard. In some cases, a single boat may cause an upstream GFPE device protecting a feeder to trip even though multiple boats are supplied from the same feeder. The use of this test device will help the facility operator prevent a particular boat from contributing to hazardous voltage and current in the marina area.

Note 2: An annual test of each boat with the leakage current measurement device is a prudent step toward determining if a boat has defective wiring that may be contributing hazardous voltage and current. Where the leakage current measurement device reveals that a boat is contributing hazardous voltage and current, repairs should be made to the boat before it is permitted to utilize shore power.

Author's Comment:

- ▶ A review of reported ESD events shows that 50% of the ESD incidents may have been avoided by having the 30 mA protection at the shore power receptacles.