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IEEE Recommended Practice for Electrical Installations on Shipboard—Safety Considerations

IEEE Industry Applications Society

Sponsored by the
Petroleum & Chemical Industry Committee

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IEEE Std 45.5™-2014

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Abstract: Electrical safety considerations for shipboard electrical systems and equipment are covered, including a review of fundamental concepts pertaining to electrical safety and establishing electrical safety programs and work practices associated with the operation and maintenance of shipboard electrical power distribution systems.

Keywords: electrical hazards, electrical safety program, electrical safety-related maintenance, IEEE 45.5™, personal protective equipment, PPE, safe electrical work practices, safety single-line diagrams

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Introduction

This introduction is not part of IEEE Std 45.5-2014, IEEE Recommended Practice for Electrical Installations on Shipboard—Safety Considerations.

The IEEE 45™ series comprises nine recommended practices addressing electrical installations on vessels and marine platforms. IEEE Std 45.5™ provides recommended practice electrical safety considerations and is intended for use with the IEEE 45 series of documents. The topics covered in this document should be considered from the beginning of the project and throughout the design and construction processes; thereby, they should facilitate the integration of electrical systems at the shipyard level. The IEEE Std 45.5 electrical safety recommendations provide a foundation for an electrical safety program but should be supplemented with additional safety practices as appropriate.

Previous editions of IEEE Std 45™ were developed as single documents addressing all areas. On June 9, 2005, Project Authorization Request (PAR) P45™ for the Revision of IEEE Std 45™-2002 was approved, and the revision of IEEE Std 45 as a single document began. It soon became apparent that attempting to cover all issues in a single document would produce a document that was very large and, therefore, difficult to ballot due to the wide range of issues needed to be addressed. In September 2008, it was decided that the revision of IEEE Std 45 should be developed as a base document with separate associated documents addressing specific areas.

On December 10, 2008, the IEEE-SA Standards Board approved separate PARs for eight separate recommended practices. Subsequently, it was recognized that two areas were very close to balloting and contained important information. Additional PARs were then prepared and approved on September 11, 2009 (for switchboards), and December 9, 2009 (for cable systems), bringing the total number of standards in the IEEE 45 series to nine:

a) IEEE Std P45, IEEE Recommended Practice for Electrical Installations on Shipboard

b) IEEE Std P45.1™, IEEE Recommended Practice for Electrical Installations on Shipboard—Design

c) IEEE Std P45.2™, IEEE Recommended Practice for Electrical Installations on Shipboard—Controls and Automation

d) IEEE Std P45.3™, IEEE Recommended Practice for Electrical Installations on Shipboard—Systems Engineering

e) IEEE Std P45.4™, IEEE Recommended Practice for Electrical Installations on Shipboard—Marine Sectors and Mission Systems

f) IEEE Std P45.5, IEEE Recommended Practice for Electrical Installations on Shipboard—Safety Considerations

g) IEEE Std P45.6™, IEEE Recommended Practice for Electrical Installations on Shipboard—Electrical Testing

h) IEEE Std P45.7™, IEEE Recommended Practice for Electrical Installations on Shipboard—Switchboards

i) IEEE Std P45.8™, IEEE Recommended Practice for Electrical Installations on Shipboard—Cable Systems

Several other IEEE standards have been prepared or are currently being developed to support the IEEE Std 45 series. These include the following:

— IEEE Std 1580™, IEEE Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Facilities

— IEEE P1580.1™, Draft Recommended Practice for Insulated Bus Pipe for Use on Shipboard and Fixed or Floating Platforms

— IEEE Std 1662™, IEEE Guide for the Design and Application of Power Electronics in Electrical Power Systems on Ships

— IEEE Std 1709™, IEEE Recommended Practice for 1 to 35 kV Medium Voltage DC Power Systems on Ships

— IEEE Std 1826™, IEEE Standard for Power Electronics Open System Interfaces in Zonal Electrical Distribution Systems Rated Above 100 kW

— IEC/PAS 60092-510, Electrical Installations in Ships—Part 510: High Voltage Shore Connection Systems (HVSC)

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IEEE Recommended Practice for Electrical Installations on Shipboard—Safety Considerations

1. Overview

1.1 Scope

The recommendations for the design to improve electrical safety on shipboards are established by this document. These recommendations reflect the technologies, engineering methods, and engineering practices in effect when this document is issued.

1.2 Purpose

An extension of the baseline technology and methods covered in IEEE Std 45™, IEEE Std 45.5™ provides a consensus of recommended practices for improved safety in marine electrical engineering as applied specifically to ships, shipboard systems, and equipment.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is