DEPARTMENT OF HOMELAND SECURITY

Coast Guard

46 CFR Parts 110, 111, 112, and 113

[Docket No. USCG–2020–0075]

RIN 1625–AC66

Update to Electrical Engineering Regulations

AGENCY: Coast Guard, DHS.

ACTION: Final rule.

SUMMARY: The Coast Guard is updating electrical engineering standards that are incorporated by reference and adding acceptable alternative standards. This rule also eliminates several outdated or unnecessarily prescriptive electrical engineering regulations. This regulatory action is consistent with the standards currently used by industry and supports the Coast Guard's maritime safety mission.

DATES: This final rule is effective April 17, 2023. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register on April 17, 2023. The incorporation by reference of certain other publications listed in the rule was approved by the Director as of April 30, 2015.

ADDRESSES: To view documents mentioned in this preamble as being available in the docket, go to *https://www.regulations.gov,* type USCG–2020–0075 in the search box and click ''Search.'' Next, in the Document Type column, select ''Supporting & Related Material.''

FOR FURTHER INFORMATION CONTACT: For information about this document call or email Raymond Martin, Systems Engineering Division, Coast Guard; telephone 202–372–1384, email *Raymond.W.Martin@uscg.mil.*

SUPPLEMENTARY INFORMATION:

Table of Contents for Preamble

I. Abbreviations

1972 COLREGS International Regulations for Preventing Collisions at Sea, 1972
ABS American Bureau of Shipping
ABYC American Boat and Yacht Council
AC Alternating current
ACP Alternative Compliance Program
ANSI American National Standards Institute
API American Petroleum Institute
ASME American Society of Mechanical Engineers
ASTM ASTM International
BLS Bureau of Labor Statistics
BSEE Bureau of Safety and Environmental Enforcement
CAN Canadian National Standard
CFR Code of Federal Regulations
CG–ENG Coast Guard Office of Design and Engineering Standards
CSA CSA Group, formerly Canadian Standards Association
DC Direct current
DHS Department of Homeland Security
DVTP Design verification test procedure
EMC Electromagnetic compatibility
Ex Designation of explosion-protected electrical apparatus complying with IEC standards
FR Federal Register
GS General Schedule
hp Horsepower
HVSC High voltage shore connection
IACS International Association of Classification Societies
IBR Incorporated by reference
IEC International Electrotechnical Commission
IECEx System IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres
IEEE Institute of Electrical and Electronics Engineers
IMO International Maritime Organization
ISA International Society of Automation
ISO International Organization of Standardization
kV Kilovolt
kW Kilowatt
LED Light-emitting diode
MISLE Marine Information for Safety and Law Enforcement
mm^2 Square millimeter
MODU Mobile Offshore Drilling Unit
MOU Mobile Offshore Unit
MSC Marine Safety Center
NAVSEA Naval Sea Systems Command
NEC National Electric Code
NEMA National Electrical Manufacturers Association
NFPA National Fire Protection Association
NPRM Notice of Proposed Rulemaking
NVIC Navigation and Vessel Inspection Circular
OCS Outer Continental Shelf
OCSNCOE Outer Continental Shelf National Center of Expertise
OMB Office of Management and Budget
OSV Offshore Supply Vessel
PSTP Periodic safety test procedure
QFA Qualitative failure analysis
RA Regulatory analysis
§ Section
SOLAS International Convention for Safety of Life at Sea, 1974
U.S.C. United States Code
V Volts

II. Executive Summary

Subchapter J of title 46 of the Code of Federal Regulations (CFR) contains the electrical engineering regulations and standards applicable to vessels and required shipboard systems regulated under subchapters D, H, I, I–A, K, L, O, Q, R, T, U, and W of title 46. A key component of subchapter J is the standards that are incorporated by reference (IBR) in 46 CFR 110.10–1 and cross-referenced throughout parts 110, 111, 112, and 113. On April 22, 2021, the Coast Guard published a notice of proposed rulemaking (NPRM) that contains a detailed description of the background and proposed changes. (86 FR 21440).

This final rule updates prior incorporations by reference in 46 CFR 110.10–1 and all of the sections in subchapter J that reference the updated IBR standards, adds a limited number of alternative standards, and eliminates outdated or unnecessarily prescriptive regulations in subchapter J. More specifically, this rule incorporates more recent editions of many standards, incorporates by reference additional standards for certain topics, and removes IBR standards that are no longer actively used by industry. Due to technological advances, it is necessary to update the current standards to ensure modern technologies are addressed in the regulations. In addition to updating the IBR standards, this rule implements the following four changes to subchapter J.

First, this rule eliminates the prescriptive requirements in 46 CFR 111.12–1(b) and (c) for generator prime movers. In accordance with 46 CFR 58.01–5, these generator prime movers continue to be required to meet standards of the American Bureau of Shipping (ABS) Steel Vessel Rules.

Second, this rule simplifies the electrical cable construction requirements in subpart 111.60 so they are similar to the classification society requirements currently accepted without supplement under the Coast

Guard's Alternate Compliance Program (ACP).

Third, for classifications of hazardous locations in subpart 111.105, this rule adds the International Electrotechnical Commission's (IEC) 60092–502 as an alternative classification. This is an internationally accepted standard, and we are not aware of any notable casualty history attributed to its use as compared to vessels complying with the current applicable U.S. regulations for classification of hazardous locations.

Fourth, this rule amends 46 CFR subpart 112.05 to allow the use of an emergency generator in port. This optional capability to use emergency generators in port is acceptable if a set of additional safeguards, approved by the International Maritime Organization (IMO) in 2005, are provided to ensure the availability of emergency power.

The following table provides an overview of the types of changes and the affected sections.

TABLE 1—TITLE 46 CFR SECTIONS AFFECTED BY THE RULE

Category	Changes	Affected title 46 CFR sections
Incorporated by Reference (IBR) Standards.	Editorial	§§ 110.15–1, 111.01–15, 111.05–9, 111.12–3, 111.12–5, 111.12–7, 111.20–15, 111.30–1, 111.30–5, 111.30–19, 111.33–3, 111.33–5, 111.33–11, 111.35–1, 111.40–1, 111.50–3, 111.50–5, 111.50–7, 111.50–9, 111.60–1, 111.60–2, 111.60–6, 111.60–11, 111.60–13, 111.60–19, 111.60–21, 111.70–1, 111.75–17, 111.75–20, 111.99–5, 111.105–3, 111.105–11, 111.105–17, 111.105–19, 111.105–31, 111.105–35, 111.105–40, 111.105–41, 111.105–45, 111.106–3, 111.106–5, 111.106–7, 111.106–13, 111.106–15, 111.107–1, 111.108–1, 111.108–3, 112.50–1, 113.10–7, 113.20–1, 113.25–1, 113.30–25, 113.30–25, 113.30–25, 113.37–10, 113.40–10, 113.65–5.
	Updating to more recent edition with changes in technical content.	§§ 110.15–1, 111.12–1, 111.12–7, 111.15–2, 111.51–5, 111.54–1, 111.55–1, 111.59–1, 111.60–5, 111.60–7, 111.60–11, 111.60–13, 111.60–23, 111.70–1, 111.75–18, 111.81–1, 111.105–3, 111.105–11, 111.105–33, 111.105–37, 111.105–39, 111.106–3, 111.107–1, 111.108–3, 113.05–7.
	Providing additional options	§§ 110.15–1, 111.01–9, 111.15–10, 111.20–15, 111.30–5, 111.30–19, 111.50–3, 111.53–1, 111.59–1, 111.60–1, 111.60–9, 111.60–13, 111.75–17, 111.75–20, 111.81–1, 111.83–7, 111.87–3, 111.105–3, 111.105–11, 111.105–17, 111.105–28, 111.105–29, 111.105–50, 111.106–3, 111.106–5, 111.108–3, 113.05–7, 113.10–7, 113.20–1, 113.25–11, 113.30–25, 113.37–10, 113.40–10.
Generator prime mover alarms and shutdowns.	Removing unique Coast Guard requirements.	§ 111.12–1.
Electrical cable requirements	Proposing additional option	§ 111.60–1.
	Removing prescriptive requirements (existing sections).	§§ 111.60–1, 111.60–3, 111.105–50.
Classification of hazardous location	Proposing additional options	§§ 111.105–3, 111.105–17, 111.105–28.
	Editorial—Harmonizing requirements between subparts.	§§ 111.105–1, 111.105–3, 111.105–11, 111.105–15 (existing), 111.105–17, 111.105–31, 111.106–3, 111.108–3.
Emergency generator	Allowing use in port	§ 112.05–7.
	Revising alarms and shutdowns	§ 112.50–1.
Editorial changes (Other than IBR standards).		§§ 110.15–1, 110.25–1, 110.25–3, 111.05–3, 111.05–37, 111.10–1, 111.10–9, 111.12–11, 111.12–13, 111.15–25, 111.15–30, 111.30–5, 111.30–25, 111.30–27, 111.30–29, 111.33–1, 111.33–3, 111.33–5, 111.33–7, 111.33–9, 111.33–11, 111.50–3, 111.51–1, 111.51–2, 111.51–3, 111.51–6, 111.52, 111.60–7, 111.95–1, 111.99–3, 111.103, 111.105–1, 111.105–3, 111.105–5, 11.105–7, 111.105–9, 111.105–15, 111.105–32, 111.107–1, 112.01–20, 112.05–5, 112.15–1, 112.50–1.

III. Basis, Purpose, and Regulatory History

The legal basis of this rule is section 1333(d) of Title 43, United States Code (U.S.C.), sections 3306 and 3703 of Title 46 U.S.C., and Department of Homeland Security (DHS) Delegation No. 00170.1, Revision No. 01.2. The provisions of 43 U.S.C. 1333(d) grant the Secretary of the Department in which the Coast Guard is operating the authority to promulgate and enforce regulations with respect to lights and other warning devices, safety equipment, and other matters relating to the promotion of safety of life and property on artificial islands, installations, and other devices. The provisions of 46 U.S.C. 3306(a)(1) authorize the Secretary to prescribe regulations for the design, construction, alteration, repair, and operation of vessels subject to inspection, including equipment, appliances, propulsion machinery, auxiliary machinery, boilers, unfired pressure vessels, piping, and electric installations. Additionally, 46 U.S.C. 3703 grants the Secretary authority to provide for navigation and vessel safety and protect against hazards to life, property, and the marine environment by regulating vessel construction, alteration, repair, maintenance, operation, and equipping. DHS Delegation No. 00170.1, Revision No. 01.2, paragraph (II)(92)(b), delegates these authorities to the Coast Guard.

The purpose of this rule is to update the standards incorporated by reference in 46 CFR subchapter J, which provide detailed specifications for electrical equipment used by vessels. Newly published editions of the international standards referenced in subchapter J address new technologies and changes in best practices. The Office of Management and Budget's (OMB) Circular A–119 states agencies should undertake a review of the standards

incorporated by reference every 3 to 5 years to remain current with technological changes. OMB encourages reducing reliance on unique government standards when an existing voluntary consensus standard would suffice. This rule follows the Circular by incorporating newer editions of industry standards and reducing the reliance on unique Coast Guard standards where industry standards are sufficient.

On April 22, 2021, the Coast Guard published a NPRM titled ''Update to Electrical Engineering Regulations'' (86 FR 21440) requesting comments on the proposed changes implemented by this final rule, including several updates to the standards incorporated by reference. A detailed description of the background and proposed changes are available in that NPRM. *See* 86 FR at 21442–60.

IV. Discussion of Comments and Changes

During the comment period for the April 22, 2021 NPRM (86 FR 21440), which ended on July 21, 2021, we received 15 comments. Several commenters expressed their support for the Coast Guard updating the standards incorporated by reference to newer editions and some confirmed they use them in current practice. The comments also offered us feedback on specific changes to the electrical engineering requirements and standards we proposed to incorporate by reference. The comments can be viewed in the docket following the instructions in the **ADDRESSES** section of this preamble. We summarize the comments and our responses, starting with general comments and then responding in order of relevant CFR section. Within each CFR section, we describe any changes to the final rule regulatory text from what was proposed in the NPRM.

General

A commenter submitted an editorial comment on the list of abbreviations in Section II for ''MOU.'' In this final rule, MOU is now correctly defined as Mobile Offshore Unit.

A commenter requested we update 33 CFR subchapter N to clarify the application of this rulemaking to Outer Continental Shelf (OCS) facilities and stated that, at a minimum, the Coast Guard should update 33 CFR 143.120 to establish the date on which the proposed rule would apply to a new floating OCS facility. Where subchapter N requires compliance with subchapter J, the date of applicability for vessels and facilities will begin 30 days after publication of this final rule, in accordance with the revised § 110.01–1(b). The updated requirements and standards in subchapter J apply to electrical installations contracted for after the effective date of the final rule.

The commenter also noted that the Bureau of Safety and Environmental Enforcement (BSEE) in the Department of the Interior is working on a regulatory update to incorporate more modern industry standards and recommended the Coast Guard engage with BSEE to ensure that both regulatory efforts are aligned, as the agencies propose to incorporate different revisions of the same industry standard in at least two cases. The Coast Guard and BSEE have a shared mission of ensuring safety on the OCS. We work closely together to ensure our requirements are not in conflict with each other, even if we use different revisions of the same standard. Because this final rule is not adding any new requirements for vessel owners and operators, it will not cause any conflicts with BSEE requirements. Any specific concerns can be addressed to either the Coast Guard's Eighth District Outer Continental Shelf Division staff (website: *https://www.atlanticarea.uscg.mil/D8/OCS/*) or the Coast Guard's Outer Continental Shelf National Center of Expertise (OCSNCOE) (website: *https://www.dco.uscg.mil/OCSNCOE/*).

Two commenters requested that we clarify the applicability of subchapter J to Floating Production Units (FPUs), as the Coast Guard Office of Design and Engineering Standards' (CG–ENG) relevant policy letter, CG–ENG Policy Letter 01–13,[1] only applies to classed FPUs rather than all FPUs in service. Similarly, a commenter requested that the Coast Guard clarify the applicability of subchapter J to floating OCS facilities, as the application of the subchapter has led to many requests for equivalencies and alternatives for a class of installations that may not technically be vessels. The comment stated that the Coast Guard should act on the National Offshore Safety Advisory Committee's recommendation that the Coast Guard issue a task statement to evaluate the suitability of subchapters F and J for floating OCS facilities. These requests are outside the scope of this rulemaking, which focuses on updating the electrical engineering standards set out in subchapter J but not further amending the applicability of subchapter J. Nevertheless, we have shared them with the appropriate Coast Guard offices. We encourage questions regarding the applicable regulations for floating OCS facilities to be sent to either the Coast Guard's Eighth District Outer Continental Shelf Division Staff (website: *https://www.atlanticarea.uscg.mil/D8/OCS/*) or OCSNCOE (website: *https://www.dco.uscg.mil/OCSNCOE/*).

Subpart 110.01—Applicability

§ 110.01–1 General

We received requests for information on the implementation dates for the revised regulations. In response and to provide greater clarity for the public, this final rule includes an amendment to § 110.01–1(b) that explains the effective date of the requirements in this rule. The requirements implemented in this final rule will be effective 30 days after the publication of this final rule. Paragraph (b) will also clarify that subchapter J applies only to electrical installations contracted for after the effective date of this final rule. Existing paragraph (c) of this section will continue to allow a vessel's electrical installations to meet the subchapter J regulations in place when those systems were initially installed. According to existing 46 CFR 110.01–3(a), repairs and replacements in kind must comply with either the regulations in this subchapter or those in effect when the vessel was built. Per § 110.01–3(b), alterations and modifications, such as re-engining, re-powering, upgrading of the main propulsion control system, or replacing extensive amounts of cabling, must comply with the regulations in this subchapter, including updates implemented by this final rule. Per existing § 110.01–1(c), all electrical systems installed or under Coast Guard review prior to this date may meet the regulations in place at the time of installation or submittal to the Coast Guard.

Subpart 110.10—Reference Specifications, Standards, and Codes

§ 110.10–1 Incorporation by Reference

We received the following comments in regard to our update of the technical standards incorporated by reference in subchapter J in § 110.10–1.

Several commenters suggested incorporating by reference newer editions than we had proposed to incorporate in § 110.10–1. Because of the frequent release of new editions, and the time necessary to evaluate them and propose their incorporation, it is often impractical to incorporate standards or new editions that publish after we issue our NPRM. Instead, the Coast Guard considered whether the standards proposed in the NPRM are still

[1] *https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/Design%20and%20Engineering%20Standards/docs/CG-ENG%20PolicyLetter%2001-13.pdf.*

sufficient and relevant to electrical engineering practices at the time of this final rule, even if a newer edition is available. We determined that the editions proposed in the NPRM are still sufficient and relevant.

Several commenters requested incorporating by reference different standards than are referenced in § 110.10–1 or proposed in the NPRM. The suggestions included standards and codes for alternative propulsion fuels; inspection, maintenance, and repair of equipment in hazardous locations; and hazardous location equipment directories or dossiers. These topics are not currently addressed in subchapter J. Including them at this stage would impose new regulatory requirements on vessels and facilities. This rule is intended to update the existing regulations in subchapter J and result in quantitative and qualitative savings for vessel owners. For this reason, standards for topics not currently addressed in subchapter J are outside the scope of this final rule. We may consider some of these standards in the future for incorporation by reference following a thorough technical analysis of the standards as well as their potential costs and benefits. Further, proposals for new requirements on topics not already included in subchapter J would be given additional public notice and opportunity for comment.

Additionally, we received specific comments on the following standards we proposed for incorporation by reference.

American National Standards Institute (ANSI)/UL standards: A commenter requested that we refer to the UL standards as ANSI/UL standards. In many of the regulatory text sections we do refer to such standards as ANSI/UL standards, but we do not do so in the IBR section, § 110.10–1. In that IBR section, we are required to list the standard name exactly as it appears on the cover of the standard.

The commenter also noted that many ANSI/UL standards related to hazardous locations replaced similar ISA standards, and suggested the UL standards should be referenced throughout the CFR. We agree with listing the ANSI/UL standards in addition to where we proposed to include the ANSI/ISA standard because of their similarities in requirements and options. In the NPRM we proposed to incorporate ANSI/ISA 12.12.01 (2015). In this final rule we are also adding ANSI/ISA–RP12.06.01 (2003) because it superseded a previously incorporated standard we removed, ISA RP 12.6 (1995). These two are the only ANSI/ISA standards that will be incorporated by reference in subchapter J and both are active standards. Where the ANSI/ISA series of standards are referenced in §§ 111.105–3(b)(2), 111.106–3(b)(2), and 111.108–3(b)(2), this final rule adds the ANSI/UL series as an option in those sections as well.

IEEE 100 (2000): A commenter noted that the Institute of Electrical and Electronics Engineers (IEEE) withdrew the standard IEEE 100 (2000). IEEE 100 (2000) is only referenced in § 110.15–1 regarding electrical and electronic term definitions. We have decided to retain it in subchapter J because the definitions are still relevant. We have confirmed that the standard is still available for the public to purchase despite IEEE withdrawing it. We acknowledge that a revision to the standard is underway and we will consider updating references to this standard in the future.

IEEE 1580 (2010): A commenter suggested we incorporate the 2018 edition. The 2018 edition was still in the draft stage when we published the NPRM in April 2021, and we were not able to propose draft standards for incorporation by reference. The IEEE board approved the IEEE 1580 (2021) on November 9, 2021, and published it on March 23, 2022, both dates after the comment period for the NPRM closed. The IEEE 1580 (2021) standard superseded the 2010 version. IEEE 1580 provides recommended practice for marine cable use on shipboard and fixed or floating facilities, and the 2021 edition addresses changes in changes in technology and revisions to referenced standards since 2010. The Coast Guard has decided that the 2010 version is still sufficient and relevant for marine cables at the time of this final rule. However, the public can submit equivalency requests for the 2021 edition to the Marine Safety Center (MSC) in accordance with § 110.20–1.

IEC 60092–302:1997: A commenter noted that this standard was superseded by IEC 60092–303–2, Electrical installations in ships—Part 302–2: Low voltage switchgear and controlgear assemblies—Marine power, published in 2019. We have decided to retain the 1997 edition until we can thoroughly review the 2019 edition. However, we may consider switchgear meeting the standards in IEC 60092–302–2:2019 under the equivalency provisions of § 110.20–1.

ISA RP 12.6:1995: We proposed in the NPRM to remove ISA RP 12.6 because ISA has withdrawn it. A commenter noted that a new standard, ANSI/ISA RP12.06.01, has superseded ISA RP 12.6. The commenter is correct. Because the two standards are very similar, we are replacing the withdrawn ISA RP 12.6 standard with the new ANSI/ISA RP12.06.01 standard as suggested. This final rule incorporates by reference ANSI/ISA–RP12.06.01:2003 in § 111.105–11. ANSI/ISA–RP12.06.01 is a recommended practice that promotes the uniform installation of intrinsically safe systems in hazardous (classified) locations and clarifies the requirements of Articles 504 and 505 of National Fire Protection Association (NFPA) standard NFPA 70.

Subpart 110.25—Plan Submittal

§ 110.25–1 Plans and Information Required for New Construction

A commenter noted that the proposed changes to § 111.105–3 provided the option to select electrical equipment on any single vessel to comply with NFPA 70 Articles 500–504, or NFPA 70 Article 505, or IEC 60092–502, based on either the Division or the Zone method of hazardous location classification. The commenter suggested that we amend the plan requirements for hazardous locations in § 110.25–1 to ensure the classification method is indicated on the plans submitted for review. We agree with this suggestion and are incorporating it into this final rule. The extent and classification of all hazardous locations is already required in the existing § 110.25–1(i) but clearly indicating the method of classification, Division or Zone, is important to ensure appropriate selection of equipment for the hazardous location. In this final rule, we amend § 110.25–1(i) to require that the plans indicate the method of classification of the hazardous locations in addition to the other requirements already included in paragraph (i).

Subpart 111.10—Power Supply

§ 111.10–9 Ship's Service Supply Transformers; Two Required

A commenter noted that our proposed revision to the note to § 111.10–09 concerning ship's service transformers appears to contradict the text of § 111.10–09 regarding the number of transformers. We disagree. Section 111.10–3 requires that the shipboard power supply system on self-propelled vessels have at least two electric generating sources. The intent of § 111.10–09 is to continue this requirement by duplicating the number of transformers that are used to supply the ship's service distribution system. As explained in this note, the intent is not to provide duplication of ship's service distribution system circuits after the ship's service switchboard. This is a long-standing position that is explained in Coast Guard guidance, specifically

page 16 of Navigation and Vessel Inspection Circular (NVIC) 2–89, ''Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Units,'' dated August 14, 1989.[2]

Subpart 111.12—Generator Construction and Circuits

§ 111.12–11 Generator Protection

Section 111.12–11(g) states that a ship's service generator and its switchboard must be in the same space and states that a control room inside the machinery casing is not considered outside the machinery space. Paragraphs 111.12–11(g)(1) and (2) provide two arrangements that the Coast Guard considers to meet this requirement. In other words, we consider a switchboard room within the machinery space, containing the overcurrent protection on the switchboard, to be satisfactory, regardless of whether there are centralized engineering controls or monitoring in that control room. This rule, which replaces a reference to a ''semiconductor rectifier'' with ''semiconductor converter'' in paragraph (g), does not substantively change these existing provisions. A commenter asked if a control room that is an air-conditioned switchboard room with generator controls on a switchboard, but without centralized engineering control and monitoring, is an acceptable control room. This question is beyond the scope of this rulemaking, but questions regarding compliance with Subchapter J may be submitted to the MSC.

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

Two commenters suggested we consider incorporating by reference IEEE 1187–2013, ''IEEE Recommended Practice for Installation Design and Installation of Valve-Regulated Lead Acid Batteries for Stationary Applications.'' The commenters noted that although FPUs are not stationary, they are not ocean-going vessels either. The commenters also noted because FPUs do not have the range of motions of a vessel, they use valve-regulated lead acid batteries (as governed by IEEE 1187–2013) rather than the vented lead-acid batteries covered in the NPRM's updates to subchapter J. We understand the unique characteristics of FPUs may require additional options and guidance. Specifically, 33 CFR 143.120(b) and CG–ENG Policy Letter 01–13 allow alternate proposals for floating OCS facilities. System designers may submit applications to the MSC demonstrating that a system using valve-regulated lead acid batteries, as governed by IEEE 1187–2013, provides an equivalent level of safety in accordance with § 110.20–1. We understand this IBR suggestion and may consider it in a future rulemaking. Further, we find that we cannot include this suggestion in this final rule because, in order to add the standard and those additional requirements, we would prefer to conduct an additional analysis of alternatives and provide the public opportunity to review and comment on its addition.

Subpart 111.30—Switchboards

§ 111.30–5 Construction

In the NPRM, we proposed replacing the existing reference to section 8.3 of IEEE 45–2002 in § 111.30–5(a)(1) with a reference to section 6 of the more recent IEEE 45.7–2012. A commenter noted section 6.3.3 of IEEE 45.7 requires a steering gear breaker trip set to not less than 200 percent of locked rotor current. This conflicts with § 58.25–55(a)(2), which requires a trip set point between 175 and 200 percent of locked rotor current. We agree that the change we proposed in the NPRM would present an unintended conflict with other existing regulations. The intent of § 111.30–5 is to address switchboard construction, not overcurrent protection for specific systems, so when reviewing IEEE 45.7 we did not observe that the standard added a requirement for the steering gear circuit overcurrent protection. We did not intend the NPRM to propose a change to the existing requirements for steering gear circuit overcurrent protection. For this reason, in § 111.30–5(a)(1) of this final rule, we are incorporating section 6 of IEEE 45.7–2012, excluding section 6.3.3.

A commenter asked for clarification of the proposed § 111.30–5(c) regarding switchboard construction, which stated that ''[t]he interchangeability and compatibility of components complying with both IEEE and IEC cannot be assumed.'' We agree this proposed paragraph (c) could have caused confusion. Our intent in this paragraph was to discourage the mixing of acceptable standards in a manner that could result in a potentially unsafe switchboard. We recognize that complying with and enforcing this relatively vague requirement would be difficult, and we have accordingly deleted it in this final rule. Switchboards should be constructed in accordance with the standards incorporated by reference in subpart 111.30.

§ 111.30–19 Buses and Wiring

In the NPRM, we proposed replacing the existing reference to section 7.10 of IEEE 45–1998 in § 111.30–19(a)(1) with a reference to section 5.10 of the more recent IEEE 45.7–2012. A commenter noted section 5.10 of IEEE 45.7–2012 appears to have less strict requirements for generator bus sizing and could be interpreted to not require sizing to support overload operation of the generator for a sustained period. We disagree. The requirements are very similar, and IEEE 45.7–2012 reflects the latest guidance on bus sizing.

§ 111.30–25 Alternating-Current Ship's Service Switchboards

A commenter suggested that the generator field rheostat (manual voltage controller) currently required by § 111.30–25(c)(1) was of limited value and is not required by other regulatory bodies. We understand this suggestion and may consider it in a future rulemaking. In order to remove the requirement, we would prefer to conduct an additional analysis of alternatives and provide the public opportunity to review and comment on its removal. In the meantime, however, system designers may submit switchboards with alternative instrumentation that provides an equivalent level of safety to the MSC in accordance with § 110.20–1.

Subpart 111.33—Power Semiconductor Converter Systems

In the NPRM, we proposed changing the heading of subpart 111.33 from Power Semiconductor Rectifier Systems to Power Semiconductor Converter Systems and changing references to rectifiers to converters. This proposed change aligned with general industry practice of using the term converter as it is more general than rectifier. This subpart applies to rectifiers (alternating current (AC) to direct current (DC)), inverters (DC to AC), and other power converters. Additionally, in the NPRM we proposed updating the standards incorporated by reference in this subpart to more recent editions. A commenter noted that 4.31.19.12 of IEEE 45.2–2011, which would replace 10.20.12 of IEEE 45–2002, covers rectifiers. The commenter is correct in this regard. However, 4.31.19.12 of IEEE 45.2–2011 provides the required nameplate data, and the Coast Guard determined the requirements of this section are also generally applicable to

[2] NVIC 2–89, ''Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units,'' is available at *https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/NVIC/1989/n2-89.pdf.*

any power semiconductor converter system.

In addition, in the NPRM, we proposed replacing references throughout subpart J to ''semiconductor rectifier (SCR)'' with references to ''semiconductor converter''. However, upon further review following the NPRM's publication, we realized that some instances of this amendment were inadvertently not included in the amendatory language for the NPRM. We have updated the amendatory language in this final rule to include these missed instances of ''converter'' in this final rule at §§ 111.33–1 and 111.33–3(b).

Subpart 111.40—Panelboards

§ 111.40–1 Panelboard Standard

A commenter noted Section 9.10 of IEEE 45.1, proposed for incorporation by reference in the NPRM, includes multiple sub-sections but only subsection 9.10.1 is directly applicable to panelboards. The commenter suggested updating the reference to only include this subsection. We agree, and in the interest of greater precision we revise § 111.40–1 in this rule to only reference subsection 9.10.1.

Subpart 111.50—Overcurrent Protection

§ 111.50–3 Protection of Conductors

A commenter noted that currently neither § 111.50–3 nor § 111.20–15 clearly addresses NFPA 70—National Electric Code (NEC) requirements for transformer secondary conductor protection and suggested that § 111.50–3 should include or cite to NEC 240.21(C)(1) requirements. NEC 240.21(C)(1) explicitly states that primary overcurrent protection is insufficient to protect secondary conductors of delta-wye transformers. In the NPRM, we did not propose substantive changes to these two sections beyond incorporating the more recent editions of the standards. Adding the requirements at NEC 240.21(C)(1) to § 111.50–3 would require additional analysis and opportunity for the public to review and comment. Nevertheless, we may consider incorporating NEC Article 240, which provides guidance for transformer conductor overcurrent protection, in § 111.50–3 in the future.

A commenter also said that neither § 111.50–3 nor § 58.25 currently address DC steering gear motors. The commenter also said that both §§ 111.50–3 and 58.25 are silent on the use of fuses for overcurrent protection in these systems. The commenter suggested that we remove the cross-reference to 46 CFR 58.25 and revise § 111.50–3 to align with ABS SVR 4–8–2/9.17.5 standards on DC steering gear motors and prohibiting fuses. We disagree with the suggested change. Paragraph 58.25–55(a)(1) specifically requires DC steering gear motors to be protected from overcurrent by a circuit breaker at the switchboard. This section does not list fuses as an acceptable means of overcurrent protection. Vessel owners and operators must ensure DC steering gear motors are protected from overcurrent by circuit breakers unless an equivalent arrangement is approved by the MSC in accordance with § 110.20–1. We did not propose substantive changes to these two sections in the NPRM beyond incorporating the more recent editions of the standards already incorporated by reference in § 111.50–3. However, we will consider updating our steering gear motor regulations in the future following a review of the latest advances in steering gear power and control systems.

Subpart 111.51—Coordination of Overcurrent Protection Devices

§§ 111.51–1 Purpose and 111.51–5 Protection of Vital Equipment

In the NPRM, we proposed to revise § 111.51–1 to set out a broad introductory discussion of the requirements for coordination of overcurrent protection devices that is based on the recommendations in IEC 60092–202:2016 and not substantively different from the existing § 111.51–1 that it replaced. A commenter noted the term ''continuity of service'' as used in the proposed revisions to § 111.51–1, as well as in the current text of § 111.51–1, is not defined and could be interpreted in a number of ways. Additionally, the same commenter also recommended editing § 111.51–5(b)(2) to allow for cases where multiple protective devices are directly in series due to the arrangement of the power system and vendor equipment supply or requirements for disconnecting device. Alternatively, they suggested we define that a protective device refers to a set of one or more protective devices which protect the same segment of the electrical system. The commenter was concerned the section could be interpreted to require explicit coordination between protective devices within the same feeder or branch circuit.

It is not the intent of this final rule to substantively alter our existing regulations for coordination of overcurrent protection devices. Continuity of service is defined in IEC 60092–202:2016 as a ''condition where, after a fault in a circuit has been cleared, the supply to the healthy circuits is re-established.'' More importantly, the goal of overcurrent protection coordination is to minimize the impact of short circuits on vital equipment as explained in §§ 111.51–1 and 111.51–5. If multiple protective devices are in series, it is incumbent on the system designer to demonstrate the devices satisfy the intent of overcurrent protection coordination. Additionally, proposing a unique definition for protective devices is not a preferred option where the definition is widely used and defined by a standard. We encourage the use of established industry standards and definitions. If there are any vessel or system specific arrangements being proposed for Coast Guard certificated vessels, their equivalency with this subpart can be demonstrated to the MSC in accordance with § 110.20–1. We made no changes from the proposed rule in § 111.51–5.

Subpart 111.60—Wiring Materials and Methods

§ 111.60–3 Cable Application (Existing)

In the NPRM, we proposed to delete this section because it is unnecessarily prescriptive. In its place, we proposed that regulated entities would consult the current and proposed cable construction standards in proposed new § 111.60–1 for the application of specific types of cable. A commenter expressed concern that cable for specialized applications, such as scientific research instruments and passenger ferry Wi-Fi networks, is sometimes not available or cost-prohibitive to meet the fire test requirements. The commenter recommended retaining § 111.60–3 largely as written. Based on our research for available products, the Coast Guard has determined that common types of cables that comply with the standards in § 111.60–1 are available and provide the safest option for U.S. vessels. Additionally, our research indicates the cost will be comparable to all other cable suitable for marine applications. Accordingly, this final rule retains the amendment from the NPRM to remove § 111.60–3. We will consider other cable on a case-by-case basis in accordance with the equivalency provisions of § 110.20–1.

§ 111.60–4 Minimum Cable Conductor Size

A commenter noted we did not propose changing the required minimum conductor size in this section of 0.82 square millimeters (mm^2) and 2.1 mm^2 for control and power cable, respectively. The commenter explained that vessels inspected under the ACP

have a lesser conductor size requirement. For example, ABS MVR 4–8–2/7.7.2 allows smaller minimum conductor sizes of 0.5 mm^2 and 1.5 mm^2 for control and power cable respectively. (The metric dimensions given in this section are metric conversions of the standard American Wire Gauge sizes rather than standard metric wire sizes suggested by this commenter and used in the ABS rule.) The commenter recommended we decrease the metric size requirements to match the requirements applicable to ACP vessels because they believed doing so would eliminate the need to excessively oversize metric cable to meet rules that are currently written to align with common AWG sizes. Vessels enrolled in the ACP comply with a comprehensive set of engineering standards and an inspection regime that collectively provide a level of safety equivalent to complying solely with the regulations in 46 CFR even though the requirements are not identical. As the commenter noted, we did not propose substantive changes to this section in the NPRM and do not intend to change it in the final rule. Allowing smaller minimum conductor sizes on all vessels regulated by subchapter J is a less stringent requirement that we may consider in the future following additional analysis and opportunity for public comment. Presently, the metric conductor size requirements in this section are still considered reasonable and safe, and we made no additional changes based on this recommendation.

§ 111.60–6 Fiber Optic Cable (Existing)

In the NPRM, we proposed to remove current § 111.60–6 because fiber optic cable that complies with § 111.60–1 is now available. A commenter contended that such fiber optic cable is not readily available. We agree that it may be difficult to find fiber optic cable to meet the standards in § 111.60–1 and have decided to forgo the proposed change to remove §§ 111.60–2 and 111.60–6. This final rule does not remove existing §§ 111.60–2 and 111.60–6, or the cross references to §§ 111.60–2 and 111.60–6 within the applicable list of standards incorporated by reference in §§ 110.10–1(j)(14), 110.10–1(q)(23), 110.10–1(k)(34), 110.10–1(k)(35), and 110.10–1(j)(13), where they were already included. However, in this final rule we have updated the standards mentioned within §§ 111.60–2 and 111.60–6 to conform with updates to standards incorporated by reference within this subchapter.

§ 111.60–11 Wire

A commenter noted the reference to Section 5.7 of IEEE 45.8–2016 in § 111.60–11 and pointed out that this section does not address wire. We agree and have removed the reference to Section 5.7 of IEEE 45.8 from this section because it is not related to the topic of § 111.60–11. The commenter also suggested that wire constructed to a recognized commercial standard or military specification MIL–W–16878 or MIL–W–22759, with particular attention to the effects of vibration, moisture, ambient temperature, and other adverse conditions such as contaminants and oils that may be present should be acceptable. We agree in principle. Section 111.60–11(c) provides that wire must the requirements set out in one of three standards for wire and concludes with ''or equivalent standard.'' System designers choosing an alternative standard they believe equivalent, such as that described by the commenter, should discuss it with the MSC. There are too many relevant standards to incorporate them all. Instead, we have decided to offer three standards as guidance for acceptable wire requirements. We will consider equivalency requests in addition to the standards we incorporate by reference.

Subpart 111.70—Motor Circuits, Controllers, and Protection

§ 111.70–3 Motor Controllers and Motor-Control Centers

A commenter noted that the proposed regulatory text in the NPRM implied that we were making changes to §§ 111.70–3(c)(2) and (d)(1)(v) but the proposed regulatory text as presented in the NPRM was unchanged from existing regulatory text. This observation is correct. We erroneously included these sections in the NPRM's amendatory instructions, but we did not actually propose any changes. No changes were intended. This final rule does not include any amendments to the regulatory text at §§ 111.70–3(c)(2) and (d)(1)(v).

Subpart 111.75—Lighting Circuits and Protection

§ 111.75–17 Navigation Lights

In the NPRM, we proposed incorporating EN 14744 in § 111.75–17 as an additional alternative standard for navigation lights. Currently, UL 1104 is the only standard incorporated by reference in § 111.75–17. One commenter suggested that, since UL 1104 is no longer supported by UL and does not address electromagnetic interference or light-emitting diode (LED) light lifecycle degradation, it should be removed from this section and EN 14744 should be adopted as the sole standard for all navigation lights, including AC- and DC-powered lights, incandescent and non-incandescent lights, lights on all vessel types and sizes, and lights on inspected and non-inspected vessels.

We disagree with the suggestion to remove UL 1104. Several years ago, UL transferred responsibility for the maintenance of UL 1104 to the American Boat and Yacht Council (ABYC). Prior to this rulemaking, UL 1104 was the only standard for the construction and testing of navigation lights incorporated by reference in subchapter J, and it is currently being used by several navigation light manufacturers. Lights manufactured and certified to UL 1104 meet the current luminous intensity and colorimetric requirements of the International Regulations for Preventing Collisions at Sea, 1972 (1972 COLREGS). Additionally, the environmental performance requirements contained in UL 1104 are similar in intent to those in EN 14744. For these reasons, we are not removing UL 1104 at this time.

Additionally, we cannot incorporate by reference EN 14744 for all light and vessel types as suggested. The scope of this rule is limited to subchapter J. The navigation light requirements in subchapter J generally apply to larger, inspected commercial vessels. The requirements for navigation lights on certain smaller, inspected commercial vessels, uninspected commercial vessels, and recreational vessels are contained in other subparts of the CFR. We did not propose amendments to those subparts in the NPRM, and because of this we cannot incorporate by reference EN 14744 for all light and vessel types.

Since UL transferred UL 1104 to ABYC we have worked with ABYC and other navigation light stakeholders to develop an updated navigation light standard to replace UL 1104. This standard, ABYC C–5, Construction and Testing of Electric Navigation Lights, published in July 2021, too late for inclusion in the NPRM and after the NPRM comment period closed. ABYC C–5 is applicable to all light and vessel types and addresses both electromagnetic interference and LED light lifecycle degradation. We may address the incorporation by reference of ABYC C–5, a broader incorporation by reference of EN 14744, other potential navigation light standards, and navigation light requirements for all vessel types in a future, broader, Coast Guard proposal.

Subpart 111.83—Shore Connection Boxes

§ 111.83–7 High Voltage Shore Connection

A commenter noted that proposed new § 111.83–7 only applies the requirements of IEC/IEEE 80005–1:2019 to vessels required by law to have high voltage shore connections (HVSCs), and recommended removing that limitation. The Coast Guard agrees the proposed limitation to only vessels that were required by state or local law to connect to HVSC would have created unnecessary confusion. This section does not require compliance with IEC/IEEE 80005–1:2019; it is a recommendation for best practices and additional safety. For vessels that connect to electrical shore power using an HVSC, we recommend complying with IEC/IEEE 80005–1:2019 regardless of whether it is required by a state or local jurisdiction. For this reason, we have removed the limitation that § 111.83–7 would only apply to vessels required by law to have shore power and instead provide this section as a recommended standard for all vessels that use an HVSC.

Another commenter requested that the ABS Guide for High Voltage Shore Connection be considered for incorporation by reference as an alternative standard for HVSCs. We have not incorporated this guide. IEC/IEEE 80005–1:2019, which is incorporated by reference in the new § 111.83–7, is an international voluntary consensus standard that provides an acceptable baseline recommendation, while the ABS Guide for High Voltage Shore Connection is a classification society guide. Although the ABS Guide for High Voltage Shore Connection may be a satisfactory alternative for consideration in an equivalency request, it is not necessary to list a classification society guide in the regulations when an international voluntary consensus standard is available. The National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) directs Federal agencies to use voluntary consensus standards in their regulatory activities unless doing so would be inconsistent with applicable law or otherwise impractical.

Subpart 111.99—Fire Door Holding and Release Systems

§ 111.99–5 General

The NPRM proposed updating the existing citation in § 111.99–5 to reflect a more current edition of the International Convention for Safety of Life at Sea, 1974 (SOLAS), Sixth edition. A commenter noted that SOLAS II–2/9.4.1.1.5 includes a number of paragraphs that include requirements for safe functioning of the fire door release system. The commenter suggested that we expand § 111.99–5 to include these additional paragraphs in II–2/9.4.1.1.5 beyond that which was referenced in the NPRM. We understand that SOLAS contains additional requirements for fire doors. Vessels that comply with SOLAS must meet these requirements, but requiring all vessels that must comply with Subchapter J's requirements meet these standards would place regulatory requirements on these vessels without providing appropriate opportunity for public notice and comment. Accordingly, we did not incorporate this suggestion at this time.

Subpart 111.105—Hazardous Locations

One commenter suggested we remove the Division system for classification of hazardous locations from subchapter J. The commenter said that compliance would be simpler if only the Zone system was accepted. We disagree. This is an established system used extensively in North America and removing the Division system would adversely affect many equipment manufacturers.

Another commenter requested we incorporate by reference American Petroleum Institute (API) standards API RP 14FZ and API RP 500, and IEEE 1187–2013. As we discussed in regard to a comment on subpart 111.15, we are not inclined to incorporate IEEE 1187 because it contains additional requirements beyond what we believe necessary to incorporate at this time. API RP 14FZ and API RP 500 are already incorporated or will be incorporated in a very limited scope, which we have determined to be a reasonable level at which to require these standards.

§ 111.105–3 General Requirements and System Integrity

The intent of § 111.105–3 is to ensure all electrical equipment installed in a hazardous location is appropriate for the location. One commenter suggested that acceptable electrical components may be combined in a manner that may produce an assembly that can ignite a hazardous atmosphere and that this may not be caught in after-installation inspections. The commenter suggested several standards to address this concern, such as ANSI/UL 698A, IEC TS 60079–46, ANSI/UL 508A, and UL 2011. Additionally, the commenter suggested that this rule address the importance of assembly verification throughout the equipment lifecycle from design to installation. Assembly verification throughout the process is an important issue for system designers, but it is outside the scope of this rulemaking. Applicants must include assemblies of electrical equipment in plans and installation details in their request for Coast Guard review in accordance with §§ 110.25–1(i) and (j). The Coast Guard then reviews the plans and installation details to ensure safe assembly in accordance with these standards.

Several commenters requested clarification of the phrase ''and not in combination in a manner that will compromise system integrity or safety,'' proposed in the NPRM for new § 111.105–3(c). Additionally, commenters suggested that we reorganize § 111.105–3 to better separate equipment selection standards and installation requirements. Since its initial adoption in 1996, our intentions in § 111.105–5 (which we had proposed to move into § 111.105–3) have been to ensure that proper and safe equipment is used in hazardous locations and to allow safe combinations of equipment complying with either NFPA 70 (Division system) or the IEC 60079 series of standards (Zone system).[3] The phrase in question, located in § 111.105–3(c) in this final rule, ensures such systems are carefully designed because the methods of classification of hazardous locations can differ. When a location is subject to two classification systems, it may have two different classifications. For example, a specific cargo oil tank may be classified as a Class I, Division 1, location under one system and Zone 0 under the other. In this example, electrical equipment approved for Class I, Division 1 (intrinsically safe) or approved for Zone 0 (ia) may be installed in the cargo tank.

In the NPRM we proposed to combine §§ 111.105–3 and 111.105–5 into § 111.105–3 to be consistent with §§ 111.106–3 and 111.108–3. This created confusion among commenters, and we have decided to revise our approach to proposed § 111.105–3. Instead, we have renumbered the proposed § 111.105–7 as § 111.105–3 and amended it to be more consistent with §§ 111.106–3 and 111.108–3 by adding notes after new paragraphs 111.105–3(b)(1) and (b)(2). This change better clarifies the appropriate guidance for using Zone equipment in Division-designated spaces or using Division equipment in Zone-designated spaces.

[3] ''Electrical Engineering Requirements for Merchant Vessels'' interim rule (61 FR 28284, June 4, 1996).

Additionally, as mentioned earlier, we will also require in § 110.25–1(i) that applicants clearly indicate the hazardous location method of classification, Division or Zone, in their plan submissions.

One comment suggested that it was more appropriate to incorporate by reference Clause 7 rather than Clause 6 of IEC 60092–502 in § 111.105–3(b). We disagree. Clause 6 concerns the requirements of electrical equipment in hazardous areas while Clause 7 addresses installation of electrical equipment in hazardous areas. The intent of § 111.105–3(b) is to prescribe the standards for electrical equipment intended for hazardous areas (locations), not specifically installation. This is the same as § 111.108(a)(3). It was not our goal for the proposed modifications to § 111.105 to substantively change the standards fundamental to equipment selection. In the existing regulations, in accordance with § 111.108–1(b), all vessels could use the standards specified in 46 CFR Subpart § 111.108. Revisions to § 111.105 are intended to make this clearer.

One comment noted that for electrical installations on mobile and fixed offshore units the proposed requirements only reference Clause 8 of IEC 61892–7. The commenter also noted that Clause 8 excludes guidance on cables and conduits and Clause 9 of IEC 61892–7 is for cables and wiring systems. This is correct. We intentionally did not reference Clause 9 for cables and wiring systems. Prior to this rulemaking, we previously incorporated Clause 6 of IEC 61892–7:2007. Clause 6 addresses electrical equipment in hazardous areas, but not wiring or cable systems. We proposed to incorporate by reference the more recent Clause 8 of IEC 61892–7:2019. Clause 8 similarly addresses electric equipment by referencing Clause 5 of IEC 60079–14:2013. It was not our intent to add wiring and cabling system requirements to § 111.105–3. The requirements for wiring and cable systems in hazardous locations are in § 111.105–17.

One commenter noted that both Clauses 8 and 9 of IEC 61892–7 reference IEC 60079–14, Electrical installations design, selection, and erection, and suggested that we should incorporate IEC 60079–14 by reference. We disagree with the suggestion. Since we incorporated by reference IEC 61892–7:2007 in 46 CFR subchapter J, the standard has evolved and been updated twice. In 2014, the IEC 61892–7 requirements for installations in hazardous area were rewritten based on the requirements of IEC 60079–14:2013. In the latest edition, 2019, IEC 61892–7 was completely rewritten and references are, to the extent possible, made to IEC 60079–14:2013 and to other relevant standards. At this time our intent is to only apply IEC 60092–14:2013 as it is referenced in Clause 8 of IEC 618792–7:2019. We describe Clause 8 in the previous paragraph. Despite the commenter mentioning Clause 9 of IEC 61892–7:2019, we did not propose to incorporate it in the NPRM. We already address the cable and wiring requirements using standards we deem sufficient in § 111.105–17. It is commonplace for standards to reference other standards, but incorporating every standard simply because it is cross-referenced would cause us to incorporate more standards than are reasonably necessary to convey the relevant requirements. A broader incorporation by reference of IEC 61892–7:2019 would require additional regulatory analysis and an additional opportunity for the public to review and comment.

§ 111.105–28 Internal Combustion Engines

A commenter said that § 111.105–28 states ''Internal combustion engines installed in Class I Divisions 1 and 2 (Zones 1 and 2),'' but there is no direct equivalency between Class I Division 1 and Zone 1 as Class I Division 1 covers equipment in Zone 0 as well. The commenter suggested that references to Class I Divisions (1 and 2) and Zones be removed from the section. We disagree with this suggestion. Currently, § 111.108–1(b) allows U.S. Mobile Offshore Drilling Units (MODUs), floating OCS facilities, and vessels other than Offshore Supply Vessels (OSVs) regulated under 46 CFR subchapter L and U.S. tank vessels that carry flammable and combustible cargoes, to comply with ASTM F2876 per § 111.108–3(g). Our purpose in changing § 111.105 is to improve the consistency of the regulations related to hazardous areas in §§ 111.105, 111.106, and 111.108. It does not change the requirements. Although we agree with the commenter's assertion that Class I Division I may also cover equipment in IEC Zone 0, internal combustion engine installations are generally prohibited for use in shipboard IEC Zone 0 areas.

A commenter noted that engines may be certified by the manufacturer to ASTM F2876 and its maximum surface temperature requirements. The commenter also noted that ASTM F2876 does not address different testing requirements from Zone 1 and Zone 2 applications. The primary purpose of ASTM F2876 is determining the maximum operating temperature of the engine, in order to ascertain the suitability of the engine installation in hazardous areas associated with the autoignition temperature of various flammable cargoes. An independent laboratory must certify all electrical equipment associated with the engine installation. Although ASTM F2876 contains other requirements in addition to temperature measurement, the references to EN 1834–1 within ASTM F2876 are recommendations only.

§ 111.105–50 Alternative Standard to the Classification of Hazardous Locations Requirements of This Subchapter

A commenter noted we proposed in the NPRM to incorporate IEC 60092–502 without also incorporating the Coast Guard's interpretations and additional requirements, issued in April 2009, which we maintain on the Coast Guard's website for the ACP.[4] The commenter did not offer an opinion or recommendation on this proposal, but asked us to clarify if these requirements in the IEC 60092–502 Supplement would be obsolete when we incorporate IEC 60092–502:1999. The intent of these interpretations and supplemental requirements was for vessels in the ACP to achieve equivalency with the regulations in 46 CFR. The Coast Guard has determined that IEC 60092–502, even without these interpretations and supplemental requirements, is a satisfactory alternative method for the classification of hazardous locations. When using IEC 60092–502 to classify hazardous locations, vessels no longer need to comply with our IEC 60092–502 Supplement issued in April 2009.

A commenter said that our proposed incorporation by reference of IEC 60092–502:1999 as an alternative method for classification of hazardous location, while also referencing §§ 32.60–20(c) and 38.20–10, resulted in conflicting ventilation requirements. We agree that they can be conflicting. Unfortunately, existing U.S. and international requirements for cargo pump room ventilation are different. Sections 32.60–20(c) and 38.20–10 both require an air change every 3 minutes (20 air changes per hour) while Clause 8.1.3 of IEC 60092–502:1999 requires an air change every 2 minutes (30 air changes per hour). We intend for IEC 60092–502:1999 to be an alternative to existing regulations. At this time we are not changing 46 CFR subchapter D, including §§ 32.60–20(c) and 38.20–10,

[4] See U.S. Coast Guard Interpretation: IEC 60092–502:1999 Supplement at *https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/Alternate%20Compliance%20Program/iec60092-502sup.pdf.*

nor modifying IEC 60092–502. System designers choosing to use IEC 60092–502:1999 for classification of hazardous locations must follow the standard. However, we are revising § 111.105–50(c) from what was proposed in the NPRM to clearly state when 30 air changes per hour are required. Specifically, if IEC 60092–502:1999 is used, cargo handling rooms and other spaces where hazardous location classification is dependent upon ventilation must have mechanical ventilation capable of at least 30 air changes per hour, based upon the gross volume of the space.

Subpart 112.05—General

§ 112.05–5 Emergency Power Source

Section 112.05–5(a) requires that an emergency power source have the capacity to simultaneously supply all loads connected to it. To further clarify this, in the NPRM we suggested adding the phrase ''at a unity (1.0) service factor.'' This simply means the emergency power source must be sufficiently sized to operate all loads at their full rated capacity.

A commenter requested we modify the required capacity of the emergency power source with a phrase such as ''with due regard being paid to such services as may have to be operated simultaneously.'' They stated that their proposed change would allow use of emergency generators that are more closely sized to the loads that would be needed in an emergency. We disagree with the commenter's proposed change. It would change the intent of the existing regulation by allowing more discretion and ambiguity than a specific load capacity measurement. In the interest of providing a clear discernable standard that we considered safe, we will proceed with requiring the unity 1.0 service factor as proposed in the NPRM.

In table 1 to § 112.05–5 footnote 2, we are replacing the reference to § 111.93 with a reference to § 58.25–65 because we moved the requirements in § 111.93 to § 58.25–65 in a previous rulemaking (60 FR 24776, May 10, 1995). Although we did not include this amendment in the NPRM, this is a conforming edit that will not have an impact on the existing emergency power requirements.

§ 112.05–7 Use of Emergency Generator in Port

A commenter noted that existing Coast Guard policy regarding in port use of the emergency generator requires that a qualitative failure analysis (QFA), design verification test procedure (DVTP), and a periodic safety test procedure (PSTP) be submitted for review, but the proposed § 112.05–7 did not have this requirement. This is correct. The requirements for these documents are contained in 46 CFR subchapter F Subpart 61.40. Based on this subpart, an emergency generator intended to meet § 112.05–7 for use in port would be required to submit a QFA, DVTP, and PSTP for review. We do not see the need to duplicate this requirement in § 112.05–7.

A commenter said we could require more comprehensive alarms in § 112.05–7(c) and requested that, at a minimum, we consider clarifying the alarms and shutdowns required versus the shutdowns allowed or disallowed. We understand the commenter's intent and request for more specific information, but this regulation provides the baseline requirements. We do not agree with revising the regulation to require additional alarm regulations at this time because we have determined that the baseline alarm requirements are still adequate.

A commenter noted that the proposed regulations regarding in-port use of the emergency generator at § 112.05–7(c) require the vessel be equipped with displays and alarms in the centralized control station and alarm monitoring at the engineers' quarters. The commenter pointed out that not all ships have a centralized control station or alarm summary panels in the crew's quarters. These regulations set the baseline requirements for in-port use of the emergency generator. If a system designer cannot meet the requirements due to unique ship characteristics, the designer may propose equivalent arrangements to the MSC in accordance with § 110.20–1. Our intent for these alarm location regulations is to require alarms both where the emergency generator is normally controlled and where crew would normally be located in port.

Additionally, two commenters noted that the NPRM did not discuss arrangements for feedback to power the vessel's main switchboard for habitability services and any special load analysis considerations or interlocks requirements for paralleling with main generators. Following our review, we find that there is not a need to include provisions on these points because the existing § 112.05–3(c) and the new § 112.05–7(g) both address use of the emergency generator to feedback to non-emergency loads and require either disconnection or automatic load shedding of these loads before the emergency generator is overloaded.

Another commenter was concerned that § 112.05–7(e) appeared to be describing requirements for breaker coordination to main services while using the emergency generator in port. This is true, and this coordination is not a new requirement. Subpart 111.51 requires coordinated protection and selective operation of overcurrent protective devices for all potential plant configurations, including this situation. Section 112.05–7(e) clarifies that in port use of the emergency generator is one of the configurations requiring coordination of overcurrent devices in accordance with § 111.51–5(a). Per the requirements of this rule, the power supply circuits for the use of an emergency generator in port must be arranged and protected to ensure that any electrical fault (except for the emergency generator and the emergency switchboard) will not affect the operation of the main and emergency services. The commenter was concerned this requirement could be interpreted to require full breaker coordination, which they believe is not feasible on many vessels with large distribution breakers from the main switchboard not designed to coordinate with a small power source such as the in-port generator. The commenter requested we remove references to protecting the main power system while using emergency generator in port from these regulations, noting that the intent of the rule is to ensure the availability of the emergency power system if it is being used as the power source while in-port. We understand the commenter's concerns, but, as explained in Section V.E, this provision has been accepted by IMO since 2005 and is similarly addressed in classification society rules. It is true that many of the provisions in this section are aimed at ensuring the availability of the emergency generator in port, but it is also important that the power circuits for the main distribution system are appropriately protected when powered by the emergency generator. We recognize that full coordination may not always be possible because of the large variation in short currents due to different operational conditions, but the coordination study must demonstrate main power system circuits connected to the emergency generator in port are adequately protected against short circuit. For these reasons we did not make any changes to the regulatory text originally proposed for § 112.05–7.

Subpart 112.15—Emergency Loads

§ 112.15–1 Temporary Emergency Loads

As provided in the NPRM, in § 112.15–1 we will now require an engineer's assistance-needed alarm as a

required temporary emergency load. A commenter correctly noted that adding the alarm as a temporary emergency load meant that it would also be a final emergency load. This is correct. In accordance with § 112.15–5(a), temporary emergency loads are also final emergency loads.

Regulatory Analysis Comments

A commenter asserted that table 3, ''Affected U.S.-Flagged Vessel Population That Complies with 46 CFR Subchapter J,'' on page 21462 of the NPRM, does not provide enough clarity to determine whether floating OCS facilities are excluded or included under the vessel count for ''Cargo and Miscellaneous Vessels.'' The commenter also encouraged the Coast Guard to make changes to the Marine Information for Safety and Law Enforcement (MISLE) database and Coast Guard documentation to ensure this and future rulemakings clarify whether floating OCS facilities are included or excluded.

Another commenter expressed a concern regarding table 3, suggesting that, despite what may be currently listed in MISLE, the latest tally of U.S.-flagged MODUs is less than 5, and likely comprises only the Helix Q4000 and Enterprise Offshore Drilling's EOD 201, and possibly the Spartan Rigs 202 and 303. The commenter suggested we revise table 3 of the proposed rule to read ''<5'' to more accurately reflect the scope of subchapter J's application to U.S.-flagged MODUs.

We agree with these commenters' assertions that we incorrectly counted the number of Cargo and Miscellaneous Vessels. Our MISLE database listed floating production systems as being inspected under Title 46 of the CFR, subchapter I–A. This is incorrect. As a result, we overstated the number of MODUs in the regulatory analysis (RA) for the proposed rule, which lowered the population of vessels in the ''Cargo and Miscellaneous Vessels'' category for the final rule. After further analysis, we revised the population of MODUs to one: the Helix Q4000. This is the only MODU in our MISLE database. Therefore, the number of MODUs for the final rule is one because we incorrectly classified the rest based on the subchapter inspection field in MISLE. We added the population of 41 floating production systems in our MISLE database to the final rule RA's category of ''Cargo and Miscellaneous Vessels'' inspected under subchapter I, which we present in table 4 of the RA. The number of vessels in this category increased from 576 in the proposed rule to 617 in the final rule. Because we updated the entire vessel population for this final rule, the total number of vessels increased from 5,570 in the proposed rule to 5,602 (see table 4).

V. Discussion of the Rule

A. Revisions to § 110.10–1 Incorporation by Reference

The standards that are incorporated by reference in subchapter J are listed in § 110.10–1. With this rule, the Coast Guard updates the technical standards to reflect more recent editions of the standards available to the public. We encourage the use of these updated standards because they reflect the best available technologies, practices, and procedures that are recommended by consensus bodies and other groups with experience in the industry. As the baseline upon which other standards, rules, and equivalency requests are evaluated, it is important that subchapter J incorporates up-to-date references.

We incorporate by reference the class rules of ABS, in particular, in multiple locations within subchapter J and throughout 46 CFR Chapter I. It is important to note that while these rules set the regulatory baseline or standard for specific engineering systems and equipment, the Coast Guard also designated several other authorized classification societies in accordance with 46 CFR part 8. These classification societies are listed on the Coast Guard website.[5] The Coast Guard authorized the listed classification societies to perform certain functions and certifications using their respective class rules on vessels enrolled in the ACP. Vessels not enrolled in the ACP may propose using the class rules of an authorized classification society as an alternative to the ABS class rules incorporated by reference for particular engineering systems and equipment in accordance with § 110.20–1.

Throughout § 110.10–1, we also add additional standards to provide alternative compliance options, remove outdated standards, and clarify existing requirements. Where applicable, we update the naming format, mailing addresses, phone numbers, and URL addresses for the standards already incorporated by reference. These updates will ensure that the standards are reasonably accessible to the public.

Following this paragraph, we list the standards we are updating, adding, or deleting in § 110.10–1. Within each standard listed, we describe the topics covered by the standard, the changes to the standard, any differences between currently incorporated IBR standards, and a list of the subparts or sections that reference the IBR standard. If this rule does not make any changes to a standard that is currently incorporated by reference, the standard will not be discussed in the revisions to § 110.10–1. However, it will be included, without change, in the regulatory text of § 110.10–1 that appears at the end of this document.

- *ABS Rules for Building and Classing Marine Vessels (ABS Marine Vessel Rules), 2020.* The rules contain a comprehensive set of construction and maintenance requirements for ships and offshore facilities. The rules are, in general, developed by the International Association of Classification Societies (IACS) and by ABS staff, and reviewed and approved by committees made up of naval architects, marine engineers, shipbuilders, engine builders, steel makers and by other technical, operating, and scientific personnel associated with the worldwide maritime industry. Because of classification society rules' comprehensive nature and ABS's long history of ensuring vessel safety and seaworthiness, they are a valuable supplement to the numerous voluntary consensus standards incorporated by reference. In subchapter J the rules provide an option for the design of engineering systems and components including generators, semiconductor rectifiers, and electric propulsion systems. Specifically, we currently reference the 2003 edition in §§ 110.15–1(b), 111.01–9(b), 111.12–3, 111.12–5, 111.12–7(a) and (b), 111.33–11, 111.35–1, 111.70–1(a), 111.105–31(n), 111.105–39 introductory text and (a), 111.105–40(a) and (c), and 113.05–7(a). In 2020, ABS transitioned from the ABS Steel Vessel Rules to the ABS Marine Vessel Rules. This allowed ABS to consolidate several rules into one foundational rule. We incorporate by reference the 2020 ABS Marine Vessel Rules in the aforementioned sections and additionally in the new § 112.05–7(c) related to use of emergency generators in port. The ABS Marine Vessel Rules undergo an annual review and approval process by ABS technical committees. The Coast Guard participates on these committees, which are comprised of international experts with relevant experience. We are incorporating by reference the following parts of the ABS Marine Vessel Rules: Parts 1, 2, 3, 4, 5A, 5B, 5C, 5D, 6, and 7. Several of the sections of the ABS Marine Vessel Rules that we incorporate

[5] See *https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Inspections-Compliance-CG-5PC-/Commercial-Vessel-Compliance/Flag-State-Control-Division/ClassSocAuth/.*

by reference have been individually updated. For example:

○ ABS Marine Vessel Rules 4–8–3/Table 2: This table specifies minimum degrees of protection for electrical equipment. This updated table contains several technical updates since the 2003 edition, including additional notes concerning areas protected by fixed water-spray or water mist fire extinguishing systems, and equipment subject to water splash.

○ ABS Marine Vessel Rules 4–8–3: We reference this section for generator construction requirements. The updated edition contains technical updates to account for changes in technology since the 2003 edition.

○ ABS Marine Vessel Rules 4–8–5/5.17.9: This section regarding semiconductor rectifiers now requires a high temperature alarm.

○ ABS Marine Vessel Rules 4–8–5/5.5: This edition contains updates to propulsion generator requirements.

○ ABS Marine Vessel Rules 4–8–2/9.17: This edition updates the requirements for protection of motor circuits to address athwartship thruster motor load alarms and more clearly defines the systems requiring undervoltage release.

○ ABS Marine Vessel Rules 4–8–3/5: This updated section regarding switchboards and motor controllers contains additional cable connection requirements, optional alternative creepage and clearance distances, and additional requirements on battery and uninterruptible power systems based on advancements in technology.

○ ABS Marine Vessel Rules 5–10–4/3: This section regarding roll-on/roll-off cargo spaces is now titled 5C–10–4/3. The new edition made updates to ventilation requirements and to the tables of dangerous goods.

○ ABS Marine Vessel Rules 4–9–7/Table 9: This table regarding equipment testing is now titled 4–9–8/Table 1. The updates to this table reflect changes in technology and industry testing practices.

• *ABS Rules for Building and Classing Mobile Offshore Units (ABS MOU Rules), Part 4 Machinery and Systems, 2020.* The rules contain a comprehensive set of construction and maintenance requirements for mobile offshore drilling units. In subchapter J the rules provide an option for the design of engineering systems and components including generator, semiconductor rectifier, and electric propulsion systems. Specifically, we currently reference the 2001 edition in §§ 111.12–1(a), 111.12–3, 111.12–5, 111.12–7(c), 111.33–11, 111.35–1, and 111.70–1(a). In 2020, ABS transitioned from the ABS Mobile Offshore Drilling Units Rules to the ABS MOU Rules. This allowed ABS to consolidate several rules into one foundational rule. By means of this rule, we incorporate by reference the 2020 ABS MOU Rules. Like the ABS Marine Vessel Rules, the ABS MOU Rules will undergo a regular review and approval process by the ABS technical committees comprised of international experts with relevant experience. ABS updated and changed the title of several of the ABS MOU rules incorporated by reference in these sections. For example:

○ ABS MOU Rules 4–3–4 (renamed ABS MOU Rules 6–1–7): We reference this section regarding generator construction requirements. ABS made several technical updates since the 2001 edition to account for changes in technology.

○ ABS MOU Rules 4–3–4/3.5.3 (renamed 6–1–7/12): We reference this section for semiconductor converters requirements. ABS made several updates to the standard due to changes in technology.

○ ABS MOU Rules 4–3–4/7.1 (renamed 6–1–7/9.9): We reference this section regarding bus bars and wiring requirements. ABS made several updates to the section since the 2001 edition.

• *ANSI/IEEE C37.12-1991—American National Standard for Alternating Current (AC) High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis-Specifications Guide.* We remove this standard from § 111.54–1 because IEEE changed the title and republished it with updates in 2008 as IEEE C37.12–2008—IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 V), 2008. This represented a complete technical revision of the standard. IEEE subsequently revised it again in 2018. We incorporate by reference IEEE C37.12–2018 in § 111.54–1 and further discuss this standard with the other IEEE standards incorporated by reference.

• *ANSI/IEEE C37.27–1987 (IEEE 331)—Application Guide for Low-Voltage AC Nonintegrally Fused Power Circuitbreakers (Using Separately Mounted Current-Limiting Fuses).* We remove the reference to this standard in § 111.54–1 because this guide was replaced by IEEE C37.27—2015—IEEE Guide for Low-Voltage AC (635 V and below) Power Circuit Breakers Applied with Separately-Mounted Current-Limiting Fuses, 2015. We discuss this standard, IEEE C37.27—2015, with the other IEEE standards incorporated by reference.

• *ANSI/ISA–RP12.06.01–2003—Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation Part 1: Intrinsic Safety.* This recommended practice provides guidance on installation of intrinsically safe systems for use in hazardous (classified) locations. It clarifies and explains the requirements of Articles 504 and 505 of NFPA 70 (National Electrical Code). This recommended practice supersedes ISA RP 12.6–1995. By means of this rule, we delete ISA RP 12.6 from reference in § 111.105–11 and replace it with ANSI/ISA–RP12.06.01–2003.

• *ANSI/ISA 12.12.01–2015—Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.* The purpose of this standard is to provide minimum requirements for the design, construction, and marking of electrical equipment or parts of such equipment for use in Class I and Class II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations. This newer edition of the standard replaces ANSI/ISA 12.12.01–2012, which the Coast Guard recently added to § 111.108–3(b) as part of a separate rulemaking titled ''Electrical Equipment in Hazardous Locations'' (80 FR 16980, Mar. 31, 2015). Additionally, we include ANSI/ISA 12.12.01–2015 in §§ 111.105–3(b) and 111.106–3(b) as another certification option for electrical equipment in hazardous location. The 2015 edition contains minor technical changes from the 2012 edition.

• *ANSI/ISA–60079–18—Explosive atmospheres—Part 18: Equipment protection by encapsulation ''m'', Third Edition, 2012.* This standard gives the specific requirements for the construction, testing, and marking of electrical equipment and parts of electrical equipment, and for the designation of explosion-protected electrical apparatus complying with IEC standards (Ex) components (which is part of an electrical equipment module found in the European hazardous area scheme) with the type of protection encapsulation ''m'' intended for use in explosive gas atmospheres or explosive dust atmospheres. We currently reference the 2009 edition of this standard in § 111.106–3(d), and the 2012 edition in § 111.108–3(e). This rule removes the ANSI/ISA–60079–18 references in §§ 111.106–3(d) and 111.108–3(e) because the standard has been withdrawn and replaced by UL 60079–18, a substantively similar standard. We replace the ANSI/ISA standard with UL 60079–18 in § 111.106–3(d) and 111.108–3(e).

• *API Recommended Practice (RP) 14F—Recommended Practice for Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Division 1 and Division 2 Locations, Sixth Edition, October 2018.* This document recommends minimum requirements and guidelines for the design, installation, and maintenance of electrical systems on fixed and floating petroleum facilities located offshore. By means of this rule, we reference clause 6.8 of the document in § 111.105–17. This clause provides guidance on use of conduit, cable seals, and sealing methods. The incorporation of this standard adds another wiring option in hazardous locations.

• *API RP 14FZ—Recommended Practice for Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Zone 0, Zone 1, and Zone 2 Locations, Second Edition, May 2013.* This document recommends minimum requirements and guidelines for the design, installation, and maintenance of electrical systems on fixed and floating petroleum facilities located offshore. By means of this rule, we reference clause 6.8 of the document in § 111.105–17. This clause provides guidance on use of conduit, cable seals, and sealing methods. The incorporation of this standard adds another wiring option in hazardous locations.

• *API RP 500—Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2, Third Edition, December 2012 with errata January 2014.* This recommended practice provides guidelines for classifying locations at petroleum facilities as Class I, Division 1 and Class I, Division 2 locations for the selection and installation of electrical equipment. We currently reference the second edition (1997) of this standard in §§ 111.106–7(a) and 111.106–13(b). By means of this rule, we reference instead the more recent, third edition (2012) in those sections. The 2012 edition contains editorial changes, but the technical content has not changed.

• *API RP 505—Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2, Second Edition, August 2018.* The purpose of this recommended practice is to provide guidelines for classifying locations Class I, Zone 0, Zone 1, and Zone 2 at petroleum facilities for the selection and installation of electrical equipment. We currently reference the first edition, which was published in 1997 and reaffirmed in 2013, in § 111.106–7(a) and 111.106–13(b). By means of this rule, we reference instead the more recent, second edition (2018) in those sections. This does not substantively change the requirements of those sections.

• *ASME A17.1–2016/CSA B44–16—Safety Code for Elevators and Escalators: Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices, reissued January 16, 2017 with errata.* This code covers the design, construction, operation, inspection, testing, maintenance, alteration, and repair of elevators, hoists, escalators and their associated parts, rooms, and spaces. We currently reference the sixteenth edition (2000) in § 111.91–1. By means of this rule, we reference instead the more recent, twenty-first edition (2016) in that section. ASME updated this standard based on changes in technology. The updated standard addresses new types of elevators being used in the industry, specifically wind turbine elevators and outside emergency elevators. In addition, the standard contains new requirements to address a new feature called ''Elevator Evacuation Operation'' that allows for the use of elevators for occupant evacuation. Moreover, there are several major changes to the standard that include seismic requirements, updated maintenance control program requirements, and revisions regarding qualifications for elevator inspectors. ASME A17 has been an industry accepted standard since 1921. Although many of the changes to the presently incorporated edition of the standard do not apply to shipboard elevators, it is important that shipboard elevators meet the updated provisions that do apply.

• *ASTM B117—19 Standard Practice for Operating Salt Spray (Fog) Apparatus, 2019.* This practice covers the apparatus, procedure, and conditions required to create and maintain the salt spray (fog) test environment. Where the Coast Guard's regulations require material to be corrosion-resistant it must meet the testing requirements of this ASTM standard practice. We currently reference the 1997 edition in § 110.15–1(b). By means of this rule, we reference instead the 2019 edition. The 1997 edition has been superseded by several subsequent editions. ASTM made the following changes over the recent editions of this standard that are ultimately incorporated into the 2019 version we adopt in this rulemaking. The testing specifications in the 2011 edition are similar to those in the 1997 edition, but the 2011 edition is more detailed. For example, the impurity restrictions are more detailed in section 8, the air supply requirements are more specific in section 9, and the conditions in the salt chamber are more precisely described in section 10. The 2016 edition added a warning about the impact of water conductivity in section 4 while the 2019 edition added several minor but non-substantive explanatory sections. Overall, the 2019 edition of this testing standard practice for operating salt spray apparatus is very similar to the 1997 edition currently incorporated, with minor improvements in the specifications to ensure testing consistency and precision.

• *ASTM F2876–10—Standard Practice for Thermal Rating and Installation of Internal Combustion Engine Packages for use in Hazardous Locations in Marine Applications, Reapproved 2015.* This practice covers the method of testing, rating, and installing internal combustion engine packages for use in hazardous areas in marine applications. We currently reference the 2010 edition of this standard in §§ 111.106–3(h) and 111.108–3(g). By means of this rule, we also reference the 2010 edition in new § 111.105–28 regarding internal combustion engines. This ensures a consistent standard for these installations on all vessel and facility types.

• *CSA C22.2 No. 30–M1986—Explosion-proof enclosures for use in class I hazardous locations, Reaffirmed 2016.* This standard covers the details of construction and tests for explosion-proof enclosures for electrical equipment to be used in Class I, Division 1, Groups A, B, C, and D hazardous locations and in gaseous mines. We currently reference the 1986 edition of this standard in §§ 111.106–3(b) and 111.108–3(b) and by means of this rule incorporate instead the reaffirmed version therein. The two versions are not substantively different. We also reference this reaffirmed standard in § 111.105–3(b), regarding approved equipment, as an additional compliance option. This affords the broadest and most current selection of IBR explosion protection standards for all vessel and facility types.

• *CSA C22.2 No. 213–16—Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations, May 2016.* This standard provides the details of construction and testing of electrical

equipment for use in Class I and II, Division 2 and Class III, Division 1 and 2 hazardous locations. We currently reference the 1987 edition in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we reference instead the 2016 edition in these sections and also in § 111.105–3(b) concerning approved equipment. This standard received a major revision since the 1987 edition based on advances in technology and changes to related standards. It is an accepted national standard and one of several available standards for nonincendive electrical equipment. Our incorporation of this updated edition ensures use of latest industry practices and including it in § 111.105–3 ensures that standards are consistent for electrical installations on all vessel and facility types.

• *CSA–C22.2 No. 0–10—General requirements—Canadian Electrical Code, Part II, including Update No. 2, dated November 2014, Reaffirmed 2015.* This standard covers definitions, construction requirements, marking, and tests of a general nature that applies to all or several of the individual standards of the Canadian Electrical Code. We currently reference the ninth edition of this standard in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we reference instead the tenth edition, reaffirmed in 2015, in these sections and in § 111.105–3(b) concerning approved equipment. The tenth edition includes new requirements for equipment containing lasers or lithium batteries, criteria for the use of adhesives in the construction of electrical equipment, surface temperature limits, attachment plug loading, and the maximum temperature of equipment in contact with gypsum. Additionally, it incorporates a comprehensive list of definitions for use in standards for electrical products and outlines the relationship between this standard and electrical product standards. We incorporate this more recent edition in subpart 111.105 to ensure that standards are consistent for electrical installations on all vessel and facility types.

• *CAN/CSA–C22.2 No. 157–92—Intrinsically safe and nonincendive equipment for use in hazardous locations, including Update No. 2, dated June 2003, reaffirmed 2016.* This standard specifies the testing of nonincendive electrical equipment and the details of construction and tests for intrinsically safe electrical equipment for use in hazardous locations. We currently reference the 1992 edition of this standard, which is not substantively different from the reaffirmed edition, in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we reference instead the reaffirmed 1992 edition in those sections. In addition, we are adding a reference to the reaffirmed edition in § 111.105–3(b) concerning approved equipment, which provides an additional option for vessels and facilities.

• *MIL–DTL–24640C with Supplement 1—Detail Specification Cables, Lightweight, Low Smoke, Electric, for Shipboard Use, General Specification for, Nov. 8, 2011.* This military specification provides the details of construction and testing of lightweight, low smoke, electric cables for Navy shipboard applications and is also used aboard commercial vessels. Incorporating this specification by reference allows manufacturers access to both military and commercial markets without the cost of unnecessary additional testing to a similar voluntary consensus standard. MIL–DTL–24640C is already incorporated by reference and approved for § 111.106–5(a). However, MIL–DTL–24640C supersedes MIL–C–24640A (1996), currently referenced in §§ 111.60–1 and 111.60–3. We incorporate the updated edition, MIL–DTL–24640C (2011), into § 111.60–1 only, because this rule deletes § 111.60–3. The updated edition, published in 2011, incorporates the latest developments in marine cable materials and performance enhancements but will not substantively change requirements. Supplement 1 includes lists of associated specification sheets and cables.

• *MIL–DTL–24643C (as updated by Supplement 1A)—Detail Specification Cables, Electric, Low Smoke Halogen-Free, for Shipboard Use, General Specification for, Oct. 1, 2009 (including Supplement 1A dated Dec. 13, 2011).* This military specification is already incorporated by reference in § 111.106–5(a) and provides the details of construction and testing of low-smoke halogen-free electric cable for Navy shipboard applications and is also used aboard commercial vessels. Incorporating this specification by reference allows manufacturers access to both military and commercial markets without the cost of unnecessary additional testing to a similar voluntary consensus standard. This specification supersedes the currently referenced MIL–C–24643A (1996) incorporated by reference in §§ 111.60–1 and 111.60–3. We delete references to MIL–C–24643A (1996) and incorporate the latest standard MIL–DTL–24643C (2011) into § 111.60–1 only, because this rule rescinds § 111.60–3. This updated edition, published in 2011, incorporates the latest developments in marine cable materials and performance enhancements. Supplement 1 includes lists of associated specification sheets and cables.

• *MIL–DTL–76E—Military Specification Wire and Cable, Hookup, Electrical, Insulated, General Specification for, Nov. 3, 2016.* This specification provides the standards for construction and testing of single-conductor, synthetic-resin insulated, electrical hookup wire and cable for use in the internal wiring of electrical and electronic equipment. Incorporating this specification by reference allows manufacturers access to both military and commercial markets without the cost of unnecessary additional testing to a similar voluntary consensus standard. We currently reference MIL–W–76D in § 111.60–11. In 2016 the standard was revised and renamed MIL–DTL–76E. This edition has formatting changes and minor updates based on current technology. We incorporate this revised standard as one of several available standards for wire.

• *EN 14744—Inland navigation vessels and sea-going vessels—Navigation light, English Version, August 2005.* This standard, developed by the European Committee for Standardization, provides the details for construction and testing of vessel navigation lights. By means of this rule, we include it as an acceptable alternate standard for navigation lights in § 111.75–17(d)(2).

• *FM Approvals Class Number 3600—Approval Standard for Electrical Equipment for Use in Hazardous (Classified) Locations—General Requirements, 2018.* This standard identifies the basis for approval of electrical equipment in hazardous (classified) locations. It is used in conjunction with the other FM Approvals standards referenced in subchapter J. We currently reference the 1998 edition of this standard in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we incorporate instead the more recent 2018 edition for §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). This edition includes transitioning from ISA series of standards to UL standards, an expanded list of normative references, and more specificity regarding the required quality control system. The incorporation of this more recent edition ensures use of the latest industry practices and including it in § 111.105–3(b) regarding approved equipment ensures that standards are consistent for electrical installations on all vessel and facility types.

• *FM Approvals Class Number 3610—Approval Standard for*

Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations, January 2018. This standard provides requirements for the construction and testing of electrical apparatus, or parts of such apparatus, whose circuits are incapable of causing ignition in Classes I, II, and III, Division 1 hazardous (classified) locations. We currently reference the 2004 edition of this standard in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we incorporate instead the more recent 2018 edition in §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). The incorporation of this more recent edition ensures use of latest industry practices and including it in § 111.105–3(b) regarding approved equipment ensures that standards are consistent for electrical installations on all vessel and facility types.

• *FM Approvals Class Number 3611—Approval Standard for Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2, Hazardous (Classified) Locations, January 2018.* This standard provides requirements for the construction and testing of electrical apparatus, or parts of such apparatus, whose circuits are incapable of causing ignition in Class I and II, Division 2, and Class III, Divisions 1 and 2 hazardous (classified) locations. This standard is currently referenced in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we add this as an alternative standard in § 111.105–3(b) concerning approved equipment. This ensures that standards are consistent for electrical installations on all vessel and facility types.

• *FM Approvals Class Number 3615—Approval Standard for Explosion-proof Electrical Equipment General Requirements, January 2018.* This standard contains the basic requirements for the construction and testing of explosion-proof electrical apparatus. This standard is currently referenced in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we add this as an alternative standard in § 111.105–3(b) regarding approved equipment. This ensures that standards are consistent for electrical installations on all vessel and facility types.

• *FM Approvals Class Number 3620—Approval Standard for Purged and Pressurized Electrical Equipment for Hazardous (Classified) Locations, January 2018.* This standard contains the basic requirements for the construction and testing of purged and pressurized electrical equipment. We currently reference the 2000 edition of this standard in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we reference instead the 2018 edition in §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). The two editions of the standard are not substantively different and adding it to § 111.105–3(b) ensures consistent standards for electrical installations on all vessel and facility types.

• *IEEE Std. C37.04–2018—IEEE Standard for Ratings and Requirements for AC High-Voltage Circuit Breakers with Rated Maximum Voltage above 1000 V, approved December 5, 2018.* This document establishes a rating structure, preferred ratings, construction, and functional component requirements for high-voltage AC circuit breakers. We currently reference the 1999 edition of this standard in § 111.54–1. By means of this rule, we reference instead the 2016 edition in § 111.54–1. This more recent edition contains updates that reflect current circuit breaker manufacturing technology.

• *IEEE Std. C37.010–2016—IEEE Application Guide for AC High-Voltage Circuit Breakers >1000 Vac Rated on a Symmetrical Current Basis, approved September 22, 2016.* This document provides guidance for the application of high-voltage circuit breakers. We currently reference the 1999 edition of this standard in § 111.54–1. By means of this rule, we reference instead the 2016 edition in § 111.54–1. This more recent edition contains updates that reflect current circuit breaker manufacturing technology.

• *IEEE Std. C37.12–2018—IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 V), approved December 5, 2018.* These specifications apply to all indoor and outdoor types of AC high-voltage circuit breakers rate above 1000 volts (V). It replaces ANSI/IEEE C37.12–1991. IEEE C37.12–2018 represents a nearly complete rewrite of 1991 edition to reflect present circuit breaker manufacturing technology. The 2018 edition of this standard is one of several acceptable circuit breaker standards listed in § 111.54–1.

• *IEEE Std. C37.13–2015—IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures, approved 5 Dec. 2015.* This standard establishes minimal functional requirements, establishes preferred rating structure, and provides preferred ratings enclosed low-voltage AC power circuit breakers. We currently reference the 2000 edition of this standard in § 111.54–1. By means of this rule, we reference instead the 2015 edition in § 111.54–1. This more recent edition has many technical updates to address advancements in technology, including an increase in nominal voltages, new testing techniques, and removal of information on DC circuit-breakers (now located in IEEE C37.14). This standard is one of several acceptable circuit-breaker standards in § 111.54–1.

• *IEEE Std. C37.14–2015—IEEE Standard for DC (3200 V and below) Power Circuit Breakers Used in Enclosures, approved 26 Mar. 2015.* This standard covers the preferred ratings and testing requirements of enclosed DC power circuit breakers. We currently reference the 2003 edition of this standard § 111.54–1. By means of this rule, we reference instead the more recent 2015 edition in § 111.54–1, which contains many technical changes to reflect present circuit breaker manufacturing technology and advancements in technology.

• *IEEE Std. C37.27–2015—IEEE Guide for Low-Voltage AC (635 V and below) Power Circuit Breakers Applied with Separately-Mounted Current-Limiting Fuses, approved December 5, 2015.* This guide sets forth recommendations for the selection of current-limiting fuses for use in combination with low-voltage AC power circuit breakers. This guide replaces ANSI/IEEE C37.27–1987, which we currently reference in § 111.54–1. IEEE C37.27–2015 contains many technical updates to address advancements in circuit breaker manufacturing technology, which provide the public with more accurate and applicable standards for modern circuit breakers than the previous 1987 edition. We incorporate this guide as one of several acceptable circuit breaker standards listed in § 111.54–1.

• *IEEE Std. 45–1998—IEEE Recommended Practice for Electric Installations on Shipboard—1998.* IEEE 45–2002 superseded the 1998 edition, but in some instances the Coast Guard previously found the 1998 edition preferable and continued to reference it. Because the 1998 edition is no longer supported by IEEE and other acceptable standards exist, we delete all references to this standard, which is currently referenced in §§ 111.30–19, 111.105–3, 111.105–31, and 111.105–41.

• *IEEE Std. 45–2002—IEEE Recommended Practice for Electrical Installations On Shipboard—2002.* We currently reference this edition of IEEE 45 in the following sections in subchapter J: §§ 111.05–7, 111.15–2, 111.30–1, 111.30–5, 111.33–3, 111.33–5, 111.40–1, 111.60–1, 111.60–3, 111.60–5, 111.60–11, 111.60–13, 111.60–19, 111.60–21, 111.60–23, 111.75–5, and 113.65–5. IEEE has developed the IEEE 45 Series, which comprises nine recommended practices addressing electrical installations on ships and

marine platforms. We replace references to IEEE 45–2002 with newer IEEE 45 Series recommended practices, individually discussed below, in those sections (except in § 111.60–11 because the IEEE 45 does not address wire-related issues that were previously covered by IEEE 45).

• *IEEE Std. 45.1–2017—IEEE Recommended Practice for Electrical Installations On Shipboard—Design, approved 23 Mar. 2017.* This recommended practice provides guidance for electrical power generation, distribution, and electric propulsion system design. These recommendations reflect the present-day technologies, engineering methods, and engineering practices. By means of this rule, we reference this standard in §§ 111.15–2, 111.40–1, 111.75–5, and 113.65–5. The technical content is similar to IEEE 45–2002, which we delete from these sections. We also add a reference to this standard in § 111.105–41 concerning battery rooms.

• *IEEE Std. 45.2–2011—IEEE Recommended Practice for Electrical Installations On Shipboard—Controls and Automation, approved 10 Sep. 2011.* This recommended practice provides guidance for shipboard controls, control applications, control apparatus, and automation. These recommendations reflect present-day technologies, engineering methods, and engineering practices. By means of this rule, we reference this document in §§ 111.33–3 and 111.33–5. The technical content is similar to IEEE 45–2002, which we delete from these sections.

• *IEEE Std. 45.6–2016—IEEE Recommended Practice for Electrical Installations on Shipboard—Electrical Testing, approved 7 Dec. 2016.* This recommended practice provides guidance for electrical testing for power generation, distribution, and electric propulsion systems. These recommendations reflect present-day technologies, engineering methods, and engineering practices. By means of this rule, we reference this document in § 111.60–21. Its technical content is similar to IEEE 45–2002, which we delete from this section.

• *IEEE Std. 45.7–2012—IEEE Recommended Practice for Electrical Installations On Shipboard—AC Switchboards, approved 29 Mar. 2012.* This recommended practice supplements the design, installation, and testing recommendations in IEEE 45–2002. This recommended practice provides new technologies and design practices for generator control panels and switchboards to aid marine electrical engineers in the design, application, and installation of this equipment on ships and other marine installations. By means of this rule, we reference this document in §§ 111.30–1, 111.30–5, and 111.30–19. The technical content of IEEE 45.7–2012 is similar to IEEE 45–2002, but more detailed. It also references other industry standards, many of which we have incorporated by reference elsewhere in subchapter J.

• *IEEE Std. 45.8–2016—IEEE Recommended Practice for Electrical Installations On Shipboard—Cable Systems, approved 29 Jan. 2016.* This document provides recommendations for selection, application, and installation of electrical power, signal, control, data, and specialty marine cable systems on shipboard systems. These recommendations include present-day technologies, engineering methods, and engineering practices. By means of this rule, we replace references to IEEE 45–2002 with IEEE 45.8–2016 in §§ 111.05–7, 111.60–5, 111.60–13, and 111.60–19. The technical content of IEEE 45.8–2016 is similar to IEEE 45–2002, but more detailed.

• *IEEE Std. 1202–2006—IEEE Standard for Flame-Propagation Testing of Wire and Cable with Corrigendum 1, reaffirmed December 5, 2012, Corrigendum 1 approved October 19, 2012.* This standard provides a protocol for exposing cable samples to a theoretical 20 kilowatt (kW) [70,000 British thermal units per hour] flaming ignition source for a 20-minute test duration. The test determines the flame propagation tendency of single conductor and multi-conductor cables intended for use in cable trays. We currently reference the 1991 edition in §§ 111.60–6 and 111.107–1(c). By means of this rule, we reference instead the more recent 2006 edition in §§ 111.60–6 and 111.107–1(c). In the 2006 edition, the normative references have been updated, the temperature at which cables are conditioned has been raised from 18 °C to 25 °C, and minor refinements to the test procedure have been made.

• *IEEE Std. 1580–2010—IEEE Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Facilities, approved 30 Sep. 2010.* This recommended practice contains the requirements for single or multiconductor cables, with or without metal armor or jacket, and rated 300 V to 35 kilovolts (kV), intended to be installed aboard marine vessels, and fixed and floating offshore facilities. The 2001 edition is currently referenced in §§ 111.60–1, 111.60–2, 111.60–3, and 111.106–5(a). By means of this rule, we reference instead the more recent 2010 edition only in §§ 111.60–1, 111.60–2, and 111.106–5(a) because we delete § 111.60–3 in this rule. The 2010 edition has been updated to incorporate the latest developments in marine cable materials and performance enhancements.

• *IEC 60068–2–52:2017—Environmental testing Part 2–52: Tests—Test Kb: Salt mist, cyclic (sodium chloride solution), Edition 3.0, 2017–11.* This standard specifies the application of the cyclic salt mist test to components or equipment designed to withstand a salt-laden atmosphere as salt can degrade the performance of parts manufactured using metallic or non-metallic materials. The second edition is referenced in § 110.15–1. By means of this rule, we incorporate instead the third edition. In this more recent edition, the standard has been updated to ensure consistency with SO 9227—Corrosion tests in artificial atmospheres—Salt spray tests.

• *IEC 60079–0—Electrical apparatus for Explosive Gas Atmospheres—Part 0: General Requirements, Edition 3.1, 2000.* This part of the IEC 60079 series of standards specifies the general requirements for construction, testing, and marking of electrical equipment and Ex components intended for use in explosive atmospheres. This standard was referenced in §§ 111.105–1, 111.105–3, 111.105–5, and 111.105–17. By means of this rule, we will reformat subpart 111.105 to be consistent with subparts 111.106 and 111.108 and will no longer specifically reference IEC 60079–0.

• *IEC 60079–1:2014—Explosive atmospheres—Part 1: Equipment protection by flameproof enclosures ''d'', Edition 7.0, 2014–06.* This part of the IEC 60079 series of standards contains specific requirements for the construction and testing of electrical equipment with the type of protection flameproof enclosure ''d'', which are intended for use in explosive gas atmospheres. We currently reference the fourth edition (2001) of this standard in §§ 111.105–1, 111.105–3, 111.105–5, 111.105–9, and 111.105–17 while the sixth edition (2007) is referenced in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we remove all references to the fourth and sixth editions of this standard, and replace them with the more recent edition 7.0 (2014) in §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). The updated standard reflects advances in technology, including:

○ Addition of material limitations of enclosures of equipment and enclosures of Ex components for external mounting;

○ Addition of power factor requirement for evaluating the ability of a plug and socket to remain flameproof during the arc-quenching period while opening a test circuit; and

○ Addition of marking requirements for Ex component enclosures, in addition to the requirements for marking of Ex components given in IEC 60079–0.

• *IEC 60079–2:2014—Explosive atmospheres—Part 2: Equipment protection by pressurized enclosures ''p'', with Corrigendum 1 (2015), Edition 6.0, 2014–07.* This part of the IEC 60079 series of standards contains specific requirements for the construction and testing of electrical equipment with pressurized enclosures, of type of protection ''p'', intended for use in explosive gas atmospheres or explosive dust atmospheres. It also includes the requirements for pressurized enclosures containing a limited release of a flammable substance. We currently reference the fourth edition (2001) of this standard in §§ 111.105–1, 111.105–3, 111.105–5, 111.105–7, and 111.105–17, while the fifth edition (2007) is referenced in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we delete all references to the fourth and fifth edition. The more recent edition 6.0 (2014) is incorporated in §§ 111.105–3(b), 111.105–17, 111.106–3(b), and 111.108–3(b). The updated standard now covers combustible dust, cells and batteries, and backup protective gas. The incorporation of the more recent edition ensures consistent, up-to-date standards for electrical installations on all vessel and facility types.

• *IEC 60079–5:2015—Explosive atmospheres—Part 5: Equipment protection by powder filling ''q'', Edition 4.0, 2015–02.* This part of the IEC 60079 series of standards contains specific requirements for the construction, testing, and marking of electrical equipment, parts of electrical equipment, and Ex components in the type of protection powder filling ''q'', intended for use in explosive gas atmospheres. We currently reference the second edition (1997) of this standard in §§ 111.105–1, 111.105–3, 111.105–5, 111.105–7, 111.105–15, and 111.105–17, while the third edition (2007) is referenced in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we delete all references to the second and third edition. The more recent edition 4.0 (2015), containing minor technical revisions and clarifications, is incorporated into §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). This will ensure consistent, up-to-date standards for electrical installations on all vessel and facility types but will not result in a substantive change to the current requirements.

• *IEC 60079–6:2015—Explosive atmospheres—Part 6: Equipment protection by liquid immersion ''o'', Edition 4.0, 2015–02.* This part of the IEC 60079 series of standards specifies the requirements for the design, construction, testing and marking of Ex equipment and Ex components with type of protection liquid immersion ''o'' intended for use in explosive gas atmospheres. We currently reference the second edition (1995) of this standard in §§ 111.105–1, 111.105–3, 111.105–5, 111.105–7, 111.105–15, and 111.105–17, while the third edition (2007) is referenced in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we delete all references to the second and third edition. The more recent edition, 4.0 (2015), will be added to §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). The incorporation of the latest edition ensures consistent, up-to-date standards for electrical installations on all vessel and facility types. The latest edition represents a major technical revision of the requirements for oil immersion ''o''. These revisions include:

○ The redefinition of the requirements for oil immersion ''o'' into liquid immersion levels of protection ''ob'' and ''oc'';

○ The addition of the ability to protect sparking contacts to both ''ob'' and ''oc''; and

○ The introduction of additional requirements for the protective liquid.

• *IEC 60079–7:2015—Explosive atmospheres—Part 7: Equipment protection by increased safety ''e'', with Amendment 1 (Consolidated Version), Edition 5.1, 2017–08.* This part of the IEC 60079 series of standards specifies requirements for the design, construction, testing, and marking of electrical equipment and Ex components with type of protection increased safety ''e'' intended for use in explosive gas atmospheres. We currently reference the third edition (2001) of this standard in §§ 111.105–1, 111.105–3, 111.105–5, 111.105–7, 111.105–15, and 111.105–17, while the fourth edition (2006) is referenced in § 111.106–3(b) and 111.108–3(b). By means of this rule, we remove all references to the third and fourth editions of this standard. The more recent consolidated edition 5.1 with amendment 1 (2017) is added to §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). The standard contains updates including the addition of terminal installation tests, the addition of solid insulating material requirements based on thermal stability, and the revision of the requirements for soldered connections. The incorporation of the more recent edition ensures consistent, up-to-date standards for electrical installations.

• *IEC 60079–11:2011—Explosive atmospheres—Part 11: Equipment protection by intrinsic safety ''i'' with Corrigendum 1 (January 2012), Edition 6.0, 2011–06.* This part of the IEC 60079 series of standards specifies the construction and testing of intrinsically safe apparatus intended for use in an explosive atmosphere and for associated apparatus, which is intended for connection to intrinsically safe circuits that enter such atmospheres. This type of protection applies to electrical equipment in which the electrical circuits themselves are incapable of causing an explosion in the surrounding explosive atmospheres. We currently reference the fourth edition (1999) of this standard in §§ 111.105–1, 111.105–3, 111.105–5, 111.105–7, 111.105–11, and 111.105–17. The fifth edition (2006) is currently referenced in § 111.106–3(b), and the more recent IEC 60079–11:2011, Edition 6.0, is referenced in § 111.108–3(b). By means of this rule, we remove all references to the fourth and fifth editions and adopt the more recent edition 6.0 with corrigendum 1 (2012), for §§ 111.105–3(b) and 111.106–3(b), as well as retaining it in § 111.108–3(b). The changes with respect to the previous editions are as follows:

○ Inclusion of non-edition specific references to IEC 60079–0;

○ Merging of the apparatus requirements for the Fieldbus Intrinsically Safe Concept (FISCO) from IEC 60079–27;

○ Merging of the requirements for combustible dust atmospheres from IEC 61241–11;

○ Clarification of the requirements for accessories connected to intrinsically safe apparatus (such as chargers and data loggers);

○ Addition of new test requirements for opto-isolators; and

○ Introduction of Annex H about ignition testing of semiconductor limiting power supply circuits.

The incorporation of the more recent edition ensures consistent, up-to-date standards for electrical installations.

• *IEC 60079–13:2017—Explosive atmospheres—Part 13: Equipment protection by pressurized room ''p'' and artificially ventilated room ''v'', Edition 2.0, 2017–05.* This part of the IEC 60079 series of standards gives requirements for the design, construction, assessment, and testing, and marking of rooms protected by pressurization. We currently reference Edition 1.0 (2010) of this standard in §§ 111.106–3(b) and

111.108–3(b). By means of this rule, we reference instead Edition 2.0 (2017), the more recent edition, in §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). This standard contains the following changes:

- Modification of the title to include artificially ventilated room ''v'' in addition to pressurized room ''p'';
- Addition of protection types (''pb'', ''pc'', and ''vc'');
- Removal of protection types (''px'', ''py'', ''pz'' and ''pv'');
- Definition of the differences between pressurization and artificial ventilation types of protection;
- Removal of protection of rooms with an inert gas or a flammable gas from the scope of standard; and
- Addition of an informative annex to include examples of applications where types of protection pressurization or artificial ventilation or pressurization and artificial ventilation can be used and associated guidelines.

The incorporation of the more recent edition ensures consistent, up-to-date standards for electrical installations.

• *IEC 60079–15:2017—Explosive atmospheres—Part 15: Equipment protection by type of protection ''n'', Edition 5.0, 2017–12.* This part of the IEC 60079 series of standards specifies requirements for the construction, testing, and marking for Group II electrical equipment with type of protection ''n'' intended for use in explosive gas atmospheres. This standard applies to non-sparking electrical equipment and also to electrical equipment with parts or circuits producing arcs or sparks or having hot surfaces which, if not protected in one of the ways specified in this standard, could be capable of igniting a surrounding explosive gas atmosphere. We currently reference the second edition (2001) of this standard in §§ 111.105–1, 111.105–3, 111.105–5, 111.105–7, 111.105–15, and 111.105–17, while the edition 4.0 (2010) is referenced in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we remove references to the second edition and edition 4.0, and instead incorporate by reference the more recent edition 5.0 (2017) in §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). This standard contains numerous technical changes from the previous version, which reflect changes in industry practices and technology.

• *IEC 60079–18:2017—Explosive atmospheres—Part 18: Equipment protection by encapsulation ''m'', Edition 4.1, Consolidated version, 2017–08.* This part of the IEC 60079 series of standards gives specific requirements for the construction, testing, and marking of electrical equipment, parts of electrical equipment, and Ex components with the type of protection encapsulation ''m'' intended for use in explosive gas atmospheres or explosive dust atmospheres. We currently reference the first edition (1992) of this standard in §§ 111.105–1, 111.105–3, 111.105–5, 111.105–7, 111.105–15, and 111.105–17, while the edition 3.0 (2009) is referenced in §§ 111.106–3(b) and (d) and 111.108–3(b) and (e). By means of this rule, we remove references to these earlier editions, and adopt instead the more recent edition 4.1 (2017) for §§ 111.105–3(b) and (e), 111.106–3(b) and (d), and 111.108–3(b) and (e). There have been a few minor technical revisions to the standard, including modified and additional requirements for cells and batteries as well as revised testing guidance. The incorporation of the more recent edition ensures consistent, up-to-date standards for electrical installations.

• *IEC 60079–25:2010—Explosive atmospheres—Part 25: Intrinsically safe electrical systems, Edition 2.0, 2010–02.* This part of the IEC 60079 series of standards contains specific requirements for construction and assessment of intrinsically safe electrical systems, type of protection ''i'', intended for use, as a whole or in part, in locations in which the use of Group I, II, or III apparatus is required. We currently reference the Edition 2.0 (2010) in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we also reference this standard in § 111.105–3(b) concerning approved equipment. This ensures that standards are consistent on electrical installations.

• *IEC 60079–30–1 Part 30–1: Electrical resistance trace heating—General and testing requirements, First edition, 2007–01.* This part of the IEC 60079 series of standards specifies general and testing requirements for electrical resistance trace heaters for application in explosive gas atmospheres. This standard covers trace heaters that may be either factory- or field- (work-site) assembled units, which may be series heating cables, parallel heating cables, or heating pads and heating panels that have been assembled or terminated in accordance with the manufacturer's instructions. By means of this rule, we reference this newly incorporated standard in §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). Given increased interest in marine operations in the polar regions, this standard provides requirements for surface heating in hazardous locations.

• *IEC 60092–101:2018—Electrical installations in ships—Part 101: Definitions and general requirements, Edition 5.0, 2018–10.* This part of the IEC 60092 series of standards contains definitions and requirements that are common to all electrical apparatus and installations in ships. Edition 4.0 (2002) is referenced in §§ 110.15–1 and 111.81–1. By means of this rule, we reference instead the more recent Edition 5.0 (2018) of this standard in those sections. This edition contains many changes, including the following:

- The applicability of the standard has been changed to 1,000 V AC and 1,500 V DC;
- The table for design temperature has been simplified;
- The clause regarding power supply system characteristics has been rewritten; and
- Information regarding pollution degree has been added in the clause regarding clearance.

• *IEC 60092–201:2019—Electrical installations in ships—Part 201: System design—General, Edition 5.0, 2019–09.* This standard contains the main features of system design of electrical installations in ships. We currently reference the fourth edition in §§ 111.70–3 and 111.81–1. By means of this rule, we reference instead the more recent Edition 5.0 (2019) of this standard in those sections. This edition contains many changes including the following:

- Adding a new subclause regarding studies and calculations;
- Adding a new subclause regarding documentation;
- Revising the clause regarding distribution systems;
- Adding a new clause regarding system earthing;
- Revising the clause regarding sources of electrical power;
- Revising the clause regarding distribution system requirements;
- Deleting the clause regarding cables and transferring it to IEC 60092–401; and
- Adding a new subclause regarding electric and electrohydraulic steering gear.

• *IEC 60092–202:2016—Electrical installations in ships—Part 202: System design—Protection, Edition 5.0, 2016–09.* This part of the IEC 60092 series of standards provides the main features of the electrical protective system design to ensure electrical installations in ships are protected against accidental over-currents, up to and including short-circuit, by appropriate devices.. We currently reference the fourth edition in §§ 111.12–7, 111.50–3, 111.53–1, and 111.54–1. By means of this rule, we reference the more recent edition 5.0 (2016) in those sections, specifically

§§ 111.12–7(b); 111.50–3(c), (e), and (g); 111.53–1(a); and 111.54–1(a). This edition contains substantial technical updates on electrical load studies, short-circuit current calculations, and protection discrimination studies. The incorporation of this edition ensures consistent, up-to-date standards.

- *IEC 60092–301:1980—Electrical installations in ships—Part 301: Equipment—Generators and motors, Third Edition with Amendment 1 (1994–05) and Amendment 2, 1995–04.* This part of the IEC 60092 series of standards provides design specifications for generators and motors. This current edition is referenced in §§ 111.12–7, 111.25–5, and 111.70–1. By means of this rule, we make formatting changes to the standard's title for consistency with the titles of all other referenced IEC standards, but the edits do not alter the edition incorporated by reference.
- *IEC 60092–302:1997—Electrical installations in ships—Part 302: Low-voltage switchgear and controlgear assemblies, Fourth Edition, 1997–05.* This current edition is referenced in §§ 111.30–1, 111.30–5, and 111.30–19. This part of the IEC 60092 series of standards provides design and testing specifications applicable to low-voltage switchgear and controlgear assemblies. By means of this rule, we make formatting changes to the standard's title for consistency with the titles of all other referenced IEC standards, but the edits do not alter the edition incorporated by reference.
- *IEC 60092–303:1980—Electrical installations in ships—Part 303: Equipment—Transformers for power and lighting, Third Edition with amendment 1, 1997–09.* This edition is referenced in § 111.20–15. This part of the IEC 60092 series of standards provides design and testing specifications applicable to all transformers used for power and lighting for use in ships. By means of this rule, we make formatting changes to the standard's title for consistency with the titles of all other referenced IEC standards, but the edits do not alter the edition incorporated by reference.
- *IEC 60092–304:1980—Electrical installations in ships—Part 304: Equipment—Semiconductor convertors, Third Edition with Amendment 1, 1995–04.* This edition is referenced in §§ 111.33–3 and 111.33–5. This part of the IEC 60092 series of standards provides design specifications applicable to static converters using semiconductor rectifying elements such as diodes, reverse blocking triode thyristors, etc. for use in ships. By means of this rule, we make formatting changes to the standard's title for consistency with the titles of all other referenced IEC standards, but the edits do not alter the edition incorporated by reference.
- *IEC 60092–306:2009—Electrical installations in ships—Part 306: Equipment—Luminaires and lighting accessories, Edition 4.0, 2009–11.* This part of the IEC 60092 series of standards contains the construction and testing requirements for luminaires and lighting accessories for use in ships. The construction and testing requirements apply primarily to luminaires for illumination purposes. This standard also applies to lighting accessories associated with the wiring and current-consuming appliance of an installation. This standard does not apply to portable luminaires, navigation lights, search lights, daylight signaling lamps, signal lights including the relevant control and monitoring equipment and other lights used for navigation in channels, harbors, etc. We currently reference the third edition (1980) of this standard in §§ 111.75–20(a) and (b) and 111.81–1. By means of this rule, we reference instead the most recent edition 4.0 (2009) of this standard in those sections. The IEC made the following changes to the standard since the 1980 edition:
  - The title was amended;
  - The scope was stated more precisely;
  - Mechanical design and material requirements were amended and stated more precisely;
  - Table 2—Standard types of lamp holders was amended;
  - Environmental tests, especially regarding shock and vibration, were added;
  - Requirements and tests concerning special chemical and physical attributes were added; and
  - The standard was editorially revised.
- *IEC 60092–350:2014—Electrical installations in ships—Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications, Edition 4.0, 2014–08.* This part of the IEC 60092 series of standards provides the general construction requirements and test methods for use in the manufacture of electric power, control, and instrumentation cables with copper conductors intended for fixed electrical systems at voltages up to and including 18/30(36) kV on board ships and offshore (mobile and fixed) units. We currently reference Edition 3.0 (2008) of this standard in § 111.106–5(a). By means of this rule, we reference instead the more recent edition, 4.0 (2014), of this standard in § 111.106–5(a) to ensure the latest industry practices based on changes in technology are addressed. The Coast Guard also amends subpart 111.60 to align with recognized classification society rules and industry practice. In support of this effort, this rule includes IEC 60092–350:2014 in § 111.60–1(a) concerning construction and testing of cable. The 4.0 edition includes the following technical changes as compared to the previous edition:
  - The standard includes a reference to IEC 60092–360 for both the insulating and sheathing compounds;
  - The standard includes partial discharge tests, which were transferred from IEC 60092–354 to align them with IEC 60092–353;
  - The IEC transferred the requirements for oil and drilling-fluid resistance (former Annexes F and G) to IEC 60092–360;
  - The standard contains improved requirements for cold bending and shocks; and
  - The document reflects the changes of material types that were introduced during development of IEC 60092–353 and IEC 60092–360.
- *IEC 60092–352:2005—Electrical installations in ships—Part 352: Choice and Installation of electrical cables, Third Edition, 2005–09.* This part of the IEC 60092 series of standards provides the basic requirements for the choice and installation of cables intended for fixed electrical systems on board ships at voltages up to and including 15 kV. We currently reference the second edition (1997) of this standard in §§ 111.60–3, 111.60–5 and 111.81–1. Because of the revisions to subpart 111.60, we instead reference the more recent third edition (2005) of this standard in §§ 111.60–1 and 111.60–5(a) and (b). Additionally, IEC 60092–352:2005 will replace the previous 1997 edition referenced in § 111.81–1. We do not include the 2005 edition in § 111.60–3 because this rule rescinds that section. The 2005 edition has several minor updates including changes to:
  - Sizes of earth continuity conductors and equipment earthing connections;
  - Bending radii for cables rated at 3,6/6,0 (7,2) kV and above;
  - Current carrying capacities in amperes at core temperatures of 70 °C and 90 °C; and
  - Tabulated current carrying capacities—defined installations.

  The incorporation of the 2005 edition ensures that we address the latest technologies and industry practices for this standard.
- *IEC 60092–353:2016—Electrical installations in ships—Part 353: Power*

cables for rated voltages 1 kV and 3 kV, Edition 4.0, 2016–09. This part of the IEC 60092 series of standards provides manufacturing requirements and characteristics of such cables directly or indirectly bearing on safety and specifies test methods for checking conformity with those requirements. We currently reference the second edition (1995) of this standard in §§ 111.60–1, 111.60–3, and 111.60–5 while the third edition (2011) is referenced in § 111.106–5(a). By means of this rule, we reference instead the more recent edition 4.0 (2016) only in §§ 111.60–1(a), 111.60–5(a) and 111.106–5(a), but not § 111.60–3 because we revise subpart 111.60 regarding cable construction and rescind § 111.60–3. The 2016 edition of this standard includes updates for advancements in insulation and sheathing materials, construction methods, and test methods. Its incorporation ensures consistent, up-to-date standards for electrical cable installations.

• *IEC 60092–354:2014—Electrical installations in ships—Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (U_m=7,2 kV) up to 30 kV (U_m=36 kV), Edition 3.0, 2014–08.* This part of the IEC 60092 series of standards provides manufacturing requirements and characteristics of such cables directly or indirectly bearing on safety and specifies test methods for checking conformity with those requirements. By means of this rule, we reference this standard in § 111.60–1(a). This aligns Coast Guard requirements with those of recognized classification society rules and industry practice.

• *IEC 60092–360:2014—Electrical installations in ships—Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables, Edition 1.0, 2014–04.* This part of the IEC 60092 series of standards specifies the requirements for electrical, mechanical, and particular characteristics of insulating and sheathing materials intended for use in shipboard and fixed and mobile offshore unit power, control, instrumentation, and telecommunication cables. By means of this rule, we reference this standard in § 111.60–1(a). This aligns Coast Guard requirements with those of recognized classification society rules and industry practice.

• *IEC 60092–376:2017—Electrical installations in ships—Part 376: Cables for control and instrumentation circuits 150/250 V (300 V), Third Edition, 2017–05.* This part of the IEC 60092 series of standards provides manufacturing requirements and characteristics of such cables directly or indirectly bearing on safety and specifies test methods for checking conformity with those requirements. By means of this rule, we reference this standard in § 111.60–1(a). This aligns Coast Guard requirements with those of recognized classification society rules and industry practice.

• *IEC 60092–401:1980—Electrical installations in ships—Part 401: Installation and test of completed installation, Third Edition with Amendment 1 (1987–02) and Amendment 2 (1997–04), 1980.* This part of the IEC 60092 series of standards provides general installation and testing requirements for electrical systems and components installed in ships. We currently reference the 1980 edition in §§ 111.05–9 and 111.81–1(d). This rule makes formatting changes to the standard's title for consistency with the titles of all other referenced IEC standards, but it does not alter the edition incorporated by reference.

• *IEC 60092–502:1999—Electrical installations in ships—Part 502: Tankers—Special features, Fifth Edition, 1999–02.* This part of the IEC 60092 series of standards deals with the electrical installations in tankers carrying liquids that are flammable, either inherently, or due to their reaction with other substances, or flammable liquefied gases. The standard details the zonal concept for hazardous area classification. We currently reference the 1992 edition in §§ 111.81–1, 111.105–31, 111.106–3(b), 111.106–5(c), 111.106–15(a), and 111.108–3(b). By means of this rule, we remove reference to this standard in § 111.105–31 and add it into §§ 111.105–1, 111.105–3(b), 111.105–11(c), 111.105–17(b), 111.105–50(c) as an option for classification of hazardous areas as further explained in Section V.D. This rule also makes formatting changes to the standard's title for consistency with the titles of all other referenced IEC standards, but does not alter the edition incorporated by reference. Additionally, we allow classification of hazardous locations based on this document, as described in more detail in section VI.D of this preamble.

• *IEC 60092–503:2007(E)—Electrical installations in ships—Part 503: Special features—AC supply systems with voltages in the range of above 1kV up to and including 15 kV, Second edition, 2007–06.* This part of the IEC 60092 series of standards covers the design and installation requirements for AC supply systems with voltages in the range of above 1 kV. We currently reference the first edition (1975) of this standard in § 111.30–5(a). By means of this rule, we reference instead the more recent second edition (2007) of this standard. The second edition covers a greater range of voltages and has updated technical requirements. The ''(E)'' stands for the English version of the standard.

• *IEC 60331–11:1999+A1:2009—Tests for electric cables under fire conditions—Circuit integrity—Part 11: Apparatus—Fire alone at a flame temperature of at least 750 °C, Edition 1.1, 2009–07 (''IEC 60331–11:2009'').* This part of IEC 60331 specifies the test apparatus to be used for testing cables required to maintain circuit integrity when subject to fire. We currently reference the first edition (1999) of this standard in § 113.30–25. By means of this rule, we reference instead the more recent 1.1 edition (2009) of this standard, which includes minor technical updating, to ensure the latest industry practices based on changes in technology are addressed.

• *IEC 60331–21:1999—Tests for electric cables under fire conditions—Circuit integrity—Part 21: Procedures and requirements—Cables of rated voltage up to and including 0.6/1.0 kV, First Edition, 1999–04.* This part of IEC 60331 specifies the test procedure and gives the performance requirement for cables when subject to fire. We currently reference this 1999 edition in § 113.30–25(j). By means of this rule, we make formatting changes to the standard's title for consistency with the titles of all other referenced IEC standards, but this rule does not alter the edition incorporated by reference.

• *IEC 60332–1–1:2015 (Consolidated Version)—Tests on electric and optical fibre cables under fire conditions—Part 1–1: Test for vertical flame propagation for a single insulated wire or cable—Apparatus, First Edition with Amendment 1 (2015–07), 2004–07.* This part of IEC 60332 specifies the apparatus for testing the resistance to vertical flame propagation for a single vertical electrical insulated conductor or cable, or optical cable, under fire conditions. This standard, along with IEC 60332–1–2:2015, supersedes IEC 60332–1:1993, currently referenced in § 111.30–19(b). By means of this rule, we replace the superseded 1993 standard in 111.30–19(b) with IEC 60332–1–1:2015 and IEC 60332–1–2:2015. IEC 60332–1–1:2015 covers the test apparatus, and IEC 60332–1–2:2015 covers the testing procedure. The technical content is similar to the 1993 edition, but has been updated with greater specificity regarding the ignition source, test sample size, and positioning of the test flame.

• *IEC 60332–1–2:2015 (Consolidated Version)—Tests on electric and optical fibre cables under fire conditions—Part 1–2: Test for vertical flame propagation for a single insulated wire or cable—Procedure for 1kW pre-mixed flame, First Edition with Amendment 1, 2015–07.* This part of IEC 60332 specifies the procedure for testing the resistance to vertical flame propagation for a single vertical electrical insulated conductor or cable, or optical cable, under fire conditions. This standard, along with IEC 60332–1–1:2015, supersedes IEC 60332–1:1993, which we currently reference in § 111.30–19(b). By means of this rule, we reference IEC 60332–1–2:2015, regarding the testing procedure, in § 111.30–19(b). The technical content is similar to the 1993 edition, but the updates in the standard provide greater specificity regarding the ignition source, test sample size, and positioning of the test flame.

• *IEC 60332–3–21:2018—Tests on electric and optical fibre cables under fire conditions—Part 3–21: Test for vertical flame spread of vertically-mounted bunched wires or cables—Category A F/R, Edition 2.0, 2018–07.* This part of IEC 60332–3 specifies the procedure for testing the resistance to vertical flame propagation for vertically-mounted bunched wires or cables, under defined conditions. Edition 2.0 (2018–7) retains and updates pre-existing categories of tests, adds a new category (category D) for testing at very low non-metallic volumes, and emphasizes that it applies to optical fibre cables as well as metallic conductor cables. By means of this rule, we adopt this standard for incorporation in §§ 111.60–1(b) and 111.107–1(c) as an option testing of flame propagation and consistency with classification society standards as further explained in Section V.D. of this preamble.

• *IEC 60332–3–22:2018—Tests on electric cables under fire conditions—Part 3–22: Test for vertical flame spread of vertically-mounted bunched wires or cables—Category A, Edition 2.0, 2018–07.* This part of IEC 60332–3 specifies methods of test for assessment of vertical flame spread of vertically-mounted bunched wires or cables, electrical or optical, under defined conditions. By means of this rule, we remove references to the superseded first edition (2000) of this standard in §§ 111.60–1, 111.60–2, 111.60–6, and 111.107–1. In these sections, we instead reference the more recent edition 2.0 (2018) of this standard. This more recent edition retains and updates the pre-existing categories of tests, adds a new category (category D) for testing at very low non-metallic volumes, and emphasizes that it applies to optical fiber cables as well as metallic conductor cables.

• *IEC 60529:2013 (Consolidated Version)—Degrees of protection provided by enclosures (IP Code), Edition 2.2, 2013–08.* This standard describes a system for classifying the degrees of protection provided by the enclosures of electrical equipment as well as the requirements for these degrees of protection and tests to verify the requirements. We currently reference Edition 2.1 (2001) of this standard in §§ 110.15–1, 111.01–9, 113.10–7, 113.20–3, 113.25–11, 113.30–25, 113.37–10, 113.40–10, and 113.50–5. In these sections, we instead reference the more recent edition 2.2 (2013) of this standard. Edition 2.2 (2013) is a minor technical update to the standard.

• *IEC 60533:2015—Electrical and electronic installations in ships—Electromagnetic compatibility—Ships with a metallic hull, Edition 3.0, 2015–08.* This standard specifies minimum requirements for emission, immunity, and performance criteria regarding electromagnetic compatibility (EMC) of electrical and electronic equipment for ships with metallic hull. We currently reference the second edition (1999) of this standard in § 113.05–7(a). By means of this rule, we instead reference the more recent edition 3.0 (2015) of this standard. This edition includes the following technical changes with respect to the previous edition:

○ The scope and title have been modified to limit the application of the standard to installations in ships with metallic hulls only;

○ The normative references have been updated;

○ Further explanation for in-situ testing has been given in section 5.1;

○ Cable routing requirements in Annex B have been amended; and

○ A new Annex C EMC test report has been added.

• *IEC 60947–2:2019 (Consolidated Version)—Low-voltage switchgear and controlgear—Part 2: Circuit-breakers, Edition 5.1, 2019–07.* This standard provides circuit-breaker construction and testing requirements. We currently reference the third edition (2003) of this standard in § 111.54–1(b). By means of this rule, we instead reference the more recent edition 5.1 (2019) of this standard. The 2019 edition of this standard contains numerous technical updates addressing technical advancements, including circuit-breaker testing, instantaneous trip circuit-breakers, and electromagnetic compatibility.

• *IEC 61363–1:1998—Electrical installations of ships and mobile and fixed offshore units—Part 1: Procedures for calculating short-circuit currents in three-phase a.c., first edition, 1998–02.* This standard outlines procedures for calculating short-circuit currents that may occur on a marine or offshore a.c. electrical installation. By means of this rule, we will make formatting changes to the standard's title for consistency with the titles of all other referenced IEC standards, but this rule does not alter the edition currently incorporated by reference. We currently reference this 1998 edition in § 111.52–5. This rule will move the standard to the new § 111.51–4(b) because we are combining the requirements of subparts 111.51 and 111.52 into a single subpart 111.51 (Calculation of Short-Circuit Currents and Coordination of Overcurrent Protective Devices).

• *IEC 61439–6: 2012—Low-voltage switchgear and controlgear assemblies—Part 6: Busbar trunking systems (busways), Edition 1.0, 2012–05.* This standard states busbar service conditions, construction requirements, technical characteristics, and verification requirements for low voltage busbar trunking systems. By means of this rule, we add it to the revised § 111.59–1 concerning general requirements for busways as an additional option.

• *IEC 61660–1:1997—Short-circuit currents in d.c. auxiliary installations in power plants and substations—Part 1: Calculation of short-circuit currents, First Edition, 1997–06,* with IEC 61660–1:1997/COR1:1999, Corrigendum 1 (March 1999), First Edition; and IEC 61660–1:1997/COR2:2000, Corrigendum 2 (March 2000), First Edition. This standard, including the corrigendums, describes a method for calculating short-circuit currents in DC auxiliary systems in power plants and substations. By means of this rule, we include it in the revised § 111.51–4(b) as an alternative for short-circuit analysis.

• *IEC 61892–7:2019—Mobile and fixed offshore units—Electrical installations—Part 7: Hazardous areas, Edition 4.0, 2019–04.* This standard contains provisions for hazardous areas classification and choice of electrical installation in hazardous areas in mobile and fixed offshore units, including pipelines, pumping or ''pigging'' stations, compressor stations, and exposed location single buoy moorings, used in the offshore petroleum industry for drilling, processing, and for storage purposes. We currently reference Edition 2.0 (2007) of this standard in § 111.108–3(b). By means of this rule, we update

the reference in § 111.108–3(b) to the more recent edition 4.0 (2019) and insert new references to this standard in §§ 111.105–1, 111.105–3(b), and 111.105–17(b). The standard has been completely rewritten. The Explosion Protection Level concept has been introduced as an alternative risk-based classification method and the requirements for installations in hazardous conditions reference IEC 60079–14 and other relevant standards, as appropriate. The incorporation of this standard into subpart 111.105 provides an alternate standard for classifications for hazardous locations.

• *IEC 62271–100:2017 (Consolidated Version)—High-voltage switchgear and controlgear—Part 100: Alternating-current circuit-breakers, Edition 2.2, 2017–06.* This standard provides construction and testing requirements for circuit-breakers having voltages above 1000 V. We currently reference Edition 1.1 (2003) of this standard in § 111.54–1(c). By means of this rule, we reference the more recent edition 2.2 (2017) of this standard. There have been numerous technical updates to address technical advancements in switchgear. To ensure we address the latest technologies and industry practices, we incorporate the more recent edition of this standard.

• *IEC/TR 60092–370:2009—Technical Report—Electrical installations in ships—Part 370: Guidance on the selection of cables for telecommunication and data transfer including radio-frequency cables, Edition 1.0, 2009–07.* This technical report gives guidance and basic recommendations for the selection and installation of shipboard and offshore unit cables intended for electrical systems used in both essential and non-essential analogue or digital signal communication, transmission, and control networks, including types suitable for high-frequency signals (*i.e.,* signals with a frequency of more than 10^5 Hertz). By means of this rule, we reference this new standard in § 111.60–1. This aligns our requirements with those of recognized classification society rules and industry practice.

• *IEC/IEEE 80005–1:2019—Utility connections in port—Part 1: High voltage shore connection (HVSC) systems—General requirements, Edition 2.0, 2019–03.* This standard describes the design, installation, and testing of HVSC systems, on board the ship and on shore, to supply the ship with electrical power from shore. Ships may be required by state or local laws to connect to high voltage shore power (over 1000 V) rather than running their onboard generators. Some ships may voluntarily connect to an HVSC. In § 111.83–7, we provide this standard as a recommended compliance standard for all applicable vessels that connect to an HVSC.

• *SOLAS Consolidated Edition 2014, Consolidated Text of the International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1988: article, annexes and certificates. (Incorporating all amendments in effect from 1 July 2014), Sixth edition, 2014.* SOLAS provides requirements for vessel construction, arrangement, and management on international voyages. We reference SOLAS 2001 requirements in §§ 111.99–5, 112.15–1, and 113.25–6 and, by means of this rule, incorporate instead the 2014 edition of SOLAS. While the applicable sections of SOLAS referenced in these requirements were not changed in the 2014 edition, we are incorporating these SOLAS amendments for completeness because industry is likely to use the more recent edition.

• *IMO Resolution A.1023(26)—Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009.* We make a non-substantive formatting change to the listing of this resolution in § 110–10–1(b). Chapter 6 of this resolution is referenced in § 111.108–3(b). The resolution provides requirements for machinery and electrical installations in hazardous areas of mobile offshore drilling units.

• *ISA RP 12.6—Wiring Practices for Hazardous (Classified) Locations Instrumentation Part I: Intrinsic Safety, 1995.* By means of this rule, we delete this standard from reference in § 111.105–11. It has been withdrawn by ISA and has been superseded by ANSI/ISA RP 12.06.01 (2003), which we incorporate by reference in § 111.105–11.

• *ISO 25861:2007(E)—Ships and marine technology—Navigation—Daylight signalling lamps, first edition, Dec, 1, 2007.* By means of this rule, we reference this standard in § 111.75–18 regarding daylight signaling lamps. This standard provides performance requirements for daylight signaling lamps pursuant to chapter V of SOLAS, 1974, as amended, and chapter 8 of the International Code for Safety for High-Speed Craft. The performance standards for daylight signaling lamps currently in § 111.75–18 are based on the international requirements in place in 1996, but the requirements contained in ISO 25861:2007 superseded those requirements. The ''(E)'' stands for the English version of the standard.

• *Lloyd's Register Type Approval System-Test Specification Number 1, March 2019.* Lloyd's Register is a vessel classification society that develops and publishes a comprehensive set of rules for the construction and maintenance of ships and offshore facilities. The rules are, in general, developed by IACS and by Lloyd's Register staff, and passed upon by committees made up of naval architects, marine engineers, shipbuilders, engine builders, steel makers and other technical, operating, and scientific personnel associated with the worldwide maritime industry. Because of classification society rules' comprehensive nature and long history of ensuring vessel safety and seaworthiness, they are a valuable supplement to the numerous voluntary consensus standards incorporated by reference. This specification details performance and environmental testing required for products used in marine applications. We currently reference the 2002 edition of this standard in § 113.05–7(a). By means of this rule, we reference the more recent 2019 edition. It has been updated several times to keep pace with changes in environmental testing.

• *NEMA ICS 2–2000 (R2005)—Industrial Control and Systems Controllers, Contactors, and Overload Relays, Rated 600 Volts, 2000.* This standard provides practical information concerning ratings, construction, test, performance, and manufacture of industrial control equipment. This edition is referenced in § 111.70–3. NEMA reaffirmed the edition without change in 2005. By means of this rule, we include the reaffirmed version of this standard, which results in no substantive changes.

• *NEMA ICS 2.3–1995—Instructions for the Handling, Installation, Operation, and Maintenance of Motor Control Centers Rated not More Than 600 Volts, 1995 (R2008).* This standard provides practical information containing instructions for the handling, installation, operation, and maintenance of motor control centers rated 600 volts or less. This edition is referenced in § 111.70–3. NEMA reaffirmed the edition without change in 2008. By means of this rule, we include the reaffirmed version of this standard, which results in no substantive changes.

• *NEMA ICS 2.4–2003 (R2102)—NEMA and IEC Devices for Motor Service—a Guide for Understanding the Differences, 2003.* This edition is referenced in § 111.70–3. This standard provides practical information concerning the differences between NEMA and IEC in ratings, construction, test, performance, and manufacture of industrial control equipment. NEMA reaffirmed the edition without change in 2012. By means of this rule, we include

the reaffirmed version of the standard, which results in no substantive changes.

• *NEMA 250–2018—Enclosures for Electrical Equipment (1000 Volts Maximum), 2018.* This standard covers classification of enclosures for electrical equipment as well as the requirements for these enclosures and tests to demonstrate conformance with the requirements. We currently reference the 1997 edition of this standard in §§ 110.15–1(b), 111.01–9, 113.10–7, 113.20–3, 113.25–11(a), 113.30–25(e), 113.37–10(b), 113.40–10(b), and 113.50–5(g). By means of this rule, we reference the more recent 2014 edition in these sections. The 2014 edition added several new enclosure types as well as several minor construction details.

• *NEMA Standards Publication No. WC–3–1992—Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy, Revision 1, Feb. 1994.* This is one of many options listed as a standard for allowable current-carrying capacity. By means of this rule, we delete this as an option under § 111.60–13(c) because NEMA has rescinded the standard.

• *ANSI/NEMA WC–70—Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy, Feb. 23, 2009.* This standard applies to materials, constructions, and testing of 2000 V and less thermoplastic, cross-linked polyethylene, and cross-linked rubber insulated wires and cables that are used for the transmission and distribution of electrical energy for normal conditions of installation and service, either indoors, outdoors, aerial, underground, or submarine. We currently reference the 1999 edition of this standard, NEMA WC–70, in § 111.60–13. By means of this rule, we reference the more recent 2009 edition with the updated naming convention. The 2009 standard contains updates based on advancements in technology, including new cable jacket types and updated testing methods.

• *NFPA 70—National Electrical Code, 2017 Edition.* This code contains standards for the installation and removal of electrical conductors, equipment, and raceways; signaling and communications conductors, equipment, and raceways; and optical fiber cables and raceways. It is referenced in many sections of subchapter J and is the basis for electrical regulations worldwide. Currently, both the 2002 and 2011 editions of the code are incorporated by reference in §§ 111.05–33, 111.20–15, 111.50–3, 111.50–7(a), 111.50–9, 111.53–1(a), 111.54–1(a), 111.55–1(a), 111.59–1, 111.60–7, 111.60–13, 111.60–23, 111.81–1(d), 111.105–1, 111.105–3, 111.105–7(a), 111.105–11, 111.105–17(b), 111.106–3(b), 111.106–5(c), 111.107–1(b) and 111.108–3(b)(1) and (2). By means of this rule, we replace these references with a reference to the more recent 2017 edition in all the aforementioned sections where the NFPA 70 code is referenced except for § 111.105–7, which we are merging into § 111.105–3. We also include § 110.15–1 in the list of sections referencing NFPA 70 because NFPA 70 is currently used in the definition of ''Special Division 1.'' Substantive changes to the NFPA 70 articles from the previous editions include the following:

○ Article 240—This article on overcurrent protection raised the threshold for high voltage overcurrent protection from 600 V to 1000 V. Additionally, it addresses arc energy reduction of fuses rated at 1200A or higher.

○ Article 250.119—Section 250.119 details the identification requirements for equipment grounding conductors. The 2017 and 2002 editions are similar, but the 2017 edition contains greater specificity for specific installations and prohibits other cables to be covered in manner that could confuse them with equipment grounding conductors.

○ Article 250.122—Section 250.122 details requirements for the size of equipment grounding conductors. The content in the two editions is similar, but the 2017 edition adds requirements for multi-conductor cable, consideration of instantaneous-trip circuit breakers or motor short-circuit protectors, and greater specificity for flexible cord and fixture wire.

○ Article 250—This article on grounding conductors has been updated based on changes in technology and has added requirements for conductors in raceways and multiconductor cable.

○ Article 314—This article on outlet or junction boxes has several minor updates based on changes in technology or industry practices.

○ Article 368—This article on busways was reformatted, and the threshold for high voltage busways was raised from 600 V to 1000 V. Additionally, it provides more detailed wiring requirements.

○ Article 400—This article on flexible cords and cable provides several additional types of flexible cords as well as conductor sizes, but the allowable ampacities for the existing types of flexible cords and cables have not changed. Additionally, it requires that the maximum operating temperature be added to the required markings.

○ Article 404—The applicability of this article on switches has been raised from 600 V systems to 1000 V systems, and several additional switch types have been added.

○ Article 430—This article on motors now raises the threshold for motors requiring additional protective measures from 600 V to 1000 V. Part X has been added to provide greater detail on adjustable-speed drive systems. Additionally, a variety of minor technical updates have been adopted, including adding references to the latest standards.

○ Article 450—This article on transformers raised the transformer threshold for high voltage transformers from 600 V to 1000 V. Additionally, minor editorial changes were made. For example, in several sections the word ''sufficient'' was replaced with ''not less than'' to ensure the intent was clear.

○ Article 504—Sections 504.10, 504.30, 504.50 and 504.60 on intrinsically safe system design will be added in § 111.105–11 because ISA RP 12.6 has been withdrawn by ISA. The requirements are similar, and NFPA is the authoritative standard for electrical engineering design.

• *NFPA 77—Recommended Practice on Static Electricity, 2019 Edition.* This recommended practice applies to the identification, assessment, and control of static electricity for purposes of preventing fires and explosions. We currently reference the 2000 edition of this standard in § 111.105–27(b). By means of this rule, we reference instead the more recent 2019 edition, which has been completely reorganized with only minor changes to the technical content. However, the 2019 edition contains changes regarding the characterization of low, medium, and high resistivity powders to reflect generally accepted international standards.

• *NFPA 99—Health Care Facilities Code, 2018.* This code provides information on health care facilities related to medical gas and vacuum systems, electrical systems, electrical equipment, and gas equipment. We currently reference the 2005 edition of this standard in § 111.105–37. By means of this rule, we instead reference the more recent 2018 edition. The 2018 standard contains extensive updates and is the authoritative reference for flammable anesthetics.

• *NFPA 496—Standard for Purged and Pressurized Enclosures for Electrical Equipment, 2017 Edition.* This standard applies to purging and pressurizing for electrical equipment in hazardous locations, electrical equipment containing sources of flammable vapors, control rooms or buildings in hazardous locations, and analyzer rooms containing sources of flammable vapors or gases and located

in hazardous locations. NFPA 496 has been an industry standard for purged and pressurized enclosures since 1971. We currently reference the 2003 edition of this standard in § 111.105–7, the 2008 edition is currently referenced in § 111.106–3(c), and the 2013 edition is currently referenced in § 111.108–3(d). By means of this rule, we update the references to the more recent 2017 edition in §§ 111.105–3 (formerly § 111.105–7), 111.106–3(c), and 111.108–3(d). This more recent edition of NFPA 496 was revised to ensure correlation with NFPA 70. The definitions of ''energized'' and ''identified'' are extracted from NFPA 70, clarify the requirements for equipment in hazardous areas, clarify the definitions of Type X, Type Y, and Type Z pressurization, and remove unspecific language such as ''near,'' ''close to,'' and ''significant portion.'' Such terms cannot be quantified in the design or evaluation of an installation designed to the standard.

• *Naval Sea Systems Command (NAVSEA) DDS 300–2—A.C. Fault Current Calculations, 1988.* By means of this rule, we will remove this standard from subchapter J because it is no longer supported or available. This is one of four options for fault calculations in § 111.52–5. We reorganize the requirements for short-circuit calculations for systems 1500 kW or above in § 111.52–5 into new § 111.51–4. The other three options that are currently in § 111.51–4 are still included in the new § 111.51–4.

• *MIL–HDBK–299(SH), 1991—Military Handbook Cable Comparison Handbook Data Pertaining to Electric Shipboard Cable Notice 1–1991.* This document provides basic information on, and listings of, shipboard cables and also provides guidance for their design, handling, installation, and maintenance. This current edition is referenced in § 111.60–3 regarding cable applications. By means of this rule, we delete this standard because we are also rescinding § 111.60–3, which we discuss in section VI.C of this preamble, because we have found that it is unnecessarily prescriptive.

• *UL 44—Standard for Safety Thermoset-Insulated Wire and Cable, 2018.* This standard specifies the requirements for single-conductor and multiple-conductor thermoset-insulated wires and cables rated 600 V, 1000 V, 2000 V, and 5000 V. We currently reference the fifteenth edition (1999) of this standard in § 111.60–11(c). By means of this rule, we reference the nineteenth edition (2018). The standard has been completely updated based on changes in technology and now addresses wires and cables up to 5000 V. Previously this standard did not cover wires or cables above 2000V. Additionally, the nineteenth edition (2018) addresses new wire types and maximum voltage ratings that were not included in the fifteenth edition (1999).

• *UL 50—Standard for Safety Enclosures for Electrical Equipment,* Non-Environmental Considerations, *2015.* This standard covers the non-environmental construction and performance requirements for enclosures to protect personnel against incidental contact with the enclosed equipment. We currently reference the eleventh edition (1995) of this standard in § 111.81–1(d). By means of this rule, we reference the more recent thirteenth edition (2015). The updated standard addresses the following items that were not included in the eleventh edition (1995):

○ Environmental Type ratings 3X, 3RX, and 3SX;

○ Sharp edges on electrical equipment;

○ Requirements for slot and tab fastenings;

○ Clarification of types of cast metal suitable for use as an enclosure;

○ Equipment door opening 90 degrees from the closed position;

○ Certification Requirement Decision for nonmetallic-sheathed cable clamps; and

○ Revision to requirement of cover and flange overlap for cabinets used as panelboards.

• *UL 62—Standard for Safety Flexible Cords and Cables, 2018.* This standard specifies the requirements for flexible cords, elevator cables, electric vehicle cables, and hoistway cables rated 600 V maximum. We currently reference the sixteenth edition (1997) of this standard in § 111.60–13(a). By means of this rule, we reference the more recent twentieth edition (2018). This standard has been updated based on advancements in technology to address new cable types, jacket types, and testing techniques. To ensure we address the latest technologies and industry practices, we incorporate the more recent edition of this standard.

• *UL 83—Standard for Safety Thermoplastic-Insulated Wires and Cables, 2017.* This standard specifies the requirements for 600 V, single-conductor, thermoplastic-insulated wires and cables. We currently reference the twelfth edition (1998) of this standard in § 111.60–11(c). By means of this rule, we reference the sixteenth edition (2017). The standard has been completely updated based on changes in technology. For example, it now addresses many new types of wire, wire sizes, and updated testing requirements.

• *UL 484—Standard for Safety Room Air Conditioners, 2014.* This standard provides requirements for room air conditioners rated not more than 600 V AC. We currently reference the seventh edition (1993) of this standard in § 111.87–3(a). By means of this rule, we reference the more recent, ninth edition (2014). The standard has been updated to account for current technology and environmental testing. In addition, sections dealing with smart air conditioners and air conditioners using flammable refrigerants have been added. To ensure we address the latest technologies and industry practices, we incorporate the more recent edition of this standard.

• *UL 489—Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures, 2016.* This standard provides requirements for molded-case circuit breakers, circuit breaker and ground-fault circuit-interrupters, fused circuit breakers, high-fault protectors, and high-fault modules. These circuit breakers are specifically intended to provide service entrance, feeder, and branch circuit protection. We currently reference the ninth edition (1996) of this standard in §§ 111.01–15(c) and 111.54–1(b). By means of this rule, we reference the thirteenth edition (2016). There have been numerous technical updates to the standard. The scope has been increased to address component testing, programmable components, electronic overprotection, and electromagnetic compatibility. To ensure we address the latest technologies and industry practices, we incorporate the more recent edition of this standard.

• *UL 514A—Standard for Safety Metallic Outlet Boxes, 2013.* This standard has been an industry standard for metallic outlet boxes since 1928 and provides requirements for metallic outlet boxes including those intended for marine applications. We currently reference the ninth edition (1996) of this standard in § 111.81–1(d). By means of this rule, we reference the more recent eleventh edition (2013). UL 514A has been revised and updated to account for advancements in outlet box construction.

• *UL 514B—Standard for Safety Conduit, Tubing, and Cable Fittings,* revised November 21, 2014. This standard provides requirements for fittings for use with cable and conduit. We currently reference the fourth edition (1997) of this standard in § 111.81–1(d). By means of this rule, we reference the more recent sixth edition (2014). UL 514B has been updated to

account for advancements in conduit, tubing, and cable fitting construction, as well as testing techniques. To ensure we address the latest technologies and industry practices, we incorporate the more recent edition of this standard.

- *UL 514C—Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers,* revised December 10, 2014. This standard provides requirements for nonmetallic outlet boxes, conduit bodies, flush-device boxes, extension rings, and covers. We currently reference the second edition (1988) of this standard in § 111.81–1(d). By means of this rule, we will reference the more recent fourth edition (2014). UL 514C has been updated to align with advancements in nonmetallic outlet boxes and requirements in similar standards. To ensure we address the latest technologies and industry practices, we incorporate the more recent edition of this standard.
- *UL 674—Standard for Safety: Electric Motors and Generators for Use in Hazardous (Classified) Locations, 2011.* This standard provides requirements for electric motors and generators or submersible and non-submersible sewage pumps and systems suitable for use in hazardous (classified) locations. We currently reference the fourth edition (2003) of this standard in § 111.106–3(b) and the fifth edition (2011) in § 111.108–3(b). By means of this rule, we reference the more recent fifth edition (2011) in § 111.106–3(b), and add a reference to this edition in § 111.105–3(b). This ensures consistent, up-to-date standards for electrical installations on all vessel and facility types.
- *UL 823—Electric Heaters for Use in Hazardous (Classified) Locations,* revised November 15, 2007. This standard provides requirements for electric heaters suitable for use in hazardous (classified) locations. We currently reference the ninth edition (2007) of this standard in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we reference the ninth edition (2007) in § 111.105–3(b) as well. This ensures that standards are consistent for electrical installations on all vessel and facility types.
- *UL 844—Standard for Safety: Luminaires for Use in Hazardous (Classified) Locations, 2012.* This standard provides requirements for fixed and portable luminaires for installation and use in hazardous (classified) locations. We currently reference the twelfth edition (2006) of this standard in § 111.106–3(b) and the thirteenth edition (2012) in § 111.108–3(b). By means of this rule, we reference the more recent thirteenth edition (2012) in § 111.106–3(b), and add a reference to this edition in § 111.105–3(b). This latest edition includes the following minor technical revisions:
  - Revisions for test paint for spray booth luminaires;
  - Revisions for temperature tests at elevated ambient temperatures; and
  - Clarification of required number of as-received samples of polymeric enclosure materials.
- *UL 913—Standard for Safety: Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations, Eighth Edition, 2013.* This standard provides requirements for apparatus or parts of apparatus intended for installation in hazardous locations. We currently reference the sixth edition (2002) of this standard in § 111.105–7(a) and the seventh edition (2006) in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we remove references to these earlier editions and reference the more recent eighth edition (2013) in §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). This latest edition includes the following technical revisions:
  - Revisions to reference the latest 2013 editions of UL 60079–0 and UL 60079–11;
  - Deletion of redundant references to applicable ordinary locations requirements;
  - Revisions to address the equivalent installation and use of Class I, Division 1 and Class II intrinsically safe and associated apparatus in Zone 20 hazardous (classified) locations respectively; and
  - Revisions to dust-tight enclosures for Class II Intrinsically Safe Apparatus.
- *UL 1042—Standard for Safety Electric Baseboard Heating Equipment,* revised September 9, 2014. This standard provides requirements for portable and fixed electric baseboard heating equipment rated at 600 V or less. We currently reference the third edition (1994) of this standard in § 111.87–3. By means of this rule, we reference the more recent fifth edition (2014). This latest edition includes the following technical revisions:
  - Revisions requiring portable heater power supply cords to meet UL 817;
  - Revisions requiring electric connections to meet established UL standards, UL 310, UL 486A–486B, UL 886C, UL 486E, or UL 1977;
  - Revisions to equipment grounding provisions; and
  - Update to the leakage current test.
- *UL 1072—Standard for Safety Medium-Voltage Power Cables,* revised June 19, 2013. This standard provides requirements for shielded and non-shielded medium-voltage power cables. We currently reference the third edition (2001) of this standard in § 111.60–1(a). By means of this rule, we reference the more recent fourth edition (2013). The fourth edition contains revised supplemental jacket thicknesses. Because supplemental jackets are only required for cables intended to be buried in the ground, this revision has no substantive impact on UL 1072 cables intended for use on vessels.
- *UL 1104—Standard for Safety for Marine Navigation Lights, Second Edition, 1998.* This standard provides construction and testing requirements for navigation lights. This standard is referenced in § 111.75–17(d). By means of this rule, we will align the naming convention in the regulatory text with that of other UL standards and specifically cite paragraph (d) in § 110–10–1(q).
- *UL 1203—Standard for Safety: Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations,* revised April 24, 2015. This standard covers explosion-proof and dust-ignition-proof electrical equipment for installation and use in hazardous locations. We currently reference the third edition (2000) of this standard in § 111.105–9 and the fourth edition (2006) in §§ 111.106–3(b) and 111.108–3(b). By means of this rule, we reference the more recent fifth edition (2015) in § 111.105–3(b) instead of § 111.105–9 due to editorial reformatting of subpart 111.105, as well as §§ 111.106–3(b) and 111.108–3(b). The more recent edition has relatively minor technical clarifications with minimal substantive changes.
- *UL 1309—Standard for Safety Marine Shipboard Cables, 2017.* This standard provides requirements for distribution (power), control, and signal cables for installation aboard marine vessels, fixed and floating offshore petroleum facilities, and MODUs. We currently reference the first edition (1995) of this standard in §§ 111.60–1, 111.60–3, and 111.106–5(a). By means of this rule, we reference the more recent third edition (2017) only in §§ 111.60–1 and 111.106–5(a) because we delete § 111.60–3. The standard has received updates to its construction, performance, ratings, and markings requirements.
- *UL 1581—Standard for Safety Reference Standard for Electrical Wires, Cables, and Flexible Cords, 2001.* By means of this rule, we delete references to this standard in §§ 111.30–19, 111.60–2, and 111.60–6 because the referenced test in this standard, VW–1,

has been moved to UL 2556, which is added to these sections as discussed below.

• *UL 1598—Standard for Safety Luminaires, 2018.* This standard provides requirements for luminaires for use in nonhazardous locations that are intended for installation on branch circuits of 600 V nominal or less. We currently reference the first edition (2000) of this standard in § 111.75–20. By means of this rule, we reference the more recent fourth edition (2018), which has been extensively updated based on changes in technology and construction techniques. This edition includes added requirements for placement and construction of LED luminaires as well as LED test methods. The standard also includes LED components and subassemblies, and other LED requirements.

• *UL 1598A—Standard for Safety Supplemental Requirements for Luminaires for Installation on Marine Vessels, First Edition (with revisions through Apr. 17, 2015), Dec. 4, 2000.* UL 1598, the First Edition, December 4, 2000, is currently incorporated by reference in § 111.75–20. By means of this rule, we incorporate UL 1598A, the First Edition with revisions through April 17, 2015 in that section. UL 1598A provides additional requirements for luminaires meeting UL 1598 and intended for vessels to ensure these luminaires are suitable for marine and shipboard environments. The revisions to the First Edition include non-substantive updates necessary due to changes in clauses of standards referenced within UL 1598A that occurred since publication of the First Edition.

• *UL 1604—Electrical Equipment for use in Class I and II, Division 2 and Class III Hazardous (Classified) Locations, 1994.* This was one of many options in § 111.108–3(b) for standards on electrical equipment in hazardous locations. By means of this rule, we delete this standard from § 111.108–3(b) because UL withdrew this standard and it is no longer active.

• *UL 2021—Standard for Safety Fixed and Location-Dedicated Electric Room Heaters, 2015.* By means of this rule, we reference this standard in § 111.87–3(a) for the first time. This standard provides requirements for electric air heaters. It will be an additional standard regulated entities may choose for electric air heaters. The Coast Guard has previously accepted it on a case-by-case basis as equivalent to the existing standards in § 111.87–3(a).

• *UL 2225—Standard for Safety: Cables and Cable-Fittings for use in Hazardous (Classified) Locations, 2013.* This standard contains construction and testing requirements for cables and cable-fittings for use in hazardous locations. We currently reference the second edition (2005) of this standard in § 111.106–3(b) and the third edition (2011) of this standard in § 111.108–3(b). By means of this rule, we reference the more recent fourth edition (2013) in §§ 111.105–3(b), 111.106–3(b), and 111.108–3(b). The latest edition includes the addition of Type TC–ER–HL cable for use in Class I, Zone 1 as permitted by the 2014 National Electrical Code to the scope, editorial revisions, and error corrections. The incorporation of this edition into all three sections ensures consistent, up-to-date standards for electrical installations on all vessel and facility types.

• *UL 2556—Wire and Cable Test Methods, 2015.* This standard describes the apparatus, test methods, and formulas to be used in carrying out the tests and calculations required by wire and cable standards. The flame retardant test VW–1, formerly of UL 1581, has been moved to this standard and is now called FV–2/VW–1. By means of this rule, we will replace UL 1581 with UL 2556 in §§ 111.30–19(b), 111.60–2, and 111.60–6.

• *UL 60079–18—Standard for Safety Explosive Atmospheres—Part 18: Equipment Protection by Encapsulation ''m'', Fourth Edition,* revised February 20, 2017. By means of this rule, we adopt this standard as a replacement for ANSI/ISA 60079–18, which was withdrawn by ISA. UL 60079–18 is not substantively different than ANSI/ISA 60079–18. This standard gives the specific requirements for the construction, testing and marking of electrical equipment, parts of electrical equipment and Ex components with the type of protection encapsulation ''m'' intended for use in explosive gas atmospheres or explosive dust atmospheres. We reference this standard in §§ 111.105(e), 111.106–3(d), and 111.108–3(e).

B. Generator Prime Movers

By means of this rule, we will delete the requirements in §§ 111.12–1(b) and (c) for each generator prime mover to have an independent overspeed device and to automatically shut down upon a loss of lubricating oil pressure to the generator bearing. The Coast Guard has required generator prime movers to meet ABS rules since 1965. We incorporate the ABS Steel Vessel Rules for generator prime movers without modification to reduce reliance on government-unique standards where an existing voluntary standard will suffice, as advocated in OMB Circular A–119. The ABS Steel Vessel Rules, which are already incorporated by reference in § 58.01–5,[6] require these same safeguards on all but small generator prime movers. The independent overspeed device is required for each engine driving a generator of 220 kW (295 horsepower (hp)) and above, while the oil pressure shutdown is required for generators of 100 kW (135 hp) and above. Because vessels will have to comply with the ABS Steel Vessel Rules, there is no need to duplicate these requirements in § 111.12–1, and we find that the requirements in the incorporation by reference sufficiently address the concerns that § 111.12–1(b) and (c) were intended to address.

C. Electrical Cable

This rule updates and amends subpart 111.60 (Wiring Materials and Methods) to align it more closely with the standards accepted internationally by vessel classification societies and foreign administrations.

This rule adds additional acceptable cable construction standards to § 111.60–1. In addition, due to the availability of widely accepted additional standards, this rule removes many of the more prescriptive cable requirements in §§ 111.60–3 and 111.60–4.

We also are rescinding § 111.60–3, which sets out the cable application regulations, because we find that those regulations are unnecessarily prescriptive. Instead, entities will consult the cable construction standards in § 111.60–1, as revised by this rule, for the application of specific types of cable.

In § 111.60–5(a), the Coast Guard currently requires that cable installations meet the recommended practices contained in IEEE 45–2002, and we excluded the section concerning cable splices. Now we will update the edition to IEEE 45.8–2016 and remove the exclusion for the section on cable splices because it is inconsistent with other regulations to exclude them. Both the existing and revised regulations regarding cable splices in § 111.60–19 refer to IEEE 45's recommendations for cable splices.

[6] We note that § 58.01 currently incorporates by reference the 2003 edition of the ABS Steel Vessel Rules. On October 18, 2021 we proposed in Updates to Marine Engineering Standards, 86 FR 57896 (Oct. 19, 2021) (proposed rule) to update the reference in § 58.01 to the 2020 edition of the ABS Marine Vessel Rules.. This is the same edition incorporated by reference in § 110.10–1(a). If we amend § 58.01 through a final rule on this same topic, any changes made would not conflict with the intent of § 111.12–1. Generator prime movers will have to meet the ABS Marine Vessel Rules incorporated by reference in § 58.01.

Additionally, in Table 111.60–7—Demand Loads, we make minor edits so that ''bus-tie'' and ''feeder'' are plural where they appear in the table. As previously mentioned in the IBR updates to § 110.10–1, we will also update the NFPA NEC 2002 standard to its newer edition, NFPA 70, where it appears in the table.

In the NPRM, we proposed to update the existing IEEE 45 reference in § 111.60–11(c) to section 5.7 of the 2016 version. A commenter correctly noted this section does not address wire, so we removed section 5.7 of IEEE 45.8 from the list of standards. The final rule leaves the following updated standards to choose from: NPFC MIL–W–76D, ANSI/UL 44, ANSI/UL 83, or an equivalent standard.

D. IEC 60092–502 Electrical Installations in Ships—Part 502: Tankers—Special Features

This rule amends our regulations for hazardous locations contained in Subpart 111.105 to allow the Coast Guard to accept IEC 60092–502:1999 as an option for classification of hazardous locations (areas) in the new § 111.105–50. New section 111.105–50(a) contains an alternative standard for the classification of hazardous locations requirements in §§ 111.105–29, 111.105–31, 111.105–32, 111.106–9 and 111.106–11 of this subchapter. This section provides instructions for how to use the IEC 60092–502:1999 option for the classification of hazardous locations as well as specific requirements for ventilation systems if system designers use IEC 60092–502:1999. This IEC standard is referenced in *SOLAS II–1/45.11, the International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk section 10.1.1, the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk section 10.1.2.1,* and all major classification societies' rules. Allowing this option will provide system designers with the flexibility to classify and specify equipment for hazardous locations using the same scheme used internationally.

IEC 60092–502:1999 is currently accepted for use by vessels in the Coast Guard's ACP when supplemented with ''USCG Supplemental Requirements for use of IEC 60092–502:1999 for application of SOLAS regulation II–1/45.11 to U.S.-flag vessels.'' [7] The Coast Guard developed these supplemental requirements to ensure an equivalent level of safety as the requirements of subpart 111.105. Through this rule, the Coast Guard will accept IEC 60092–502:1999 without the supplement. This edition of the standard has been published for over 15 years, and we are not aware of any casualty history attributed to its use as compared to vessels complying with the applicable U.S. regulations. For these reasons, we will accept it as an option for U.S. vessels.

In § 111.105–50(c), we specify that if IEC 60092–502:1999 is used for hazardous locations classifications, then the applicable ventilation requirements for cargo handling rooms on tank vessels in subchapter D apply. This is not a new requirement, but it is placed here to ensure system designers do not assume that compliance with the ventilation standards in IEC 60092–502:1999 is sufficient. As noted in the discussion of the comment section, this final rule also clarifies that the mechanical ventilation must be capable of at least 30 air changes per hour, based upon the gross volume of the space, for cargo handling or pump rooms and other spaces where hazardous location classification is dependent upon ventilation.

In the final rule, we also break down paragraph (c) into multiple subparagraphs to help with readability. This change is an editorial amendment that does not result in any substantive changes from what we proposed in the NPRM.

E. Emergency Generator in Port

This rule amends our regulations for a vessel's emergency power sources contained in subpart 112.05 to allow the emergency generator to be used in port in the new § 112.05–7. The current regulations in § 112.05–1 require that the emergency source of power must be dependable, independent, and dedicated. The purpose of these requirements in § 112.05–1 is that emergency power must be immediately and dependably available in the event of a loss of the ship's service power. For decades this has been achieved by installation of a dedicated and independent emergency generator.

In the late 1990s, IACS proposed a unified interpretation to the IMO in light of improvements in automation and potential environmental benefits. That proposal incorporated a set of additional safety standards in order to allow the use of an emergency generator during lay time in port. This interpretation, with the supplemental safety standards, would encourage the use of a more appropriately sized generator for lay time loads instead of an overly large ship service generator while simultaneously assuring the availability of emergency power. The IMO subsequently adopted this proposal in 2005, promulgated it in IMO circular MSC/Circ.1176 (dated May 25, 2005), and updated it in IMO circular MSC.1/Circ. 1464/Rev.1 (dated October 24, 2013). Since then, most classification societies and flag states have harmonized their rules to align with this interpretation.

Similar to the IMO, by means of this rule we will allow use of emergency power systems that incorporate a generator with the additional safeguards similar to those prescribed by the IMO. The additional safeguards provide an equivalent level of safety as the existing requirements in part 112 as well as other potential operational benefits. With respect to providing a dependable source of emergency power, operation of the emergency generator in port does not decrease the dependability of the emergency power system. On the contrary, regular operation of the generator with the associated planned maintenance scheme required by MSC.1/Circ.1464/Rev.1 will result in increased dependability and crew familiarity and an improved readiness of the system should an emergency situation occur. Further, the additional requirements related to load shedding, fuel and lubrication oil systems, generator and switchboard construction, power management, and operational instructions will ensure the dedicated and independent operation of this system in an emergent situation and solely provide service to the emergency power system. Overall, this system will deliver additional flexibility to the crew while ensuring the availability of a dedicated source of power in the event of an emergency. The arrangements will result in improved performance, better fuel economy, lower emissions, and higher reliability than less integrated systems.

For these reasons, this rule will allow the emergency generator to be used in port provided that supplemental safety standards are in place. The supplemental safety standards incorporated in § 112.05–7 are similar to those prescribed in MSC.1/Circ.1464/Rev.1 as well as section 4–8–2/5.17 of the ABS Marine Vessel Rules.

[7] See Commercial Vessel Inspection Alternatives and Delegated Functions, available at *https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Commercial-Regulations-standards-CG-5PS/Office-of-Standards-Evaluation-and-Development/US-Coast-Guard-Regulatory-Development-Program-RDP-/Alternate-Compliance-Program/.*

F. Description of Additional Changes Within Subchapter J[8]

§ 110.15–1 Definitions

This rule adopts a more descriptive definition of ''deadship'' that aligns with 4–1–1/1.9.6 of the ABS Marine Vessel Rules and IEC 60092–201:2019.

The definition of a ship's service loads and drilling loads are moved from § 111.10–1(a) to § 110.15–1 so that all definitions for subpart J are in one location.

§ 110.25–1 Plans and Information Required for New Construction

We have consolidated the hazardous locations plan submittal requirements of the existing § 110.25–1(i), (p), and (q) into a single section, § 110.25–1(i). The ''Offshore Supply Vessels of at Least 6,000 GT ITC'' interim rule (79 FR 48893, Aug. 18, 2014) and the ''Electrical Equipment in Hazardous Locations'' final rule (80 FR 16980, Mar. 31, 2015) included plan submittal requirements, §§ 110.25–1(p) and (q), respectively. As explained in Section V, we will offer all types of vessels and facilities the same selection of explosion protection standards. Therefore, the plan submittal requirements are identical, and three separate sections are no longer required.

This rule makes one addition to the list of required items to be on the plan submission under existing § 110.25–1(i). The plan must clearly indicate the method of classification, Division or Zone, of the hazardous location. This information is important to ensure appropriate selection of equipment for the hazardous location.

§ 111.05–3 Design, Construction, and Installation; General

In § 111.05–3(c), we clarify the grounding requirements for appliances and tools so that the requirements are consistent with current industry practice.

§ 111.10–9 Ship's Service Supply Transformers; Two Required

This rule revises the note to § 111.10–9 to clarify that transformers located downstream of the ship's service switchboard are not required to be provided in duplicate. This item is regularly misunderstood. This revision is consistent with the explanation on page 16 of NVIC 2–89, ''Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units,'' dated August 14, 1989.[9]

§ 111.12–11 Generator Protection

In this section and many other sections, we replace the term ''semiconductor rectifier (SCR)'' with ''semiconductor converter,'' which is a term now more commonly used in industry.

§ 111.12–13 Propulsion Generator Protection

We are deleting this section on propulsion generator protection because it is simply a reference to § 111.35–1. This cross-reference is not necessary.

§ 111.15–10 Ventilation

In § 111.15–10(b)(2)(i), we add the IEC equivalent classification of Class I, Division 1, Group B as an alternate standard.

§ 111.25–5 Marking

Under § 111.25–1, motors are required to meet the requirements for generators in § 111.12–5. That section in turn incorporates by reference section 4–8–3 of the ABS Marine Vessel Rules, which means that motors must meet that standard. Because the ABS Marine Vessel Rules sufficiently address requirements for motor marking, we are deleting this section on motor markings as unnecessary.

§ 111.30 Switchboards

The requirements for switchboards contained in IEEE 45 2002 are replaced with requirements from the recently published IEEE 45.7 (2012), excluding section 6.3.3 related to steering gear circuit overcurrent protection. We did not intend the NPRM to propose a change the existing requirements for steering gear circuit overcurrent protection. For this reason, in § 111.30–5(a)(1) of this final rule, we are incorporating section 6 of IEEE 45.7–2012, excluding section 6.3.3 as discussed above in response to comments received on the NPRM.

In the NPRM, we had proposed a new paragraph (c) that warned readers that the interchangeability and compatibility of components complying with both IEEE and IEC cannot be assumed. That effort was to address the growing use of components meeting IEC standards on U.S. vessels. As noted in the discussion of the comments related to § 111.30–5, we have opted to remove paragraph (c) from the final rule because complying with and enforcing this relatively vague requirement would be difficult. Switchboards should be constructed in accordance with the standards incorporated by reference in subpart 111.30.

The flame retardant test standard IEC 332–1 has been superseded by IEC 60332–1–1:2015 and IEC 60332–1–2:2015. We are updating the standards for the flame retardant test in § 111.30–19(b)(4) regarding buses and wiring accordingly.

This rule replaces the term ''pilot light'' with the more commonly used term ''indicator light.''

Subpart 111.33 Power Semiconductor Rectifier Systems

We are replacing the requirements for semiconductor converters contained in IEEE 45 2002 with requirements from the recently published IEEE 45.2 (2012).

§ 111.50–3 Protection of Conductors

In § 111.50–3(b)(2), we revise the requirement for steering gear circuits from subchapter F to a more specific cite of § 58.25. We also remove the reference to IEC 92–202 from § 111.50–3(c). This standard does not address standard ratings for fuses or circuit breakers.

Subpart 111.51 Calculation of Short-Circuit Currents and Subpart 111.52 Coordination of Overcurrent Protective Devices

This rule combines subparts 111.51 and 111.52 into new subpart 111.51 to more clearly and concisely present the requirements for coordination of overcurrent protection devices and calculation of short-circuit currents. The general discussion contained in current § 111.51–1 is based on IEC 60092–202:2016.

The short-circuit calculations requirements of new § 111.51–2(a) are from the existing § 111.52–1. The new § 111.51–2(b) clarifies that the calculations must be performed to select suitably rated equipment and protective devices. The short-circuit calculations requirements of the new §§ 111.51–3 and 111.51–5 are from the existing §§ 111.52–3 and 111.52–5, respectively.

We are deleting NAVSEA DDS 300–2 from the existing § 111.52–5(b) because it is no longer available. Instead, we add IEC 61660–1:1997 as a standard for DC systems.

The requirements for the protection of vital equipment, § 111.51–6, are from the existing § 111.51–3.

[8] In addition to the changes specifically discussed in this preamble, we note that we have made additional non-substantive edits for clarity following the NPRM. For example, we removed the word ''both'' in § 111.87–3 because, following the addition of a new standard as discussed elsewhere in this rule, ''both'' was no longer an accurate description.

[9] NVIC 2–89, ''Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units,'' is available at *https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/NVIC/1989/n2-89.pdf.*

§ 111.54–1 Circuit Breakers

In § 111.54–1(c)(2), the maximum voltage for direct-current circuit breakers meeting IEC 60947–2:2013 will be identified as 1500 V. This is in accordance with that standard.

§ 111.75–17 Navigation Lights

In § 111.75–17(a), this rule removes the requirement that a feeder directly from the emergency switchboard supply the navigation light indicator panel. The emergency switchboard must still supply the panel, but this change allows for the common practice of supplying the navigation lights from an emergency lighting panel rather being directly fed from the switchboard. This is consistent with industry practice and vessel classification society rules. As part of this change we also delete § 112.43–13, which provided details on the navigation light panel feeder.

In § 111.75–17(d)(2), we will offer EN 14744 as an alternative for certification of navigation lights. UL 1104, which is currently the only certification specifically referenced in § 111.75–17(d)(2), is the other acceptable standard, but it has not been updated in over 20 years and addresses neither LED light sources nor EMC testing. EN 14744 addresses LED lights and EMC testing and has been published for 15 years. The other construction and testing requirements of EN 14744 are not identical to UL 1104, but it is accepted worldwide. We are unaware of any safety concerns related to it. For these reasons, we feel it is an acceptable option for certification of navigation lights. The Coast Guard currently accepts navigation lights constructed and tested to the requirements of EN 14744 on a case-by-case basis subject to the additional requirements of the MSC's Marine Technical Note 01–18, Guidance for Establishing Equivalency to UL 1104 Navigation Lights.[10] Following the publication of this final rule, we will accept EN 14744 without these additional requirements.

Additionally in § 111.75–17(d)(2), this rule clarifies the requirements for battery powered navigation lights. The existing text has been misinterpreted on occasion. Like all navigation lights, these lights must be certified by an independent laboratory to the applicable requirements of UL 1104, EN 14744, or an equivalent standard. This ensures they meet the applicable requirements of the 1972 COLREGS and the Inland Navigation Rules (33 CFR 83).

[10] See *https://www.dco.uscg.mil/Portals/9/MSC/MTN/MTN.01-18.07.16.18.LEDand EUNavigationLights.pdf.*

This rule deletes the requirement for a flashing light in the existing § 111.75–17(d)(4) because this requirement is contained in section 22.11 of UL 1104 and section 4.4 of EN 14744.

§ 111.75–18 Signaling Lights

This rule deletes the outdated, prescriptive requirements on signaling lights in this section that were based on the applicable international requirements in 1996 and incorporates by reference ISO 25861. This standard provides performance requirements for daylight signaling lamps pursuant to chapter V of SOLAS, 1974, as amended, and chapter 8 of the International Code for Safety for High-Speed Craft. Further, since 2002, navigation equipment required by chapter V of SOLAS, including signaling lamps (or lights), have been required to be type approved by the administration.

§ 111.75–20 Luminaires (Lighting Fixtures)

Throughout this section, we replace the term ''lighting fixture'' with the internationally used term ''luminaire,'' and we remove the prescriptive requirements contained in this section. Lighting fixtures meeting the standards incorporated by reference in this section, ANSI/UL 1598A or IEC 60092–306:2009, are suitable for use on vessels. Further, this rule specifies the clauses of ANSI/UL 1598A applicable to nonemergency and inside-type decorative luminaires.

§ 111.83–7 High Voltage Shore Connection

This section contains a standard for HVSCs, IEC/IEEE 80005–1:2019, applicable to ships that connect to shore power. The Coast Guard has actively participated with state and local stakeholders, shoreside and marine industry representatives, and equipment manufacturers to develop a standard to safely connect to HVSCs. This standard is offered as an option for compliance with state or local law, or when a vessel voluntarily connects to an HVSC.

§ 111.99–3 Definitions

We remove this section of definitions because the definitions are no longer necessary. Fire door holding and release systems are discussed in greater detail in SOLAS II–2/9. Many years ago there were detailed fire door system requirements in § 111.99. Now § 111.99–5 requires fire door holding and release systems, if fitted, to meet SOLAS II–2/9.4.1.1.5.3. Previously, § 111.99–5 required these systems to meet SOLAS II–2/30.4.3, but we have updated this reference to SOLAS II–2/9.4.1.1.5.3 based on the reorganization of SOLAS Chapter II–2.

Subpart 111.103 Remote Stopping Systems

The order of the subsections in 46 CFR subpart 111.103 has caused confusion and led readers to incorrectly infer that machinery space ventilation is a separate category from the ventilation referred to by 46 CFR 111.103–7. We are making editorial changes to this section to clarify its intent.

Subpart 111.105 Hazardous Locations

The Coast Guard completed two recent rulemaking projects related to hazardous locations, the ''Offshore Supply Vessels of at Least 6,000 GT ITC'' interim rule (79 FR 48893, Aug. 18, 2014) and the ''Electrical Equipment in Hazardous Locations'' final rule (80 FR 16980, Mar. 31, 2015). We are revising subpart 111.105 (Hazardous Locations) to be consistent with existing regulations. This final rule expands the list of acceptable national and international explosion protection standards, providing more options for operators. Additionally, in this final rule, we combine important provisions from §§ 111.105–3, 111.105–5, and 111.105–7 into one revised section, § 111.105–3, titled ''Approved Equipment.'' In the NPRM, we proposed to only combine §§ 111.105–3 and 111.105–5 into § 111.105–3, but this created confusion among commenters. We decided to also add § 111.105–7 into § 111.105–3 to consolidate all the approved equipment regulations. The reason for this change is discussed previously in response to comments related to § 111.105–3.

We add the internationally accepted independent third-party certification system, the International Electrotechnical Commission System for Certification to Standards relating to Equipment for use in Explosive Atmospheres (IECEx), as an accepted method of testing and certifying electrical equipment intended for use in hazardous locations. Existing § 111.108–1(b) allows owners and operators of existing U.S. MODUs, floating OCS facilities, vessels other than OSVs, and U.S. tank vessels that carry flammable or combustible cargoes, the option of using the same expanded list of standards and the IECEx System. In amending subpart 111.105, we incorporate these standards so that they are available to all vessels and facilities that must comply with subchapter J.

In § 111.105–11, we reduced the number of requirements listed here for intrinsically safe systems because the standards for these systems are now

contained in § 111.105–3. Additionally, we are replacing ISA RP 12.6–1995 in the existing § 111.105–11(d) with the standard that supersedes it, ANSI/ISA 12.06.01–2003. This standard is now located in § 111.105–11(b).

In § 111.105–7(a)(1)(i), we add ANSI/ISA 12.12.01 as a new standard for equipment in hazardous locations. See section VI.A for further explanation of this standard. In the NPRM, we also proposed incorporating UL 783 and ANSI/UL 2062 into this section. In the final rule, we have decided not to incorporate these standards by reference because they would have added electrical equipment requirements that were not already required for regulated vessels prior to this rulemaking. We would like to evaluate these standards and their effect on the industry more before considering them for incorporation by reference.

In § 111.105–17(b), we add IEC 61892–7:2019, IEC 60092–502:1999, API RP 14, and API RP 14FZ as additional acceptable standards for the use of conduit. See section VI.A for further explanation of each standard.

In the new § 111.105–28, we add ASTM F2876–10 to address internal combustion engines in hazardous locations. Under the new section, internal combustion engines installed in Class I Divisions 1 and 2 must meet the provisions of ASTM F2876–10. Like the expanded list of standards for electrical equipment in hazardous locations, this standard in subparts 111.106 and 111.108 is the result of previous rulemaking projects and will be added to § 111.105–28. This will ensure a consistent standard for these installations on all vessel and facility types.

In § 111.105–31(e), we are providing the option for submerged cargo pumps that do not meet § 111.105–31(d) to receive concept approval by the Commandant (CG–ENG) and plan approval by the Commanding Officer, MSC. This is consistent with existing §§ 111.106–3(f) and 111.108–3(f).

In § 111.105–31(f), we delete references to IEEE 45 1998 and IEC 60092–502:1999 because they do not provide any additional information on classification of cargo tanks beyond what is currently in subchapter J.

In § 111.105–31(o), we clarify the requirements for systems installed in duct keels.

In §§ 111.105–35 and 111.105–45, we update the IEC classification notation in accordance with IEC 60079–10–2:2015.

In § 111.105–41, we remove the reference to IEEE 45 1998 because the standard has been superseded.

Subpart 111.106 Hazardous Locations on OSVs

In § 111.106–3(b)(1)(i), we incorporate ANSI/ISA 12.12.01 as a new standard for equipment in hazardous locations. See section VI.A for further explanation of this standard. In the NPRM, we also proposed incorporating UL 783 and ANSI/UL 2062 by reference, but we have decided not to incorporate these standards because they would add electrical equipment requirements that were not already required for regulated vessels prior to this rulemaking. We would like to evaluate these standards and their effect on the industry more before considering them for incorporation by reference.

§ 111.107–1 Industrial Systems

In § 111.107–1(b), we clarified the standards for switchgear. Currently § 111.107–1(b)(1) refers to an unnecessarily broad range of standards. We simplify this section by cross-referencing the specific sections of the existing regulations in subpart 111.30 that apply to switchgears.

Subpart 111.108 Hazardous Locations Requirements on U.S. and Foreign MODUs, Floating OCS Facilities, Vessels Conducting OCS Activities, and U.S. Vessels That Carry Flammable and Combustible Cargo

We remove paragraph (b) from § 111.108–1, which was a cross-reference to the expanded list of standards and the IECEx System in subpart 111.105; the paragraph is directed to owners and operators of existing U.S. MODUs, floating OCS facilities, vessels other than OSVs, and U.S. tank vessels that carry flammable or combustible cargoes. This cross-reference to subpart 111.105 is no longer necessary because we include the same standards and systems in § 111.108–3 (General requirements).

In § 111.108–3(b)(1)(i), we add ANSI/ISA 12.12.01 as a new standard for equipment in hazardous locations. See section VI.A for further explanation of this standard. In the NPRM, we also proposed incorporating UL 783 and ANSI/UL 2062 by reference, but we have decided not to incorporate these standards because they would add electrical equipment requirements that were not already required for regulated vessels prior to this rulemaking. We would like to evaluate these standards and their effect on the industry more before considering them for incorporation by reference.

§ 112.01–20 Final Emergency Power Source

We clarify the description of the final emergency power source in this section. For the convenience of the reader, we also cross-reference § 112.15–5, which specifies the existing regulations for final emergency power sources.

§ 112.05–5 Emergency Power Source

In § 112.05–5(a), we clarify that the emergency power source must be sized using a unity (1.0) service factor on all loads as required by Table 112.05–5(a). This section currently states that the emergency power source must simultaneously supply these loads. When sizing the emergency power source to meet this requirement the loads in Table 112.05–5(a) must have a service factor of unity, 1.0 or 100 percent. This is also referred to as a load factor. This is not a change to the existing requirement but only a clarification of the requirement that the emergency power source must be appropriately sized to accomplish this task.

§ 112.15–1 Temporary Emergency Loads

In § 112.15–1(s), we add the engineer's assistance-needed alarm to the list of loads that must be powered by the temporary emergency power source. This is consistent with the requirement in § 113.27–1(c) that states it must be powered from the same source as the general alarm.

§ 112.43–13 Navigation Light Indicator Panel Supply

We delete the requirement that the emergency light indicator panel be supplied directly from the emergency switchboard in this section. We made this change because § 111.75–1(a) will no longer require that a feeder from the emergency generator directly supply the navigation light indicator panel supply and instead allow it to be supplied by an electrical panel, such as an emergency lighting panel, which is supplied by the emergency switchboard.

§ 112.50–1 General

In § 112.50–1(g), we delete the requirement that emergency generators automatically shut down upon loss of lubricating oil pressure. This section will continue to require that generators be set to shut down automatically upon overspeed or operation of a fixed fire extinguishing system in the emergency generator. Removing the requirement for emergency generators to automatically shut down in case of loss of lubricating oil pressure is consistent with classification society rules and allows

the crew to decide in an emergency situation if the emergency generator should be shut down. We also reformat § 112.50–1(g) to clarify the remaining regulations for emergency generator set shut downs.

In addition, we revise the format of paragraph (h) to clarify that the alarms are required for all of the listed conditions in each section, not just one of the two conditions listed in each section. This is a non-substantive formatting edit that does not affect the existing alarm regulations for emergency generators in § 112.50–1(h).

VI. Incorporation by Reference

Material that this rule incorporates by reference appears in § 110.10–1, and is summarized and discussed in section V.A of this preamble. Copies of the material are available either at the publisher's web address included in the regulatory text of § 110.10–1 or by contacting the publisher listed in the standard listed in § 110.10–1. We also reviewed and updated all the publisher's web addresses listed in § 110.10–1 to ensure they are current. The following list of publishers offer some of the more recent standards we propose to incorporate at no cost to the public: ABS, FM Approvals, IMO, Lloyd's Register, NFPA, DDS/Military Handbook, and UL. Based on the volume of equivalency requests the Coast Guard receives asking us to confirm that the latest edition is equivalent to or better than the edition currently incorporated, we believe industry already has access to and uses these more recent standards. The affected industry typically obtains the more recent editions of standards in the course of their business, in order to address advancements in technology.

You may also contact the person in the **FOR FURTHER INFORMATION CONTACT** section for additional direction on how to obtain access to electronic copies of the materials. The Director of the Federal Register approved the material in § 110.10–1 for incorporation by reference under 5 U.S.C. 552 and 1 CFR part 51.

VII. Regulatory Analyses

We developed this rule after considering numerous statutes and Executive orders related to rulemaking. Below we summarize our analyses based on these statutes or Executive orders.

A. Regulatory Planning and Review

Executive Orders 12866 (Regulatory Planning and Review) and 13563 (Improving Regulation and Regulatory Review) direct agencies to assess the costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility.

Details on the estimated cost savings of this rule can be found in the rule's RA that follows. This rule has not been designated by OMB a significant regulatory action under section 3(f) of Executive Order 12866. Accordingly, OMB has not reviewed it.

The Coast Guard received two public comments regarding the affected population in the RA for the proposed rule. We discuss our responses to these comments in section IV of the preamble of this final rule. We incorporated the commenters' suggestions into the RA for this final rule and revised the population of MODUs and Cargo and Miscellaneous Vessels based on MISLE data. We also updated the total population for the final rule (see table 4). In addition, we updated the mean hourly wage rate using 2021 data from the Bureau of Labor Statistics (BLS). As a result, we revised the estimated cost savings for this final rule. Table 2 summarizes the changes from the NPRM to the final rule and their expected impact on costs and cost savings. The changes we made to the respective CFR sections from the NPRM to the final rule, which we show in table 2, have no additional impact on the affected population or the cost savings we estimated in this analysis.

TABLE 2—CHANGES TO CFR FROM NPRM TO FINAL RULE

NPRM's CFR cite	Final rule's CFR cite	Cost impact of change
46 CFR 110.01–1(b) General	46 CFR 110.01–1(b) General	No impact. We are updating the implementation date for the revised regulations.
46 CFR 110.10–1(c) Incorporation by reference.	46 CFR 110.10–1(b) Incorporation by reference.	No impact. Based on public comment received, we are adding ANSI/ISA–RP12.06.01 (2003) as this standard superseded ISA RP 12.6 (1995), which was deleted in the NPRM.
46 CFR 110.25–1(i)(1) Plans and information required for new construction.	46 CFR 110.25–1(i) Plans and information required for new construction.	No impact. We are updating the numbering of subparagraphs to account for changes made by this final rule. No quantifiable cost estimate for the method of classification, or Division or Zone.
46 CFR 111.30–5 Construction	46 CFR 111.30–5 Construction	No impact. We are removing the NPRM's proposed paragraph (c), which warned that the interchangeability of IEEE and IEC components could not be assumed. Public comments argued this was confusing and unnecessary.
46 CFR 111.33–1 General	46 CFR 111.33–1 General	No impact, editorial changes. We are changing the word ''converter'' to ''rectifier'' to conform with a change proposed for 46 CFR 111.33–3 in the NPRM.
46 CFR 111.40–1 Panelboard standard.	46 CFR 111.40–1 Panelboard standard.	No impact, editorial changes. We are changing the reference to section 9.10 of IEEE 45.1–2017 to subsection 9.10.1 of IEEE 45.1–2017.
46 CFR 111.60–6 Fiber optic cable	46 CFR 111.60–2 Specialty cable for communication and RF applications, and 46 CFR 111.60–6 Fiber optic cable.	No impact, editorial changes. We are restoring existing §§ 111.60–2 and 111.60–6, which were proposed for deletion in the NPRM, and updating standards referenced within these sections to conform with updates proposed in the NPRM.
46 CFR 111.60–11(c) Wire	46 CFR 111.60–11(c) Wire	No impact. We are removing the incorporation by reference of section 5.7 of IEEE 45.8–2016 proposed in the NPRM as this section does not address wire.
46 CFR 111.105–3 General requirements and system integrity.	46 CFR 111.105–3 Approved equipment.	No impact, editorial changes. We are combining §§ 111.105–3 and 111.105.7 and renumbering paragraphs to improve clarity and consistency with similar requirements elsewhere in subchapter J.

TABLE 2—CHANGES TO CFR FROM NPRM TO FINAL RULE—Continued

NPRM's CFR cite	Final rule's CFR cite	Cost impact of change
46 CFR 111.105–7 Approved equipment.	46 CFR 111.105–3 Approved equipment.	No impact. We are combining §§ 111.105–3 and 111.105–7 into § 111.105–3 and removing § 111.105–7.
46 CFR 111.105–11 Intrinsically safe systems.	46 CFR 111.105–11 Intrinsically safe systems.	No impact, editorial changes. We are adding ANSI/ISA RP12.06.01:2003 because it supersedes ISA RP 12.6 (1995), which was deleted in the NPRM.
46 CFR 111.105–50 Alternative standard to the classification of hazardous locations requirements of this subchapter.	46 CFR 111.105–50 Alternative standard to the classification of hazardous locations requirements of this subchapter.	No impact, editorial changes. Based on public comments, we are reorganizing and clarifying these requirements.

With this final rule, the Coast Guard will update subchapter J of title 46 of the CFR to align the standards that govern electrical equipment and installations on U.S.-flagged vessels with current industry practices to ensure that the standards are consistent on all vessel types referenced in subchapter J. The provisions of this final rule will update existing standards through incorporation by reference, provide options to use alternative standards, eliminate obsolete standards, and clarify the existing requirements. The majority of the updates will simply incorporate by reference more recent versions of the same standards with little or no substantive change. The more recent editions reflect more modern technologies, terminology, and practices. By updating standards, we expect the final rule to generate cost savings, from a reduction in equivalency requests, to industry and the Federal Government of approximately $209,352 over a 5-year period of analysis in 2021 dollars, using a 7-percent discount rate (we are using a 5-year period of analysis because we anticipate this final rule will not produce cost savings beyond this time period). We estimate annualized cost savings to be approximately $51,059, using a 7-percent discount rate. The cost savings are a result of industry submitting fewer equivalency requests to the Coast Guard (and the Coast Guard, therefore, needing to review fewer equivalency requests), and not from the changes to the IBR standards we make with this final rule. We expect the final rule to generate unquantified benefits because incorporating these standards will simplify regulatory compliance, reduce confusion, and provide industry flexibility. Table 3 provides a summary of the impacts of the final rule.

TABLE 3—SUMMARY OF IMPACTS OF THE FINAL RULE

Category	Summary
Applicability	Incorporate by reference electrical engineering standards or update existing standards through incorporation by reference in subchapter J of Title 46 CFR.
Affected Population	• Cost savings based on an 80 percent reduction of equivalency requests from owners and operators of 183 new U.S.-flagged vessels that entered service over the past 5 years. • Standards used by approximately 5,602 U.S.-flagged vessels (affected population varies by CFR part and subpart, see table 4).
Benefits	Industry Cost Savings ($2021, 7-percent discount rate): 5-year period of analysis: $91,320. Annualized: $22,272. Government Cost Savings ($2021, 7-percent discount rate): 5-year period of analysis: $118,032. Annualized: $28,787. Total Cost Savings ($2021, 7-percent discount rate): 5-year period of analysis: $209,352. Annualized: $51,059. Unquantified benefits include providing flexibility by offering options or alternatives for IBR and non-IBR provisions, removing regulatory redundancy and confusion by updating standards and simplifying regulatory text through editorial changes, and consolidating regulatory text.

Affected Population

This final rule affects four parts in subchapter J of title 46 of the CFR (110, 111, 112, and 113), as well as multiple subparts within each part. Subchapter J applies to vessels covered by subchapters D, H, I, I–A, K, L, O, R, and U of title 46 of the CFR.[11]

We updated the affected population for the final rule because two years have elapsed since we collected the original data for the proposed rule. This final rule will affect approximately 5,602 existing inspected U.S.-flagged vessels. We obtained the affected population of this rule from our MISLE database. For standards we are incorporating by reference in this final rule, we expect all U.S.-flagged vessel owners and operators to use the most recent incorporated standards, some of which were updated as recently as 2020. For construction standards, we expect all U.S.-flagged vessel owners and operators to use the most recent incorporated standards that are in place at the time of construction or modification of a vessel.

For the purpose of the cost savings analysis, we use a subset of the total affected population because only owners and operators of new U.S.-flagged vessels entering service annually will generate cost savings by submitting fewer equivalency requests to the Coast

[11] Title 46 CFR subchapter J lists two other subchapters, Q and W. Subchapter Q does not contain vessels; it applies to vessels in the other subchapters regarding equipment, construction, and materials for specifications and approval. Similarly, subchapter W does not contain vessels but applies to vessels that have lifesaving appliances and arrangements in one of the subchapters previously listed.

Guard. Included in the total population of 5,602 vessels are 1,460 new U.S.-flagged vessels that entered service in the last 8 years, from 2014 to 2021. We divided 1,460 by 8 years to obtain an average of approximately 183 new U.S.-flagged vessels annually (see table 4 below). We based the cost savings analysis on the past number of equivalency requests owners and operators of new U.S.-flagged vessels submitted to the Coast Guard over an 18-month period from September 2018 to February 2020. The Coast Guard received 10 equivalency requests annually from owners and operators of new vessels during this period. Prior to this time period, the Coast Guard did not collect data on equivalency requests.

We expect this final rule will reduce the baseline number of equivalency requests the Coast Guard receives from industry by 80 percent.[12] We do not expect this final rule or any updates to standards to eliminate the public's questions altogether; although this rulemaking will update standards, we expect a certain number of standards to be out of date each year because standards organizations are continuously revising standards to reflect safety concerns or to maintain pace with technological advancements within the industry. Thus, we project that about 20 percent of the public still may have questions about the standards they are using annually during the 5-year period and expect the number of equivalency requests that we receive from the public to be about 20 percent of its current annual level. The Coast Guard makes a determination in the year we receive a question (equivalency request) from the public; therefore, the questions will not accumulate from one year to the next. For example, if we characterize the number of questions in the first year as 100 percent of the total amount, we expect this final rule to reduce the number of questions by 80 percent in this year, which produces the cost savings. The balance of 20 percent is the amount that remains, which comprises the number of questions in the first year. In the second year, the public generates additional questions based on the standards they are using, which do not add to the number of questions in the first year. Again, we treat the number of questions in the second year as 100 percent of the total amount, and we expect this final rule to reduce the number of requests by 80 percent in this year, as we explained above. This, again, leaves an amount of 20 percent, which comprises the number of questions in the second year. Essentially, the number of questions in a subsequent year replaces the number of questions the Coast Guard resolves in the preceding year. This process continues through to the fifth year of the analysis period when we expect standards organizations to have completed the process of updating all existing standards.

Specifically, we expect owners and operators of new U.S.-flagged vessels that enter service to submit two equivalency requests annually, or a reduction of eight equivalency requests annually. Owners and operators of new U.S.-flagged vessels submit equivalency requests to the Coast Guard to ask for approval to use a standard that is not in regulation but may be equivalently safe. We explain equivalency requests in greater detail in the Cost Savings Analysis portion of this RA.

TABLE 4—AFFECTED U.S.-FLAGGED VESSEL POPULATION THAT COMPLIES WITH 46 CFR SUBCHAPTER J

Subchapter J vessels	Description	Population
D	Tank Vessels	871
H	Passenger Vessels (≥100 gross tons)	41
I	Cargo and Miscellaneous Vessels	*617
I–A	Mobile Offshore Drilling Units (MODUs)	1
L	Offshore Supply Vessels (OSV)	282
O (tank barge)	Certain Bulk Dangerous Cargoes	8
R	Nautical Schools	15
U	Oceanographic Research Vessels	6
O–I (tank barge)	Combination Bulk Cargo	145
O–D (tank barge or freight barge)	Combination Bulk Cargo-including chemicals	3,616
Total		5,602
Average number of new U.S.-flagged vessels entering service annually.	Includes all subchapters listed above (average of the population for the period 2014–2021).	183

Note: There are 784 unmanned tank barges in the subchapter D population, 173 unmanned freight barges and 3 unmanned tank barges in the subchapter I population in addition to the subchapter O, O–I, and O–D populations. With these populations combined, there is a total of 4,729 unmanned and non-self-propelled vessels.

*This number includes 41 Floating Production Systems in the subchapter I category.

This rule continues the Coast Guard's response to the Presidential Regulatory Reform Initiative of Mar. 4, 1995, and directives including Executive Orders 12866 and 13563 that are intended to improve regulation and the regulatory process. The provisions of this final rule will remove obsolete regulations, revise current regulatory text, substitute performance-based options for regulatory compliance as opposed to conventional prescriptive solutions, and incorporate by reference more recent national and international industry standards into the CFR. The Coast Guard recognizes the significant technological advances in electrical engineering equipment, systems, and devices carried on vessels. As a result, this final rule will encourage the use of newer equipment and promote adherence to modern standards in the industry. Industry also will realize cost savings from not having to send equivalency requests to the Coast Guard. See table 4 for how parts of the CFR will be affected by this final rule along with the anticipated impacts.

Benefits of the Rule

Cost Savings Analysis

We divided all of the changes of this final rule into three categories, which

[12] Generally, standards are updated every 5 years. We therefore assume that 20 percent of the standards become outdated each year as time elapses, so 100 percent/5 years = 20 percent annually (outdated standards). So, the remaining 80 percent (100 percent − 20 percent) will generate the cost savings.

we present in table 5: (1) Editorial changes to the CFR, (2) updates to IBR standards with technical changes, and (3) IBR standards with incorporated options or alternative options. The changes we make to the standards incorporated by reference in this final rule will not result in costs or cost savings to industry.

First, we will editorial changes to subchapter J that include such items as the removal of outdated terminology and the consolidation of text in different paragraphs into one paragraph, which includes regulatory provisions in 46 CFR parts 110, 111, 112, 113; we expect these changes to be a no cost change.

Second, we update IBR standards that have technical changes, which includes regulatory provisions in numerous subparts of 46 CFR parts 110, 111, and 113. It is standard practice in vessel manufacturing to follow the most recent editions of standards developed by representative groups of experts using a consensus-based process, because most manufacturers also supply materials to vessels not required to comply with 46 CFR subchapter J. Manufacturers of certain types of electrical equipment carried on vessels are currently producing equipment to the more recent standards, most of which have been published for at least several years and all of which have been developed by standard-based development organizations. These more recent standards, which this final rule adopts, provide greater clarity and specificity than the outdated technical standards they are replacing; therefore, we expect these changes to be a no cost change.

Third, for IBR standards that are one of several available standards as referenced in subchapter J, we update standards with a more recent edition (these will be alternative options) and add standards as new options to the several other available standards for vessel owners and operators and manufacturers of certain types of electrical equipment. The combination of these options will provide industry the opportunity to remove overly prescriptive requirements, simplify regulatory compliance, and provide regulatory flexibility. Many of the options, some of which are alternative options and others of which are new, are IBR standards that affect multiple subparts of 46 CFR parts 110, 111, and 113. The remaining options are not IBR standards and affect multiple subparts of 46 CFR parts 111 and 112. The options we incorporate by reference apply to the same population of 5,602 vessels. We assume industry will use the more recent national and international standards referenced in this rule. We expect adding a revised or new standard, which represents a more recent standard industry that is currently using, as an additional option to the existing standards will be a no cost change because these standards are not requirements; industry can instead choose a given standard to use among different alternative options. See table 5.

Specifically, we adopt the following four changes to subchapter J, related to generator prime movers, electrical cable construction, hazardous locations, and emergency generators, in order to eliminate outdated or unnecessarily prescriptive electrical engineering regulations and add a limited number of alternative standards. Of the four items listed in the following text, the generator prime mover falls into the second category (IBR standards with technical changes), while electrical cable construction, emergency generator, and hazardous locations fall primarily into the third category (IBR standards with proposed and alternative options), which we listed previously.

Generator Prime Mover

This final rule eliminates the regulatory requirements in § 111.12–1(b) and (c) for each generator prime mover to have an independent overspeed device and a loss of lubricating oil pressure to the generator bearing shutdown. The ABS rules, already incorporated by reference in § 111.12–1(a) since 1965, require these same safeguards on all but small generator prime movers. We also incorporate by reference the ABS Steel Vessel Rules for generator prime movers without modification. Industry has been using these rules for many years and the removal of these requirements will not affect the performance of the generator prime mover. We expect this to be a no cost change.

Electrical Cable Construction

For electrical cable construction requirements in subpart 111.60, this final rule incorporates by reference the more recent editions of the 2017 IEC standards and 2017 editions of ANSI standards to ensure alignment with current technological trends and to eliminate several unnecessary prescriptive requirements. This final rule also aligns electrical cable standards in subpart 111.60 with standards accepted internationally by vessel classification societies and foreign administrations and removes unnecessary, prescriptive requirements developed by the Coast Guard, which in turn, will simplify compliance. We expect this to be a no cost change because electrical cables are readily available that meet the standards that we incorporate by reference with this final rule.

Hazardous Locations

This final rule amends subpart 111.105 by incorporating by reference the IEC standard 60092–502 as an alternative standard for classification of hazardous locations. This IEC standard, published in 1999, is referenced in international standards and codes as well as all major classification societies' rules. Because we are adding an alternative standard and not changing requirements with this item, we expect this to be a no cost or no cost savings change.

Emergency Generator

This final rule amends subpart 112.05 to allow vessel owners and operators to use an emergency generator in port. Some U.S.-flagged vessel owners and operators favor the availability of this option in port because it is more fuel-efficient and results in fewer exhaust emissions than using the ship's larger service generators. This option is consistent with international guidance and classification society rules. However, this option applies to a very small number of U.S.-flagged vessel owners and operators who request it, and the Coast Guard will approve the use of an emergency generator for vessel owners and operators in compliance with subchapter J only. We expect this option to have unquantified cost savings associated with it. We also anticipate unquantified benefits due to a decrease in exhaust emissions since an emergency generator uses less fuel than a ship's main generator.

This final rule creates consistency between Coast Guard regulations and national and international standards through incorporation by reference, provides options with alternative standards, eliminates obsolete standards, and clarifies the existing requirements through the changes we adopt in 46 CFR subchapter J. We categorize these changes in table 5, which summarizes the impacts of this final rule and the affected parts and subparts in subchapter J. Consistent with DHS practice, table 5 specifically lists all of the individual changes by part, subpart, and paragraph of 46 CFR subchapter J. Table 1 in section II of the preamble is a general summary of the changes in subchapter J.

TABLE 5—REGULATORY CHANGES IN THIS FINAL RULE BY CFR PART

Category	Description	Affected Title 46 CFR subparts/sections	Applicability	Cost impact
Editorial Changes	• IEC naming convention. • Industry standard terminology.	§§ 110.15–1(a), 110.15–1(b), 110.25–1(i), 110.25–1(a)(6), 110.25–1(j), 110.25–1(n), 110.25–1(p), 110.25–1(q), 110.25–3(c), 110.25–3(c), 111.05–3(c), 111.05–9, 111.05–37, 111.10–1, 111.10–9, 111.12–11(g)(2), 111.12–13, 111.12–7(b), 111.15–25(b), 111.15–30, 111.20–15, 111.30–1, 111.30–5(a)(1), 111.30–5(a)(2), 111.30–19(a)(2), 111.30–25(b)(3), 111.30–25(d)(2), 111.30–25(f)(2), 111.30–27(b)(4), 111.30–27(f)(2), 111.30–29, 111.30–29(e)(3), 111.33–1, 111.33–3(a), 111.33–5, 111.33–7, 111.33–9, 111.33–11, 111.33–3(a)(2), 111.33–3(c), 111.33–5(b), 111.50–3(b)(2), 111.50–5(a)(2), subparts 111.51 and 111.52, §§ 111.51–1, 111.51–2, 111.51–3, 111.51–6, 111.60–1(a), 111.60–7, 111.70–1(a), 111.70–3(a), 111.75–17(d)(2), 111.81–1(d), 111.95–1(b), 111.99–3, 111.103, 111.105–1, 111.105–3, 111.105–3(b), 111.105–3(b)(1), 111.105–3(b)(1)(i), 111.105–3(b)(1)(ii), 111.105–3(b)(1)(iii), 111.105–3(b)(2), 111.105–3(d), 111.105–5, 111.105–15, 111.105–17(d), 111.105–32(c), 111.105–35(a), 111.105–35(c), 111.105–45(a), 111.105–45(b), 111.105–45(b)(1), 111.106–15(a), 111.107–1(a)(1), 112.01–20, 112.05–5, 112.15–1, 112.50–1.	This applies to all vessels regulated under subchapters D, H, I, I–A, K, L, O, R, and U.	No cost or cost savings. These editorial changes include clarification of text, removal of outdated or redundant terminology, and consolidation of text in different paragraphs into one paragraph.
	Editorial changes to the more recent editions of IBR standards.	§§ 110.15–1(b), 111.01–15(c), 111.12–3, 111.12–5, 111.25–5, 111.30–1, 111.30–5(a)(1), 111.33–3(a)(1), 111.33–5(a), 111.33–11, 111.35–1, 111.40–1, 111.50–3(c), 111.50–7(a), 111.50–9, 111.60–13(b)(1), 111.60–19(b), 111.60–21, 111.60–23(d), 111.75–5(b), 111.99–5, 111.105–3(e), 111.105–31(n), 111.105–40(a), (c), 111.105–41, 111.106–3(b)(1), 111.106–3(b)(1)(i), 111.106–3(b)(1)(ii), 111.106–3(b)(2), 111.106–3(d), 111.106–5(c), 111.106–7(a), 111.106–13(b), 111.107–1(c)(1), 111.108–3(b)(1)(i), 111.108–3(b)(1)(ii), 111.108–3(b)(2), 113.10–7, 113.20–1, 113.25–11(a), 113.30–25(e), 113.30–25(i), 113.37–10(b), 113.40–10(b), 113.30–25(j)(2), 113.65–5. Note to § 111.108–3(b)(1), Note to § 111.108–3(b)(2), Note to § 111.106–3(b)(1).	This applies to all vessels regulated under subchapters D, H, I, I–A, K, L, O, R, and U.	No cost or cost savings. These provisions will make minimal textual changes to reflect latest trends in technology. These changes will simplify regulatory compliance by referencing the more recent national and international standards that industry is currently using.
	Editorial changes with deletions.	§§ 111.60–1(b), 111.60–1(c) 111.60–1(d), 111.60–1(e) 111.60–2, 111.60–3, 111.60–6, 111.60–11(c), 111.60–13(a), 111.60–13(c), 111.60–23(d), 111.75–17(d)(4), 111.75–18, 111.75–20(c) and (d) 111.105–9, 111.105–11(a) and (b), 111.105–17(c), 111.105–19, 111.105–31(e), 111.106–3(b)(1)(i), 111.108–1, and 112.50–1(g).	This applies to all vessels regulated under subchapters D, H, I, I–A, K, L, O, R, and U.	No cost or cost savings. These provisions will remove obsolete standards and outdated terminology.
Technical Changes	IBR standards with technological changes in electrical equipment and testing.	§§ 110.15–1(b), 111.05–33(a) and (b), 111.12–1(a), 111.12–1(b), 111.12–7(a) and (b), 111.12–7(c), 111.15–2(b), 111.51–5, 111.54–1(c)(1)(ii), 111.54–1(c)(1)(i), 111.54–1(c)(1)(iii), 111.54–1(c)(3)(ii), 111.55–1(a), 111.59–1, 111.60–5(a)(1), 111.60–5(a)(2) and (b), 111.60–7, 111.60–11(c), 111.60–13(b)(2), 111.60–23(f), 111.70–1(a), 111.75–18, 111.105–3, 111.105–11(d), 111.105–37, 111.105–39, 111.105–39(a), 111.106–3(b)(1), 111.106–3(b)(1)(ii), 111.106–3(b)(1)(iii), 111.106–3(b)(3)(vi), 111.106–3(b)(3)(vi), 111.106–3(b)(3)(vi), 111.106–3(b)(3)(vi), 111.106–3(c), 111.106–3(d), 111.107–1(b), 111.107–1(c)(1), 111.108–3(b)(1), 111.108–3(b)(1)(i), 111.108–3(b)(1)(ii), 111.108–3(b)(3), 111.108–3(e), and 113.05–7(a)(2).	This applies to all vessels regulated under subchapters D, H, I, I–A, K, L, O, R, and U.	No cost or cost savings. These provisions will ensure the implementation of the more recent industry and international standards that industry is currently using. Incorporation by reference is an administrative provision that simplifies regulatory compliance.

TABLE 5—REGULATORY CHANGES IN THIS FINAL RULE BY CFR PART—Continued

Category	Description	Affected Title 46 CFR subparts/sections	Applicability	Cost impact
Options	Newly incorporated options.	§§ 110.15–1(b), 111.01–9(a) and (c), 111.01–9(b), 111.01–9(d), 111.15–10(b)(2)(i), 111.20–15, 111.30–5(a)(2), 111.30–19(a)(1), 111.30–19(b)(4), 111.50–3(c) and (e), 111.50–3(e) and (g)(2), 111.53–1(a)(1) and 111.54–1(a)(1), 111.54–1(b), 111.54–1(c)(2), 111.54–1(c)(3)(i), 111.60–1, 111.60–9(c), 111.60–13(a), 111.60–13(c), 111.75–20(a), 111.81–1(d), 111.87–3(a), 111.106–5(a), 113.05–7(a), 113.10–7, 113.20–1, 113.25–11(a), 113.30–25(e), 113.30–25(i), 113.37–10(b), and 113.40–10(b).	This applies to all vessels regulated under subchapters D, H, I, I–A, K, L, O, R, and U.	No cost or cost savings. These options provide flexibility to U.S.-flagged vessel owners and operators and simplifies regulatory compliance. Because these options represent the more recent standards, which are the current industry standards, there is no cost impact. Incorporating the more recent editions of national and international standards simplifies regulatory compliance and ensures the inclusion of technological changes.
	Additional options	§§ 111.59–1, 111.60–1, 111.75–17(b), 111.75–20(b), 111.83–7, 111.87–3(a), 111.105–3(b)(3), 111.105–11(c), 111.105–17(b), 111.105–28, 111.105–29(e), 111.105–50, 111.105–50(a), 111.105–50(b), 111.106–3(b)(1)(i), 111.108–3(b)(1)(i), 111.108–3(b)(3), and 112.05–7.	This applies to all vessels regulated under subchapters D, H, I, I–A, K, L, O, R, and U.	No cost or cost savings. The options provide flexibility to U.S.-flagged vessel owners and operators and simplifies regulatory compliance. Because these new options represent the more recent standards, there is no cost impact. Incorporating the more recent editions of national and international standards simplifies regulatory compliance and ensures the inclusion of technological changes.

Note: We may list the same citation of the CFR multiple times because we are proposing numerous changes to the same paragraph. These changes may include clarifications, deletions, or insertions of text. The term ''current industry standards'' means equipment manufacturers have been constructing equipment to the more recent editions of standards.

The Coast Guard evaluated the affected population and estimates that this final rule will generate cost savings for owners and operators of new U.S.-flagged vessels who will no longer submit equivalency requests to the MSC for review. This final rule will also generate cost savings for the Federal Government, which will review fewer equivalency requests. An equivalency request is when an owner or operator of a new U.S.-flagged vessel sends questions to the Coast Guard to ask for a review of the standards they are currently using. Any member of the marine industry may submit a request, but it is primarily submitted by vessel owners and operators. Generally, an owner or operator makes such a request to seek a determination from the Coast Guard on whether or not a standard not contained in Coast Guard regulations is sufficient for use. For example, an equivalent standard could be a more recent edition of a standard in subchapter J, or it could be an alternative standard not currently listed in 46 CFR subchapter J. A Coast Guard Marine Engineer compares the equivalent standard with the standard incorporated by reference in subchapter J to ensure it offers an equal or greater level of safety.

When evaluating the proposed alternative standard, we compare the standard that industry is using to the standard in subchapter J that addresses the type of engineering equipment under review. Typically, owners and operators of existing U.S.-flagged vessels (at the time of construction of a vessel and when a vessel enters service) use the more recent standards in subchapter J, and, therefore they will not likely request an equivalency review from the Coast Guard following this rule. However, the Coast Guard expects owners and operators of new U.S.-flagged vessels that enter service each year to nevertheless have some equivalency questions because they may not be familiar with all of the applicable regulations in subchapter J, which include the most recent standards that are incorporated by reference.

Based on MSC data, the Coast Guard received 15 equivalency requests over the period from September 2018 to February 2020; this is the only period of time for which the Coast Guard maintained equivalency data. This is equivalent to 10 requests annually (15 requests ÷ 18 months × 12 months = 10 requests). We did not receive any public comments concerning this estimate; therefore, we retain the estimate of about 10 requests annually for the final rule. MSC data, validated by CG–ENG, show that a vessel owner or operator typically submits no more than one equivalency request in a given year, no matter how many vessels they may own or operate. Generally, organizations such as UL and the IEC create electrical standards for industry that take into account updates in the latest technology and construction techniques for electrical equipment. These organizations usually review and update standards every 5 years. Therefore, based on a 5-year interval, we generally expect 20 percent of the standards to be out of date in a given year, which, in turn, creates equivalency requests from industry. Because the Coast Guard makes a determination on an equivalency request in the same year it receives the request, we do not expect the number of equivalency questions to accumulate from year to year such that the 20-percent estimate will change in any year of a 5-year period. Even if we publish a rule to address updates to electrical standards in subchapter J, we still expect each year that the public will have questions about the standards it is using, which generates equivalency requests on an annual basis; we do not expect a published rule to eliminate the public's questions altogether.

Industry Baseline Costs

Without this final rule or under the current baseline, the Coast Guard receives approximately 10 equivalency requests annually, as we discussed previously. To draft an equivalency request to the MSC, an owner or operator of a U.S.-flagged vessel seeks the services of an engineering design firm or a shipyard's technical staff for a Marine Engineer or Naval Architect. Using the BLS ''Occupational and Employment Statistics'' database and May 2021 wage estimates, the unloaded mean hourly wage rate for Marine Engineers and Naval Architects is $47.03 (occupational code 17–2121).[13] To account for an employee's non-wage benefits, we apply a load factor to the unloaded mean hourly wage rate, which we calculated by using BLS's ''Employer Cost for Employee Compensation''

[13] Visit *https://www.bls.gov/oes/2021/may/oes172121.htm* to find 2021 unloaded mean hourly wage rate for occupations in the United States.

database. We determined the load factor to be approximately 1.48, rounded.[14] We multiply $47.03 by 1.48 to obtain a loaded mean hourly wage rate of approximately $69.60 for this occupation.

Based on information from the MSC and validated by subject matter experts in CG–ENG, it takes a Marine Engineer or Naval Architect approximately 40 hours of time to develop an equivalency request and submit it to the Coast Guard for review, which includes the electronic submission.

We estimate the total undiscounted cost for industry to submit 10 equivalency requests annually to be approximately $27,840, or $2,784 for each request (10 equivalency requests × $69.60 × 40 hours per request). See table 6 for industry inputs.

TABLE 6—INDUSTRY INPUTS

[Baseline]

Item	Unit values
Annual Equivalency Requests	10
Hours to Draft One Request	40
Loaded Hourly Wage Rate (Marine Engineer or Naval Architect)	$69.60

Federal Government Baseline Costs

When the Coast Guard receives an equivalency request from a vessel owner or operator (or an electrical equipment manufacturer), the Coast Guard personnel at the MSC must review the request to provide a determination on whether or not the proposed standard is equivalent to a standard found in subchapter J. Based on information from the MSC and validated by subject matter experts in CG–ENG, a civilian Coast Guard Marine Engineer needs about 32 hours to review an equivalency request. Based on 10 requests received annually, the Coast Guard expends approximately 320 hours annually to review these requests. A Coast Guard Marine Engineer typically has a Federal Government General Schedule (GS) grade level of GS–14. The Office of Personnel Management lists the hourly pay for Federal employees who work in the Washington, DC area on its website, and records the hourly pay of a person with the grade level of a GS–14, step 5 (the midpoint of the pay grade) as $66.54.[15] We then calculate the share of total compensation of Federal employees to account for a Government employee's non-wage benefits. The Congressional Budget Office reports total compensation to Federal employees to be $64.80 per hour and wages to be $38.30.[16] We determine the load factor to be approximately 1.69 ($64.80 ÷ $38.30). We multiply $66.54 by 1.69 to obtain a loaded hourly wage rate of approximately $112.45 for a GS–14 Senior Engineer (Marine Engineer or Naval Architect). We estimate the total, undiscounted cost for the Federal Government to review 10 equivalency requests annually to be approximately $35,984 (10 equivalency requests × 32 hours for each request × $112.45), or $3,598 for each request. See table 7 for the Federal Government inputs.

TABLE 7—FEDERAL GOVERNMENT INPUTS

[Baseline]

Item	Unit values
Annual Equivalency Requests Reviewed	10
Hours to Review One Request	32
Loaded Hourly Wage Rate (Marine Engineer or Naval Architect)	$112.45

We estimate the total, undiscounted baseline cost to industry and the Federal Government to submit and review equivalency requests, respectively, to be approximately $63,824 ($27,840 + $35,984), annually. Table 8 presents a summary of the baseline costs associated with industry submitting equivalency requests to the Coast Guard.

TABLE 8—ANNUAL BASELINE COSTS OF EQUIVALENCY REQUESTS

[$2021, Undiscounted]

Item	Cost
Industry	$27,840
Federal Government	35,984
Total	63,824

Note: Totals may not sum due to independent rounding.

Industry Cost Savings

The baseline costs we estimate for industry is from vessel owners and operators of new U.S.-flagged vessels that enter service each year who submit equivalency requests. We expect this rule will reduce the number of equivalency requests industry submits annually. We estimate 195 companies own the average number of 183 new U.S.-flagged vessels that have entered service each year in the past 8 years. The number of equivalency requests the Coast Guard has received annually from these owners and operators is approximately 10 (a vessel owner or operator will request an equivalency determination without regard to the number of vessels owned). We anticipate standards organizations to update their standards every 5 years. Therefore, we expect 20 percent of the standards to be out of date in a given year over this period of time (100 percent divided by 5 years equals 20 percent). We multiplied the 20 percent value by the baseline number of 10 equivalency requests the Coast Guard receives annually from owners and operators of new U.S.-flagged vessels. Therefore, we expect industry to submit 2 equivalency requests (10 equivalency requests × 0.20) in any given year of the analysis period, or a reduction in the number of requests of 80 percent. Similarly, the marine industry will save approximately 320 hours annually from not drafting and submitting equivalency requests (320 hours = 8 requests × 40 hours for each request). The submission of an equivalency request will not affect or change an existing information collection request, nor will it create a new one, because we estimate the number of requests to be approximately 2 annually, which is below the threshold of 10 limit set by the Paperwork Reduction Act of 1995 (44 U.S.C. 3501–3520). The Federal Government does not require the marine industry to submit these requests; vessel owners and operators (or manufacturers) voluntarily submit requests only if they have questions about the standards they are using.

[14] A loaded hourly wage rate is what a company pays per hour to employ a person, not the hourly wage an employee receives. The loaded hourly wage rate includes the cost of non-wage benefits (health insurance, vacation, etc.). To obtain the load factor, we used the multi-screen data search feature from this database and searched for ''private industry workers'' under ''total compensation'' and then for ''all workers'' in the category ''Transportation and Materials Moving Occupations,'' within the United States. We performed the same steps to obtain the value for ''wages and salaries.'' The series IDs for total compensation, and wages and salaries are CMU2010000520000D and CMU2020000520000D, respectively, which are not seasonally adjusted values. Using second quarter data for 2021, we divided the value for total compensation, $31.90, by wages and salaries, or $21.54, to obtain a load factor of about 1.48, rounded. *https://data.bls.gov/cgi-bin/dsrv?cm.*

[15] *https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/salary-tables/21Tables/html/DCB_h.aspx.*

[16] Congressional Budget Office (2017), ''Comparing the Compensation of Federal and Private-Sector Employees, 2011 to 2015,'' *https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/52637-federalprivatepay.pdf.*

Using the same labor category previously used to calculate the baseline for industry costs, we estimate the total undiscounted cost savings of this rule to industry to be approximately $22,272 annually [(10 equivalency requests × 40 hours for each equivalency × $69.60 = $27,840) minus (2 equivalency requests × 40 hours for each equivalency request × $69.60 = $5,568)]. We estimate 5-year cost savings of this rule to industry to be approximately $91,320, using a 7-percent discount rate. We estimate the annualized cost savings to be approximately $22,272, using a 7-percent discount rate, as shown in table 9.

TABLE 9—ESTIMATED INDUSTRY COST SAVINGS FROM THIS RULE

[$2021, 5-year period of analysis, 7- and 3-percent discount rates]

Year	Number of reduced equivalencies	Hours to draft equivalencies	Total cost savings	Discounted cost savings, 7%	Discounted cost savings, 3%
1	8	40	$22,272	$20,814.95	$21,623.30
2	8	40	22,272	19,453.23	20,993.50
3	8	40	22,272	18,180.59	20,382.04
4	8	40	22,272	16,991.20	19,788.38
5	8	40	22,272	15,879.63	19,212.02
Total	.....	.....	.....	91,319.60	101,999.24
Annualized Cost Savings	.....	.....	.....	22,272	22,272

Note: Totals may not sum due to independent rounding.

Federal Government Cost Savings

With this final rule, we expect the Coast Guard will review annually 2 equivalency requests (10 equivalency requests × 0.20). This again will be a reduction of 80 percent from the baseline number of 10 requests. With fewer equivalencies to review, the Coast Guard will also save approximately 256 hours annually from not reviewing equivalency requests (8 requests × 32 hours per request).

Using the same labor category previously for MSC personnel to review an equivalency request, we estimate the total, undiscounted cost savings of this final rule to the Federal Government to be approximately $28,787 annually [(10 baseline equivalency requests × 32 hours for each equivalency request × $112.45 = $35,984) minus (2 equivalency requests × 32 hours for each equivalency request × $112.45 = $7,197)]. We estimate the 5-year discounted cost savings of this rule to the Federal Government to be approximately $118,032, using a 7-percent discount rate. We estimate the annualized cost savings to be approximately $28,787, using a 7-percent discount rate, as shown in table 10.

TABLE 10—ESTIMATED FEDERAL GOVERNMENT COST SAVINGS FROM THIS RULE

[$2021, 5-year period of analysis, 7- and 3-percent discount rates]

Year	Number of reduced equivalencies	Hours to review equivalencies	Total cost savings	Discounted cost savings, 7%	Discounted cost savings, 3%
1	8	32	$28,787	$26,903.74	$27,948.54
2	8	32	28,787	25,143.68	27,134.51
3	8	32	28,787	23,498.77	26,344.18
4	8	32	28,787	21,961.46	25,576.88
5	8	32	28,787	20,524.73	24,831.92
Total	80	.....	.....	118,032.38	131,836.03
Annualized Cost Savings	.....	.....	.....	28,787	28,787

Note: Totals may not sum due to independent rounding.

Total Cost Savings of This Rule

We estimate the 5-year, total discounted cost savings of this final rule to be approximately $209,352 ($91,320 + $118,032), using a 7-percent discount rate. We estimate the annualized cost savings of this rule to be approximately $51,059, using a 7-percent discount rate. The total annualized cost savings is the summation of the values in tables 9 and 10 ($22,272 + $28,787 = $51,059) as a result of the reduction in the number of equivalency requests we expect annually from industry, as shown in table 11.

TABLE 11—TOTAL ESTIMATED COST SAVINGS FROM THIS RULE

[$2021, 5-year period of analysis, 7- and 3-percent discount rates]

Item	Industry cost savings	Federal government cost savings	Total
Discounted Cost Savings, 7%	$91,320	$118,032	$209,352

TABLE 11—TOTAL ESTIMATED COST SAVINGS FROM THIS RULE—Continued

[$2021, 5-year period of analysis, 7- and 3-percent discount rates]

Item	Industry cost savings	Federal government cost savings	Total
Discounted Cost Savings, 3%	101,999	131,836	233,835
Annualized Cost Savings, 7%	22,272	28,787	51,059

Unquantified Cost Savings of the Final Rule

We expect this final rule will have unquantified cost savings associated with the option of using an emergency generator while in port. The use of an emergency generator in port will likely save fuel because it does not require a vessel owner or operator to use a ship's larger service generators. However, we are not able to quantify the cost savings associated with this option because the Coast Guard does not have the data to predict how many vessel owners and operators will choose this option while in port. Nevertheless, we expect at least a small number of vessel owners and operators to choose this option.

Additionally, we expect this final rule to generate qualitative benefits. This final rule is necessary because it will update obsolete standards, remove redundancy in regulatory text, clarify and rearrange regulatory text, and provide options to owners and operators of vessels and manufacturers of certain types of electrical equipment. By updating standards and providing options, Coast Guard regulations will be less ambiguous and conform to the more recent industry standards, thereby ensuring consistency within the marine industry. Some of these options we consider to be alternative options, and others will be new options. With these changes, industry will follow less ambiguous regulatory provisions, which we expect will create fewer equivalency requests. In addition, we removed Coast Guard prescriptive requirements in some places and replaced them with more recent national or international standards, which should simplify compliance.

Regarding the use of an emergency generator while in port, this option will likely reduce emissions and save fuel for vessel owners and operators who choose to use an emergency generator while in port. Some U.S.-flagged vessel owners and operators favor the availability of this option in port because it is more fuel-efficient and results in fewer exhaust emissions than using the larger ship's service generators. This will be an option for a very small number of U.S.-flagged vessel owners and operators who request it. This option is consistent with international guidance and classification society rules. The Coast Guard will approve the use of an emergency generator for vessel owners and operators in compliance with subchapter J only.

We are not able to quantify the expected reduction in the exhaust emissions because the Coast Guard is not able to predict how many vessel owners and operators will choose this option while in port due to the lack of data. The Coast Guard did not receive any public comments on the proposed rule concerning cost or cost savings associated with the use of an emergency generator and exhaust emissions while a vessel is in port.

Analysis of Alternatives

(1) Industry would continue to meet the current standards in 46 CFR subchapter J with no updates to standards or incorporations by reference (current baseline without regulatory action).

This alternative is a representation of the current state of the industry where vessel owners and operators would continue to follow standards in 46 CFR subchapter J without any updates to standards. To use a newer standard or alternative standard, industry must submit an equivalency request, and the Coast Guard must grant that equivalency. With this alternative, industry would not benefit from regulations incorporating newer or alternative standards and would not benefit from the latest advances in electrical equipment technology without incurring the cost of submitting equivalency requests. With this alternative, there would be no change in the costs.

With this alternative, we would not update the standards in 46 CFR subchapter J, and industry would not follow the more recent standards, which includes technological advancements in electrical equipment carried on vessels. We rejected this alternative because it would not create cost savings for the marine industry and industry also would not benefit from this alternative because it would not provide needed regulatory clarity.

(2) Issuance of a policy letter that would permit the marine industry to meet the more recent editions of the IBR standards without updating the editions that are incorporated by reference in 46 CFR subchapter J.

For this alternative, we would issue a policy letter that would permit industry members to meet the most recent editions of the pertinent standards. With such a policy in place, we anticipate that the marine industry would use the more recent editions of the IBR standards. However, 46 CFR subchapter J would still contain outdated standards and overly prescriptive regulations that we could only remove through notice and comment rulemaking. Issuing a policy letter would not provide the agency an opportunity for soliciting public comment on current industry practice and standards. Additionally, the policy letter would not be enforceable against the public, and the Coast Guard could revise the policy letter without opportunity to comment.

We would expect the number of equivalency requests to decrease with this alternative by the same amount as the preferred alternative, and we also expect the cost savings associated with this alternative to be the same as the preferred alternative. We estimate this alternative would save industry approximately $22,272 annually (undiscounted). We estimate the 5-year discounted cost savings of this alternative to industry would be approximately $91,320, using a 7-percent discount rate. We estimate the annualized cost savings would be approximately $22,272, using a 7-percent discount rate. We rejected this alternative because we would not be incorporating by reference the more recent standards in the CFR, industry would not benefit from enhanced regulatory clarity in subchapter J, and the public would not be given the opportunity to comment on the appropriateness of the more recent editions of the IBR standards.

(3) Preferred Alternative—Update the IBR standards in 46 CFR subchapter J, create regulatory options, and make

editorial changes to reduce the ambiguity that currently exists.

With this alternative, we will update the current standards in 46 CFR subchapter J and incorporate the more recent industry standards. This is the preferred alternative because it will create consistency between Coast Guard regulations and national and international standards, update the standards incorporated by reference to reflect the more recent standards available, provide options for alternative standards, eliminate obsolete standards, and clarify the existing requirements.

This alternative will reduce the number of equivalency requests from the marine industry and create cost savings for vessel owners and operator and manufacturers of marine equipment. It will also reduce the hours the marine industry will spend on drafting and submitting equivalency requests to the Coast Guard. We analyzed and presented the cost saving impacts of this alternative to industry and the Coast Guard earlier in this RA.

B. Small Entities

Under the Regulatory Flexibility Act of 1980 (5 U.S.C. 601–612) (RFA), we have considered whether this final rule would have a significant economic impact on a substantial number of small entities. The term ''small entities'' comprises small businesses, not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000.

This rule creates cost savings for industry because we estimate fewer equivalency requests will be submitted to the Coast Guard. We expect equivalency requests to be submitted by owners or operators of new U.S.-flagged vessels who may have questions about standards that are not in 46 CFR subchapter J. Over an 8-year period from 2014–2021, we found 1,460 new U.S.-flagged vessels entered service, or an average of approximately 183 annually during this period. We found that 195 companies owned the 1,460 vessels.

Using the publicly-available online database ''ReferenceUSAgov'' (in addition to individual online searches of companies) to search for company-specific information such as annual revenues and number of employees, we found revenue or employee information on 119 of the 195 companies, or approximately 61 percent.[17] Using the Small Business Administration's ''Table of Size Standards'' and the North American Industry Classification System codes listed in the table, we found 88 of the 119 companies to be small entities.[18] We found the other 31 companies to be not small.[19] We did not find information on the remaining 76 companies; therefore, we assumed these companies to be small entities for a total of 164 small entities out of 195 companies, or approximately 84 percent.

We analyzed the potential economic impacts of this final rule on small entities and found that each small entity that no longer submits an equivalency request will save approximately $2,784 annually. We estimate an 80 percent reduction in the number of equivalency requests (from 10 to 2 annually) industry submits to the Coast Guard with this rule; therefore, the Coast Guard certifies under 5 U.S.C. 605(b) that this final rule will not have a significant economic impact on a substantial number of small entities.

Any small entity that does not submit an equivalency request will not be impacted by any costs or cost savings.

C. Assistance for Small Entities

Under section 213(a) of the Small Business Regulatory Enforcement Fairness Act of 1996 (Pub. L. 104–121), we offer to assist small entities in understanding this rule so that they can better evaluate its effects on them and participate in the rulemaking. The Coast Guard will not retaliate against small entities that question or complain about this rule or any policy or action of the Coast Guard.

Small businesses may send comments on the actions of Federal employees who enforce, or otherwise determine compliance with, Federal regulations to the Small Business and Agriculture Regulatory Enforcement Ombudsman and the Regional Small Business Regulatory Fairness Boards. The Ombudsman evaluates these actions annually and rates each agency's responsiveness to small business. If you wish to comment on actions by employees of the Coast Guard, call 1–888–REG–FAIR (1–888–734–3247).

D. Collection of Information

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires the U.S. Coast Guard to consider the impact of paperwork and other information collection burdens imposed on the public. The Coast Guard has determined that there will be no new requirement for the collection of information associated with this final rule.

E. Federalism

A rule has implications for federalism under Executive Order 13132 (Federalism) if it has a substantial direct effect on States, on the relationship between the National Government and the States, or on the distribution of power and responsibilities among the various levels of government. We have analyzed this rule under Executive Order 13132 and have determined that it is consistent with the fundamental federalism principles and preemption requirements described in Executive Order 13132. Our analysis follows.

It is well settled that States may not regulate in categories reserved for regulation by the Coast Guard. It is also well settled that all of the categories covered in 46 U.S.C. 3306, 3703, 7101, and 8101 (design, construction, alteration, repair, maintenance, operation, equipping, personnel qualification, and manning of vessels), as well as the reporting of casualties and any other category in which Congress intended the Coast Guard to be the sole source of a vessel's obligations, are within the field foreclosed from regulation by the States. *See United States* v. *Locke,* 529 U.S. 89, 115–116 (2000) (holding that Congress intended that the Coast Guard regulations be the sole source of vessel design, operation, and reporting requirements). This proposed update to electrical engineering standards for vessels is issued under the authority in 46 U.S.C. 3306(a)(1), which authorizes the Secretary to prescribe regulations for the design, construction, alteration, repair, and operation of vessels subject to inspection, including equipment, appliances, propulsion machinery, auxiliary machinery, boilers, unfired pressure vessels, piping, and electric installations. Therefore, because the States may not regulate within these categories, this rule is consistent with the fundamental federalism principles and preemption requirements described in Executive Order 13132.

F. Unfunded Mandates

The Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1531–1538) requires Federal agencies to assess the effects of their discretionary regulatory actions. In particular, the Unfunded Mandates Reform Act addresses actions that may result in the expenditure by a State, local, or tribal government, in the aggregate, or by the private sector of $100,000,000 (adjusted for inflation) or more in any one year. Although this rule will not result in such expenditure, we discuss the effects of this rule elsewhere in this preamble.

[17] *http://www.referenceusagov.com.*

[18] The Coast Guard was unable to find revenue information for two of these small entities.

[19] *https://www.sba.gov/document/support--table-size-standards.*

G. Taking of Private Property

This rule will not cause a taking of private property or otherwise have taking implications under Executive Order 12630 (Governmental Actions and Interference with Constitutionally Protected Property Rights).

H. Civil Justice Reform

This rule meets applicable standards in sections 3(a) and 3(b)(2) of Executive Order 12988 (Civil Justice Reform) to minimize litigation, eliminate ambiguity, and reduce burden.

I. Protection of Children

We have analyzed this rule under Executive Order 13045 (Protection of Children from Environmental Health Risks and Safety Risks). This rule is not an economically significant rule and will not create an environmental risk to health or risk to safety that might disproportionately affect children.

J. Indian Tribal Governments

This rule does not have tribal implications under Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments) because it will not have a substantial direct effect on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes.

K. Energy Effects

We have analyzed this rule under Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use). We have determined that it is not a ''significant energy action'' under that order because it is not a ''significant regulatory action'' under Executive Order 12866 and is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

L. Technical Standards and Incorporation by Reference

The National Technology Transfer and Advancement Act, codified as a note to 15 U.S.C. 272, directs agencies to use voluntary consensus standards in their regulatory activities unless the agency provides Congress, through OMB, with an explanation of why using these standards would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.,* specifications of materials, performance, design, or operation; test methods; sampling procedures; and related management systems practices) that are developed or adopted by voluntary consensus standards bodies.

This rule uses the following voluntary consensus standards:

- ANSI/ISA–RP12.06.01–2003—Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation Part 1: Intrinsic Safety, approved 16 April 2003 (''ANSI RP12.06.01''),
- ANSI/ISA 12.12.01–2015—Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations, approved Aug. 21, 2015 (''ANSI/ISA 12.12.01'').
- API RP 14F—Recommended Practice for Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class 1, Division 1 and Division 2 Locations, Sixth Edition, October 2018 (''API RP 14F'').
- API RP 14FZ—Recommended Practice for Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Zone 0, Zone 1, and Zone 2 Locations, Second Edition, May 2013 (''API RP 14FZ'').
- API RP 500—Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2, Third Edition, December 2012 with errata January 2014 (''API RP 500'').
- API RP 505—Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2, Second Edition, August 2018 (''API RP 505'').
- ASME A17.1—2016/CSA B44–16 Safety Code for Elevators and Escalators: Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices, reissued January 16, 2017 with errata (''ASME A17.1'').
- ASTM B117—19, Standard Practice for Operating Salt Spray (Fog) Apparatus, approved Nov. 1, 2019 (''ASTM B117'').
- ASTM F2876–10—Standard Practice for Thermal Rating and Installation of Internal Combustion Engine Packages for use in Hazardous Locations in Marine Applications, reapproved May 1, 2015 (''ASTM F2876–10'').
- CSA C22.2 No. 30–M1986—Explosion-proof enclosures for use in class I hazardous locations, Reaffirmed 2016 (''CSA C22.2 No. 30–M1986'').
- CSA C22.2 No. 213–16—Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations, May 2016 (''CSA C22.2 No. 213–16'').
- CSA–C22.2 No. 0–10—General requirements—Canadian Electrical Code, Part II, including Update No. 2, dated November 2014, Reaffirmed 2015 (''CSA C22.2 No. 0–10'').
- CAN/CSA–C22.2 No. 157–92 (Reaffirmed 2016)—Intrinsically safe and non-incendive equipment for use in hazardous locations, including Update No. 2, dated June 2003, Reaffirmed 2016 (''CSA C22.2 No. 157–92'').
- EN 14744—Inland navigation vessels and sea-going vessels—Navigation light, English version, Aug. 2005 (''EN 14744'').
- FM Approvals Class Number 3600—Approval Standard for Electrical Equipment for Use in Hazardous (Classified) Locations—General Requirements, Jan. 2018 (''FM Approvals Class Number 3600'').
- FM Approvals Class Number 3610—Approval Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations, January 2018 (''FM Approvals Class Number 3610'').
- FM Approvals Class Number 3611—Approval Standard for Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2, Hazardous (Classified) Locations, January 2018 (''FM Approvals Class Number 3611'').
- FM Approvals Class Number 3615—Approval Standard for Explosionproof Electrical Equipment General Requirements, January 2018 (''FM Approvals Class Number 3615'').
- FM Approvals Class Number 3620—Approval Standard for Purged and Pressurized Electrical Equipment for Hazardous (Classified) Locations, January 2018 (''FM Approvals Class Number 3620'').
- IEEE Std. C37.04–2018—IEEE Standard for Ratings and Requirements for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V, approved December 5, 2018 (''IEEE C37.04'').
- IEEE Std. C37.010–2016—IEEE Application Guide for AC High-Voltage Circuit Breakers >1000 Vac Rated on a Symmetrical Current Basis, approved September 22, 2016 (''IEEE C37.010'').
- IEEE Std. C37.12–2018—IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 V), approved December 5, 2018 (''IEEE C37.12'').

- IEEE Std. C37.13–2015—IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures, approved December 5, 2015 (''IEEE C37.13'').
- IEEE Std. C37.14–2015—IEEE Standard for DC (3200 V and below) Power Circuit Breakers Used in Enclosures, approved 26 Mar. 2015 (''IEEE C37.14'').
- IEEE Std. C37.27–2015—IEEE Guide for Low-Voltage AC (635 V and below) Power Circuit Breakers Applied with Separately-Mounted Current-Limiting Fuses, approved December 5, 2015 (''IEEE C37.27'').
- IEEE Std. 45.1–2017—IEEE Recommended Practice for Electrical Installations on Shipboard—Design, approved 23 Mar. 2017 (''IEEE 45.1–2017'').
- IEEE Std. 45.2–2011—IEEE Recommended Practice for Electrical Installations on Shipboard—Controls and Automation, approved 10 Sep. 2011 (''IEEE 45.2–2011'').
- IEEE Std. 45.6–2016—IEEE Recommended Practice for Electrical Installations on Shipboard—Electrical Testing, approved 7 Dec. 2016 (''IEEE 45.6–2016'').
- IEEE Std. 45.7–2012—IEEE Recommended Practice for Electrical Installations on Shipboard—AC Switchboards, approved 29 Mar. 2012 (''IEEE 45.7–2012'').
- IEEE Std. 45.8–2016—IEEE Recommended Practice for Electrical Installations on Shipboard—Cable Systems, approved 29 Jan. 2016 (''IEEE 45.8–2016'').
- IEEE Std. 100—The Authoritative Dictionary of IEEE Standards Terms, Seventh Edition, published December 2000 (''IEEE 100'').
- IEEE Std. 1202–2006 (R2012)—IEEE Standard for Flame-Propagation Testing of Wire and Cable, reaffirmed December 5, 2012, (''IEEE 1202'').
- IEEE Std 1202–2006/Cor 1–2012—IEEE Standard for Flame-Propagation Testing of Wire and Cable Corrigendum 1, approved November 21, 2012 (''IEEE 1202'').
- IEEE Std. 1580–2010—IEEE Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Facilities, approved September 30, 2010 (''IEEE 1580'').
- IEC 60068–2–52:2017—Environmental testing—Part 2–52: Tests—Test Kb: Salt mist, cyclic (sodium chloride solution), Edition 3.0, 2017–11.
- IEC 60079–1:2014—Explosive atmospheres—Part 1: Equipment protection by flameproof enclosures ''d'', Edition 7.0, 2014–06.
- IEC 60079–2:2014—Explosive atmospheres—Part 2: Equipment protection by pressurized enclosures ''p'', Edition 6.0, 2014–07.
- IEC 60079–2:2014/COR1:2015—Explosive atmospheres—Part 2: Equipment protection by pressurized enclosures ''p'' with Corrigendum 1, Edition 6.0, 2015.
- IEC 60079–5:2015—Explosive atmospheres—Part 5: Equipment protection by powder filling ''q'', Edition 4.0, 2015–02.
- IEC 60079–6:2015—Explosive atmospheres—Part 6: Equipment protection by liquid immersion ''o'', Edition 4.0, 2015–02.
- IEC 60079–7:2015+AMD1:2017 CSV (Consolidated Version)—Explosive atmospheres—Part 7: Equipment protection by increased safety ''e'', Edition 5.1, 2017–08, (''IEC 60079–7:2015).
- IEC 60079–11:2011—Explosive atmospheres—Part 11: Equipment protection by intrinsic safety ''i'', Edition 6.0, 2011–06.
- IEC 60079–11:2011—Explosive atmospheres—Part 11: Equipment protection by intrinsic safety ''i'' with Corrigendum 1 (Jan. 2012), Edition 6.0, 2011–06.
- IEC 60079–13:2017—Explosive atmospheres—Part 13: Equipment protection by pressurized room ''p'' and artificially ventilated room ''v'' Edition 2.0, 2017–05.
- IEC 60079–15:2017—Explosive atmospheres—Part 15: Equipment protection by type of protection ''n'', Edition 5.0, 2017–12.
- IEC 60079–18:2017 (Consolidated version)—Explosive atmospheres—Part 18: Equipment protection by encapsulation ''m'', Edition 4.1, 2017–08.
- IEC 60079–25:2010—Explosive atmospheres—Part 25: Intrinsically safe electrical systems, Edition 2.0, 2010–02.
- IEC 60079–30–1:2007—Part 30–1: Electrical resistance trace heating—General and testing requirements, First Edition, 2007–01.
- IEC 60092–101:2018—Electrical installations in ships—Part 101: Definitions and general requirements, Edition 5.0, 2018–10.
- IEC 60092–201:2019—Electrical installations in ships—Part 201: System design—General, Edition 5.0, 2019–09.
- IEC 60092–202:2016—Electrical installations in ships—Part 202: System design—Protection, Edition 5.0, 2016–09.
- IEC 60092–301:1980—Electrical installations in ships—Part 301: Equipment—Generators and motors, Third Edition with amendment 1 (1994–05) and Amendment 2 (1995–04), 1980.
- IEC 60092–301:1980/AMD1:1994—Electrical installations in ships—Part 301: Equipment—Generators and motors, Third Edition with Amendment 1, 1994–05.
- IEC 60092–301:1980/AMD2:1995—Electrical installations in ships—Part 301: Equipment—Generators and motors, Third Edition with Amendment 2, 1995–04.
- IEC 60092–302:1997—Electrical Installation in ships—Part 302: Low-voltage switchgear and control gear assemblies, Fourth Edition, 1997–05.
- IEC 60092–303:1980—Electrical installations in ships—Part 303: Equipment—Transformers for power and lighting, Third Edition, 1980.
- IEC 60092–303:1980/AMD1:1997—Electrical installations in ships—Part 303: Equipment—Transformers for power and lighting, Third Edition with Amendment 1, 1997–09.
- IEC 60092–304:1980—Electrical installations in ships—Part 304: Equipment—Semiconductor convertors, Third Edition, 1980–01.
- IEC 60092–304:1980/AMD1:1995—Electrical installations in ships—Part 304: Equipment—Semiconductor convertors, Third Edition with Amendment 1, 1995–04.
- IEC 60092–306:2009—Electrical installation in ships—Part 306: Equipment—Luminaires and lighting accessories, Edition 4.0, 2009–11.
- IEC 60092–350:2014—Electrical installations in ships—Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications, Edition 4.0, 2014–08.
- IEC 60092–352:2005—Electrical installation in ships—Part 352: Choice and Installation of electrical cables, Third Edition, 2005–09.
- IEC 60092–353:2016—Electrical installation in ships—Part 353: Power cables for rated voltages 1 kV and 3 kV, Edition 4.0, 2016–09.
- IEC 60092–354:2014—Electrical installations in ships—Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (U_m=7,2 kV) up to 30 kV (U_m=36 kV), Edition 3.0, 2014–08.
- IEC 60092–360:2014—Electrical installations in ships—Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables, Edition 1.0, 2014–04.
- IEC 60092–376:2017—Electrical installations in ships—Part 376: Cables for control and instrumentation circuits 150/250 V (300 V), Third Edition, 2017–05.

- IEC 60092–401:1980—Electrical installations in ships—Part 401: Installation and test of completed installation, Third Edition, 1980.
- IEC 60092–401:1980/AMD1:1987—Electrical installations in ships—Part 401: Installation and test of completed installation, Amendment 1, (1987–02).
- IEC 60092–401:1980/AMD2:1997—Electrical installations in ships—Part 401: Installation and test of completed installation, Amendment 2 (1997–04).
- IEC 60092–502:1999—Electrical installations in ships—Part 502: Tankers—Special features, Fifth Edition, 1999–02.
- IEC 60092–503:2007(E)—Electrical installations in ships—Part 503: Special features—AC supply systems with voltages in the range of above 1kV up to and including 15 kV, Second Edition, 2007–06, (''IEC 60092–503:2007'').
- IEC 60331–11:1999+A1:2009—Tests for electric cables under fire conditions—Circuit integrity—Part 11: Apparatus—Fire alone at a flame temperature of at least 750 °C, Edition 1.1, 2009–07, (''IEC 60331–11:2009'').
- IEC 60331–21:1999—Tests for electric cables under fire conditions—Circuit integrity—Part 21: Procedures and requirements—Cables of rated voltage up to and including 0.6/1.0kV, First Edition, 1999–04.
- IEC 60332–1–1:2015—Tests on electric and optical fibre cables under fire conditions—Part 1–1: Test for vertical flame propagation for a single insulated wire or cable—Apparatus, First Edition with Amendment 1, 2015–07.
- IEC 60332–1–2:2015—Tests on electric and optical fibre cables under fire conditions—Part 1–2: Test for vertical flame propagation for a single insulated wire or cable—Procedure for 1kW pre-mixed flame, First Edition with Amendment 1, 2015–07.
- IEC 60332–3–21:2018—Tests on electric and optical fibre cables under fire conditions—Part 3–21: Test for vertical flame spread of vertically-mounted bunched wires or cables—Category A F/R, Edition 2.0, 2018–07.
- IEC 60332–3–22:2018—Tests on electric and optical fibre cables under fire conditions—Part 3–22: Test for vertical flame spread of vertically-mounted bunched wires or cables—Category A, Edition 2.0, 2018–07.
- IEC 60529:2013—Degrees of protection provided by enclosures (IP Code), Edition 2.2, 2013–08.
- IEC 60533:2015—Electrical and electronic installations in ships—Electromagnetic compatibility—Ships with a metallic hull, Edition 3.0, 2015–08.
- IEC 60947–2:2019—Low-voltage switchgear and controlgear—Part 2: Circuit-breakers, Edition 5.1, 2019–07.
- IEC 61363–1:1998—Electrical installations of ships and mobile and fixed offshore units—Part 1: Procedures for calculating short-circuit currents in three-phase a.c., First Edition, 1998–02.
- IEC 61439–6:2012: Low-voltage switchgear and control gear assemblies—Part 6: Busbar trunking systems (busways), Edition 1.0, 2012.
- IEC 61660–1:1997—Short-circuit currents in d.c. auxiliary installations in power plants and substations—Part 1: Calculation of short-circuit currents, First Edition, 1997–06.
- IEC 61660–1:1997/COR1:1999, Short-circuit currents in d.c. auxiliary installations in power plants and substations—Part 1: Calculation of short-circuit currents, Corrigendum 1 (March 1999), First Edition.
- IEC 61660–1:1997/COR2:2000, Short-circuit currents in d.c. auxiliary installations in power plants and substations—Part 1: Calculation of short-circuit currents, Corrigendum 2 (March 2000), First Edition.
- IEC 61892–7:2019—Mobile and fixed offshore units—Electrical installations—Part 7: Hazardous areas, Edition 4.0, 2019–04.
- IEC 62271–100:2017 (Consolidated Version)—High-voltage switchgear and controlgear—Part 100: Alternating-current circuit-breakers, Edition 2.2, 2017–06.
- IEC/TR 60092–370:2009—Technical Report—Electrical installations in ships—Part 370: Guidance on the selection of cables for telecommunication and data transfer including radio-frequency cables, Edition 1.0, 2009–07.
- IEC/IEEE 80005–1:2019—Utility connections in port—Part 1: High voltage shore connection (HVSC) systems—General requirements, Edition 2.0, 2019–03.
- ISO 25861:2007(E)—Ships and marine technology—Navigation—Daylight signalling lamps, First edition, Dec. 1, 2007.
- NEMA ICS 2–2000 (R2005)—Industrial Control and Systems Controllers, Contactors, and Overload Relays, Rated 600 Volts, 2000 (''NEMA ICS 2'').
- NEMA ICS 2.3–1995 (R2002, R2008)—Instructions for the Handling, Installation, Operation, and Maintenance of Motor Control Centers Rated not More Than 600 Volts, 1995 (''NEMA ICS 2.3'').
- NEMA ICS 2.4–2003 (R2012)—NEMA and IEC Devices for Motor Service—A Guide for Understanding the Differences, 2003 (''NEMA ICS 2.4'').
- NEMA 250–2018—Enclosures for Electrical Equipment (1000 Volts Maximum), 2018 (''NEMA 250'').
- ANSI/NEMA WC–70—Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy, Feb. 23, 2009 (''ANSI/NEMA WC–70'').
- NFPA 70—National Electrical Code, 2017 Edition, ANSI-approved August 24, 2016 (''NFPA 70'').
- NFPA 77—Recommended Practice on Static Electricity, ANSI-approved May 24, 2018, 2019 Edition (''NFPA 77'').
- NFPA 99—Health Care Facilities Code, 2018 Edition, ANSI-approved September 6, 2017 (''NFPA 99'').
- NFPA 496—Standard for Purged and Pressurized Enclosures for Electrical Equipment, 2017 Edition, ANSI-approved June 2, 2016 (''NFPA 496 (2017)'').
- UL 44—Standard for Safety Thermoset-Insulated Wire and Cable, Nineteenth Edition, Jan. 9, 2018 (''ANSI/UL 44'').
- UL 50—Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations, Thirteenth Edition, Oct. 16, 2015 (''UL 50'').
- UL 62—Standard for Safety Flexible Cords and Cables, Twentieth Edition, July 6, 2018 (''ANSI/UL 62'').
- UL 83—Standard for Safety Thermoplastic-Insulated Wires and Cables, Sixteenth Edition, Jul. 28, 2017 (''ANSI/UL 83'').
- UL 484—Standard for Safety Room Air Conditioners, Ninth Edition, Feb. 7, 2014 (''ANSI/UL 484'').
- UL 489—Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, Thirteenth Edition, Oct. 24, 2016 (''ANSI/UL 489'').
- UL 514A—Standard for Safety Metallic Outlet Boxes, Eleventh Edition, Feb. 1, 2013 (''ANSI/UL 514A'').
- UL 514B—Standard for Safety Conduit, Tubing, and Cable Fittings, Sixth Edition, revised Nov. 21, 2014 (''ANSI/UL 514B'').
- UL 514C—Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers, Fourth Edition, revised Dec. 10, 2014 (''ANSI/UL 514C'').
- UL 674—Standard for Safety Electric Motors and Generators for Use in Hazardous (Classified) Locations, Fifth Edition, May 31, 2011 (''ANSI/UL 674'').
- UL 823—Electric Heaters for Use in Hazardous (Classified) Locations, Ninth Edition, revised Nov. 15, 2007) (''ANSI/UL 823'').
- UL 844—Standard for Safety Luminaires for Use in Hazardous

(Classified) Locations, Thirteenth Edition, June 29, 2012 (''ANSI/UL 844).

• UL 913—Standard for Safety Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations, Eighth Edition, 2013 (''ANSI/UL 913'').

• UL 1042—Standard for Safety Electric Baseboard Heating Equipment, Fifth Edition, revised Sep. 9, 2014 (''ANSI/UL 1042'').

• UL 1072—Standard for Safety Medium-Voltage Power Cables, Fourth Edition, revised June 19, 2013 (''ANSI/UL 1072'').

• UL 1104—Standard for Safety for Marine Navigation Lights, Second Edition, Oct. 29, 1998, (''ANSI/UL 1104'').

• UL 1203—Standard for Safety: Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations, Fifth Edition, revised Apr. 24, 2015 (''ANSI/UL 1203'').

• UL 1309—Standard for Safety Marine Shipboard Cables, Third Edition, Apr. 21, 2017 (''ANSI/UL 1309'').

• UL 1598—Standard for Safety Luminaires, Fourth Edition, Aug. 28, 2018 (''ANSI/UL 1598'').

• UL 1598A—Standard for Safety Supplemental Requirements for Luminaires for Installation on Marine Vessels, First Edition, (with revisions through Apr. 17, 2015), Dec. 4, 2000, (''ANSI/UL 1598A'').

• UL 2021—Standard for Safety Fixed and Location-Dedicated Electric Room Heaters, Fourth Edition, Sept. 30, 2015 (''ANSI/UL 2021'').

• UL 2225—Standard for Safety Cables and Cable-Fittings for use in Hazardous (Classified) Locations, Fourth Edition, Sept. 30, 2013 (''ANSI/UL 2225'').

• UL 2556—Standard for Safety Wire and Cable Test Methods, Fourth Edition, Dec. 15, 2015 (''ANSI/UL 2556'').

• UL 60079–18—Standard for Safety Explosive Atmospheres—Part 18: Equipment Protection by Encapsulation ''m'', Fourth Edition, revised Feb. 20, 2017 (''ANSI/UL 60079–18'').

The sections that reference these standards and the locations where these standards are available are listed in § 110.10–1.

This rule also uses technical standards other than voluntary consensus standards. These are not government-unique standards but rather standards issued by the International Maritime Organization and two vessel classification societies, all of which have a long history of developing standards to ensure vessel safety and seaworthiness. Additionally, we incorporate several military specifications that are extensively used by the maritime community.

ABS Rules for Building and Classing Marine Vessels, 2020, (''ABS Marine Vessel Rules''), including:

(i) Part 1: Rules for Conditions of Classification;

(ii) Part 2: Rules for Materials and Welding;

(iii) Part 3: Rules for Building and Classing Marine Vessels—Hull Construction and Equipment;

(iv) Part 4: Rules for Building and Classing Marine Vessels—Vessel Systems and Machinery;

(v) Part 5A & 5B: Rules for Building and Classing Marine Vessels—Specific Vessel Types; Common Structural Rules for Bulk Carriers and Oil Tankers;

(vi) Part 5C: Rules for Building and Classing Marine Vessels—Specific Vessel Types (Chapters 1–6 and 7–18);

(vii) Part 5C: Rules for Building and Classing Marine Vessels—Specific Vessel Types (Chapters 7–18);

(viii) Part 5D: Rules for Building and Classing Marine Vessels—Offshore Support Vessels for Specialized Services;

(ix) Part 6: Rules for Building and Classing Marine Vessels—Specialized Items and Systems; and

(x) Part 7: Rules for Survey after Construction.

• ABS Rules for Building and Classing Mobile Offshore Units, Part 4 Machinery and Systems, 2020 (''ABS MOU Rules'').

• Lloyd's Register Type Approval System-Test Specification Number 1, March 2019.

• MIL–DTL–76E—Military Specification Wire and Cable, Hookup, Electrical, Insulated, General Specification for, Nov. 3, 2016 (''MIL–DTL–76E'').

• MIL–DTL–24640C—Detail Specification Cables, Lightweight, Low Smoke, Electric, for Shipboard Use, General Specification for, Nov. 8, 2011 (''MIL–DTL–24640C'').

• MIL–DTL–24640C Supplement 1—Detail Specification Cables, Lightweight, Low Smoke, Electric, for Shipboard Use, General Specification for, Nov. 8, 2011 (''MIL–DTL–24640C'').

• MIL–DTL–24643C—Detail Specification Cables, Electric, Low Smoke Halogen-Free, for Shipboard Use, General Specification for, Oct. 1, 2009(''MIL–DTL–24643C'').

• MIL–DTL–24643C Supplement 1A—Detail Specification Cables, Electric, Low Smoke Halogen-Free, for Shipboard Use, General Specification for, including Supplement 1A, Dec. 13, 2011, (''MIL–DTL–24643C'').

• SOLAS Consolidated Version, Consolidated Text of the International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1988: article, annexes and certificates, (Incorporating all amendments in effect from 1 July 2014), Sixth edition, 2014 (''IMO SOLAS 74'').

• IMO Resolution A.1023(26)—Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009, 18 Jan. 2010 (''2009 IMO MODU Code'').

The sections that reference these standards and the locations and web addresses where these standards are available are listed in § 110.10–1.

The Director of the Federal Register has approved the material in § 110.10–1 for incorporation by reference under 5 U.S.C. 552 and 1 CFR part 51. Copies of the material are available from the sources listed in § 110.10–1(a).

Consistent with 1 CFR part 51 incorporation by reference provisions, this material is reasonably available. Interested persons have access to it through their normal course of business, may purchase it from the organizations identified in 46 CFR 110.10–1, or may view a copy by means we have identified in that section.

M. Environment

We have analyzed this rule under Department of Homeland Security Management Directive 023–01, Rev. 1, associated implementing instructions, and Environmental Planning COMDTINST 5090.1 (series), which guide the Coast Guard in complying with the National Environmental Policy Act of 1969 (42 U.S.C. 4321–4370f), and have made a determination that this action is one of a category of actions that do not individually or cumulatively have a significant effect on the human environment. A Record of Environmental Consideration supporting this determination is available in the docket. For instructions on locating the docket, see the **ADDRESSES** section of this preamble. This rule is categorically excluded under paragraphs L54 and L57 of Appendix A, Table 1 of DHS Instruction Manual 023–01–001–01, Rev. 01. Paragraph L54 pertains to regulations that are editorial or procedural. Paragraph L57 pertains to regulations concerning manning, documentation, admeasurement, inspection, and equipping of vessels.

This rule involves incorporating by reference several updated electrical engineering standards along with removing several outdated or unnecessarily prescriptive electrical engineering regulations.

List of Subjects

46 CFR Part 110

Incorporation by reference, Reporting and recordkeeping requirements, Vessels.

46 CFR Parts 111 and 112

Incorporation by reference, Vessels.

46 CFR Part 113

Communications equipment, Fire prevention, Incorporation by reference, Vessels.

For the reasons discussed in the preamble, the Coast Guard amends 46 CFR parts 110, 111, 112, and 113 as follows:

Title 46—Shipping

PART 110—General Provisions

■ 1. The authority citation for part 110 is revised to read as follows:

Authority: 43 U.S.C. 1333; 46 U.S.C. 3306, 3307, 3703; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; DHS Delegation 00170.1, Revision No. 01.2; § 110.01–2 also issued under 44 U.S.C. 3507. Sections 110.15–1 and 110.25–1 also issued under sec. 617, Pub. L. 111–281, 124 Stat. 2905.

■ 2. Revise § 110.01–1(b) to read as follows:

* * * * *

(b) This subchapter applies only to electrical installations contracted for after April 17, 2023.

* * * * *

■ 3. Revise § 110.10–1 to read as follows.

§ 110.10–1 Incorporation by reference.

Certain material is incorporated by reference into this subchapter with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved incorporation by reference (IBR) material is available for inspection at the U.S. Coast Guard and at the National Archives and Records Administration (NARA). Contact U.S. Coast Guard at: U.S. Coast Guard, Office of Design and Engineering Standards (CG–ENG), 2703 Martin Luther King Jr Ave. SE, Stop 7418, Washington, DC 20593–7418, 202–372–1384, *www.dco.uscg.mil/CG–ENG/.* For information on the availability of this material at NARA, email: *fr.inspection@nara.gov;* website: *www.archives.gov/federal-register/cfr/ibr-locations.html.* The material may be obtained from the following sources:

(a) *American Bureau of Shipping (ABS),* 1701 City Plaza Drive, Spring, TX 77389; 281–877–5800; *CSC@eagle.org; ww2.eagle.org.*

(1) Rules for Building and Classing Marine Vessels, January 2020 (''ABS Marine Vessel Rules''); IBR approved for §§ 110.15–1(b); 111.01–9(b); 111.12–3; 111.12–5; 111.12–7(a) and (b); 111.33–11; 111.35–1; 111.70–1(a); 111.105–31(o); 111.105–39 introductory text and (a); 111.105–40(a) and (c); 112.05–7(c);113.05–7(a); including:

(i) Part 1: Rules for Conditions of Classification;

(ii) Part 2: Rules for Materials and Welding;

(iii) Part 3: Rules for Building and Classing Marine Vessels Hull—Hull Construction and Equipment;

(iv) Part 4: Rules for Building and Classing Marine Vessels Vessel—Vessel Systems and Machinery;

(v) Part 5A & 5B: Rules for Building and Classing Marine Vessels—Specific Vessel Types; Common Structural Rules for Bulk Carriers and Oil Tankers;

(vi) Part 5C: Rules for Building and Classing Marine Vessels—Specific Vessel Types (Chapters 1–6 and 7–18);

(vii) Part 5C: Rules for Building and Classing Marine Vessels—Specific Vessel Types (Chapters 7–18);

(viii) Part 5D: Rules for Building and Classing Marine Vessels—Offshore Support Vessels for Specialized Services;

(ix) Part 6: Rules for Building and Classing Marine Vessels—Specialized Items and Systems; and

(x) Part 7: Rules for Survey after Construction.

(2) Rules for Building and Classing Mobile Offshore Units, Part 4 Machinery and Systems, January 2020 (''ABS MOU Rules''); IBR approved for §§ 111.12–1(a); 111.12–3; 111.12–5; 111.12–7(c); 111.33–11; 111.35–1; 111.70–1(a).

(b) *American National Standards Institute (ANSI),* 25 West 43rd Street, New York, NY 10036; 212–642–4900; *info@ansi.org; www.ansi.org.*

(1) ANSI/ISA–RP12.06.01–2003, Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation Part 1: Intrinsic Safety, approved April 16, 2003 (''ANSI RP12.06.01''); IBR approved for § 111.105–11(b).

(2) ANSI/ISA 12.12.01–2015, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations, approved August 21, 2015 (''ANSI/ISA 12.12.01''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(c) *American Petroleum Institute (API),* 200 Massachusetts Avenue NW, Suite 1100. Washington, DC 20001–5571; 202–682–8000; *APIPubs@api.org*; *www.api.org.*

(1) API Recommended Practice 14F, Recommended Practice for Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Division 1 and Division 2 Locations, Sixth Edition, October 2018 (''API RP 14F''); IBR approved for § 111.105–17(b).

(2) API Recommended Practice 14FZ, Recommended Practice for Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Zone 0, Zone 1, and Zone 2 Locations, Second Edition, May 2013, (''API RP 14FZ''); IBR approved for § 111.105–17(b).

(3) API Recommended Practice 500, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2, Third Edition, December 2012 with errata January 2014 (''API RP 500''); IBR approved for §§ 111.106–7(a) and 111.106–13(b).

(4) API Recommended Practice 505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2, Second Edition, August 2018 (''API RP 505''); IBR approved for §§ 111.106–7(a); 111.106–13(b).

(d) *American Society of Mechanical Engineers* (*ASME),* Two Park Avenue, New York, NY 10016–5990; 800–843–2763; *CustomerCare@asme.org; www.asme.org.*

(1) ASME A17.1–2016/CSA B44–16, Safety Code for Elevators and Escalators: Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices, reissued January 16, 2017 with errata (''ASME A17.1''); IBR approved for § 111.91–1.

(2) [Reserved]

(e) *ASTM International (ASTM),* 100 Barr Harbor Drive, West Conshohocken, PA 19428–2959; 610–832–9500; *service@astm.org; www.astm.org.*

(1) ASTM B117–19, Standard Practice for Operating Salt Spray (Fog) Apparatus, approved November 1, 2019 (''ASTM B117''); IBR approved for § 110.15–1(b).

(2) ASTM F2876–10 (Reapproved 2015), Standard Practice for Thermal Rating and Installation of Internal Combustion Engine Packages for use in Hazardous Locations in Marine Applications, Reapproved May 1, 2015 (''ASTM F2876–10''); IBR approved for §§ 111.105–28; 111.106–3(h); 111.108–3(g).

(f) *CSA Group,* 178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3; 800–463–6727; *client.services@csagroup.org; www.csagroup.org.*

(1) CSA C22.2 No. 30–M1986 (Reaffirmed 2016), Explosion-proof enclosures for use in class I hazardous locations, Reaffirmed 2016 (''CSA C22.2 No. 30–M1986''), IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(2) CSA C22.2 No. 213–16, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (classified) locations, May 2016 (''CSA C22.2 No. 213–16''); IBR approved for §§ 111.105–3(b); 111.106–3(b) and 111.108–3(b).

(3) CSA–C22.2 No. 0–10 (Reaffirmed 2015), General requirements—Canadian Electrical Code, Part II, including Update No. 2, dated November 2014, Reaffirmed 2015 (''CSA C22.2 No. 0–10''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(4) CAN/CSA–C22.2 No. 157–92 (Reaffirmed 2016)—Intrinsically safe and non-incendive equipment for use in hazardous locations, including Update No. 2, dated June 2003, Reaffirmed 2016 (''CSA C22.2 No. 157–92''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(g) *DLA Document Services,* Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111, 215–697–6396; *dlacontactcenter@dla.mil*; *https://quicksearch.dla.mil/qsSearch.aspx.*

(1) MIL–DTL–76E, Military Specification Wire and Cable, Hookup, Electrical, Insulated, General Specification for, Nov. 3, 2016 (''MIL–DTL–76E''); IBR approved for § 111.60–11(c).

(2) MIL–DTL–24640C—Detail Specification Cables, Lightweight, Low Smoke, Electric, for Shipboard Use, General Specification for, (''MIL–DTL–24640C''), including:

(i) MIL–DTL–24640C, November 8, 2011; IBR approved for §§ 111.60–1(a); 111.106–5(a); and

(ii) MIL–DTL–24640C Supplement 1, November 8, 2011; IBR approved for §§ 111.60–1(a); 111.106–5(a).

(3) MIL–DTL–24643C, Detail Specification Cables, Electric, Low Smoke Halogen-Free, for Shipboard Use, General Specification for (''MIL–DTL–24643C''), including:

(i) MIL–DTL–24643C, October 1, 2009; IBR approved for §§ 111.60–1(a); 111.106–5(a); and

(ii) MIL–DTL–24643C with Supplement 1A, 13 December 2011; IBR approved for §§ 111.60–1(a); 111.106–5(a).

(h) *European Committee for Standardization,* CEN–CENELEC Management Centre, rue de la Sence 23, B–1040 Brussels, Belgium; + 32 2 550 08 1; *info@cencenelec.eu; www.cen.eu.*

(1) EN 14744, Inland navigation vessels and sea-going vessels—Navigation light, English version, August 2005; IBR approved for § 111.75–17(d).

(2) [Reserved]

(i) *FM Approvals,* P.O. Box 9102, Norwood, MA 02062, 781–762–4300; *https://www.fmglobal.com/report-contact-page/general-contact-form*; *https://www.fmapprovals.com.*

(1) Class Number 3600, Approval Standard for Electrical Equipment for Use in Hazardous (Classified) Locations—General Requirements, January 2018 (''FM Approvals Class Number 3600''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(2) Class Number 3610, Approval Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations, January 2018 (''FM Approvals Class Number 3610''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(3) Class Number 3611, Approval Standard for Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2, Hazardous (Classified) Locations, January 2018 (''FM Approvals Class Number 3611''), IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(4) Class Number 3615, Approval Standard for Explosion-proof Electrical Equipment General Requirements, January 2018 (''FM Approvals Class Number 3615''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(5) Class Number 3620, Approval Standard for Purged and Pressurized Electrical Equipment for Hazardous (Classified) Locations, January 2018 (''FM Approvals Class Number 3620''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(j) *Institute of Electrical and Electronic Engineers (IEEE),* 3 Park Avenue, New York, NY 10016–5997; 800–701–4333; *contactcenter@ieee.org; www.ieee.org.*

(1) IEEE Std. C37.04–2018, IEEE Standard Rating for Ratings and Requirements for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V, approved December 5, 2018 (''IEEE C37.04''); IBR approved for § 111.54–1(c).

(2) IEEE Std. C37.010–2016, IEEE Application Guide for AC High-Voltage Circuit Breakers >1000 Vac Rated on a Symmetrical Current Basis, approved September 22, 2016 (''IEEE C37.010''); IBR approved for § 111.54–1(c).

(3) IEEE Std. C37.12–2018, IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 V), approved December 5, 2018 (''IEEE C37.12''); IBR approved for § 111.54–1(c).

(4) IEEE Std. C37.13–2015, IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures, approved December 5, 2015 (''IEEE C37.13''); IBR approved for § 111.54–1(c).

(5) IEEE Std. C37.14–2015, IEEE Standard for DC (3200 V and below) Power Circuit Breakers Used in Enclosures, approved March 26, 2015 (''IEEE C37.14''); IBR approved for § 111.54–1(c).

(6) IEEE Std. C37.27–2015, IEEE Guide for Low-Voltage AC (635 V and below) Power Circuit Breakers Applied with Separately-Mounted Current-Limiting Fuses, approved December 5, 2015 (''IEEE C37.27''); IBR approved for § 111.54–1(c).

(7) IEEE Std. 45.1–2017 IEEE Recommended Practice for Electrical Installations on Shipboard—Design, approved March 23, 2017 (''IEEE 45.1–2017''); IBR approved for §§ 111.15–2(b); 111.40–1; 111.75–5(b); 111.105–41; and 113.65–5.

(8) IEEE Std. 45.2–2011, IEEE Recommended Practice for Electrical Installations on Shipboard—Controls and Automation, approved September 10, 2011 (''IEEE 45.2–2011''); IBR approved for §§ 111.33–3(a); 111.33–5(a).

(9) IEEE Std. 45.6–2016; IEEE Recommended Practice for Electrical Installations on Shipboard—Electrical Testing, approved December 7, 2016 (''IEEE 45.6–2016''); IBR approved for § 111.60–21.

(10) IEEE Std. 45.7–2012, IEEE Recommended Practice for Electrical Installations on Shipboard—AC Switchboards, approved March 29, 2012 (''IEEE 45.7–2012''); IBR approved for §§ 111.30–1; 111.30–5(a); 111.30–19(a).

(11) IEEE Std. 45.8–2016, IEEE Recommended Practice for Electrical Installations on Shipboard—Cable Systems, approved January 29, 2016 (''IEEE 45.8–2016''); IBR approved for §§ 111.05–7; 111.60–5(a); 111.60–13(a); 111.60–19(b).

(12) IEEE Std. 100, The Authoritative Dictionary of IEEE Standards Terms, Seventh Edition, published December 2000 (''IEEE 100''); IBR approved for § 110.15–1(a).

(13) IEEE Std. 1202–2006, IEEE Standard for Flame-Propagation Testing of Wire and Cable, (''IEEE 1202''), including:

(i) IEEE Std. 1202–2006 (R2012), reaffirmed December 5, 2012; IBR

approved for §§ 111.60–6(a); 111.107–1(c); and

(ii) IEEE Std. 1202–2006/Cor 1–2012, Corrigendum 1 approved November 21, 2012; IBR approved for §§ 111.60–6(a); 111.107–1(c).

(15) IEEE Std. 1580–2010, IEEE Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Facilities, approved September 30, 2010 (''IEEE 1580''); IBR approved for §§ 111.60–1(a); 111.60–2; 111.106–5(a).

(k) *International Electrotechnical Commission (IEC),* 3 Rue de Varembe, Geneva, Switzerland; +41 22 919 02 11; *www.iec.ch*; *https://www.iec.ch/contact?id=40499*.

(1) IEC 60068–2–52:2017, Environmental testing—Part 2–52: Tests—Test Kb: Salt mist, cyclic (sodium chloride solution), Edition 3.0, 2017–11; IBR approved for § 110.15–1(b).

(2) IEC 60079–1:2014, Explosive atmospheres—Part 1: Equipment protection by flameproof enclosures ''d'', Edition 7.0, 2014–06; IBR approved for §§ 111.105–3(b); 106–3(b); 111.108–3(b).

(3) IEC 60079–2:2014, Explosive atmospheres—Part 2: Equipment protection by pressurized enclosures ''p'', including:

(i) IEC 60079–2:2014, Edition 6.0, 2014–07, IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b); and

(ii) IEC 60079–2:2014/COR1:2015, with Corrigendum 1 (2015), Edition 6.0, 2014–07; IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(4) IEC 60079–5:2015, Explosive atmospheres—Part 5: Equipment protection by powder filling ''q'', Edition 4.0, 2015–02, IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(5) IEC 60079–6:2015, Explosive atmospheres—Part 6: Equipment protection by liquid immersion ''o'', Edition 4.0, 2015–02; IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(6) IEC 60079–7:2015+AMD1:2017 CSV (Consolidated Version), Explosive atmospheres—Part 7: Equipment protection by increased safety ''e'', Edition 5.1, 2017–08, (''IEC 60079–7:2015''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(7) IEC 60079–11:2011, Explosive atmospheres—Part 11: Equipment protection by intrinsic safety ''i'' (''IEC 60079–11:2011''), including:

(i) IEC 60079–11:2011, Edition 6.0, 2011–06; IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b); and

(ii) IEC 60079–11:2011, Corrigendum 1 (January 2012), Edition 6.0, 2011–06; IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(8) IEC 60079–13:2017, Explosive atmospheres—Part 13: Equipment protection by pressurized room ''p'' and artificially ventilated room ''v'', Edition 2.0, 2017–05; IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(9) IEC 60079–15:2017, Explosive atmospheres—Part 15: Equipment protection by type of protection ''n'', Edition 5.0, 2017–12; IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(10) IEC 60079–18:2017 (Consolidated Version), Explosive atmospheres—Part 18: Equipment protection by encapsulation ''m'', Edition 4.1, 2017–08, (''IEC 60079–18:2017''); IBR approved for §§ 111.105–3 (b)and (e); 111.106–3(b) and (d); 111.108–3(b) and (e).

(11) IEC 60079–25:2010, Explosive atmospheres—Part 25: Intrinsically safe electrical systems, Edition 2.0, 2010–02; IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(12) IEC 60079–30–1:2007, Part 30–1: Electrical resistance trace heating—General and testing requirements, First Edition, 2007–01; IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(13) IEC 60092–101:2018, Electrical installations in ships—Definitions and general requirements, Edition 5.0, 2018–10; IBR approved for §§ 110.15–1(a); 111.81–1(d).

(14) IEC 60092–201:2019, Electrical installations in ships—Part 201: System design—General, Edition 5.0, 2019–09; IBR approved for §§ 111.70–3(a); 111.81–1(d).

(15) IEC 60092–202:2016, Electrical installations in ships—Part 202: System design—Protection, Edition 5.0, 2016–09; IBR approved for §§ 111.12–7(b); 111.50–3(c), (e), and (g); 111.53–1(a); 111.54–1(a).

(16) IEC 60092–301:1980, Electrical installations in ships—Part 301: Equipment—Generators and motors, (''IEC 60092–301:1980''), including:

(i) IEC 60092–301:1980, Third Edition, copyright 1980; IBR approved for §§ 111.12–7(b); 111.70–1(a);

(ii) IEC 60092–301:1980/AMD1:1994, Amendment 1 (1994–05), copyright 1980, IBR approved for §§ 111.12–7(b); 111.70–1(a); and

(iii) IEC 60092–301:1980/AMD2:1995, Amendment 2 (1995–04), copyright 1980; IBR approved for §§ 111.12–7(b); 111.70–1(a).

(17) IEC 60092–302:1997, Electrical Installation in ships—Part 302: Low-voltage switchgear and control gear assemblies, Fourth Edition, 1997–05; IBR approved for §§ 111.30–1; 111.30–5; 111.30–19(a).

(18) IEC 60092–303:1980, Electrical installations in ships—Part 303: Equipment—Transformers for power and lighting, (''IEC 60092–303:1980), including:

(i) IEC 60092–303:1980, Third Edition, 1997–09, copyright 1980; IBR approved for § 111.20–15; and

(ii) IEC 60092–303:1980/AMD1:1997, Amendment 1, copyright 1980; IBR approved for § 111.20–15.

(19) IEC 60092–304:1980, Electrical installations in ships—Part 304: Equipment—Semiconductor convertors, (''IEC 60092–304:1980''), including:

(i) IEC 60092–304:1980, Third Edition, (1980–01); IBR approved for §§ 111.33–3(a); 111.33–5(b); and

(ii) IEC 60092–304:1980/AMD1:1995, Amendment 1, 1995–04; IBR approved for §§ 111.33–3(a); 111.33–5(b).

(20) IEC 60092–306:2009, Electrical installation in ships—Part 306: Equipment—Luminaires and lighting accessories, Edition 4.0, 2009–11; IBR approved for §§ 111.75–20(a) and (b); 111.81–1(d).

(21) IEC 60092–350:2014, Electrical installations in ships—Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications, Edition 4.0, 2014–08; IBR approved for §§ 111.60–1(a); 111.106–5(a).

(22) IEC 60092–352:2005, Electrical installation in ships—Part 352: Choice and Installation of electrical cables, Third Edition, 2005–09; IBR approved for §§ 111.60–1; 111.60–5(a) and (b); 111.81–1(d).

(23) IEC 60092–353:2016, Electrical installation in ships—Part 353: Power cables for rated voltages 1 kV and 3 kV, Edition 4.0, 2016–09; IBR approved for §§ 111.60–1(a); 111.60–5(a); 111.106–5(a).

(24) IEC 60092–354:2014, Electrical installations in ships—Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (U_m=7,2 kV) up to 30 kV (U_m=36 kV), Edition 3.0, 2014–08; IBR approved for § 111.60–1(a).

(25) IEC 60092–360:2014, Electrical installations in ships—Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables, Edition 1.0, 2014–04; IBR approved for § 111.60–1(a).

(26) IEC 60092–376:2017, Electrical installations in ships—Part 376: Cables for control and instrumentation circuits 150/250 V (300 V), Third Edition, 2017–05; IBR approved for § 111.60–1(a).

(27) IEC 60092–401:1980, Electrical installations in ships—Part 401: Installation and test of completed installation, (''IEC 60092–401:1980''), including:

(i) IEC 60092–401:1980, Third Edition, 1980; IBR approved for §§ 111.05–9; 111.81–1(d);

(ii) IEC 60092–401:1980/AMD1:1987, Amendment 1, (1987–02), 1980; IBR approved for §§ 111.05–9; 111.81–1(d); and

(iii) IEC 60092–401:1980/AMD2:1997, Amendment 2 (1997–04), 1980; IBR approved for §§ 111.05–9; 111.81–1(d).

(28) IEC 60092–502:1999, Electrical installations in ships—Part 502: Tankers—Special features, Fifth Edition, 1999–02; IBR approved for §§ 111.81–1(d); 111.105–1, 111.105–3(b); 111.105–11(c); 111.105–17(b); 111.105–50(a), (b), and (c); 111.106–3(b); 111.106–5(c); 111.106–15(a); 111.108–3(b).

(29) IEC 60092–503:2007(E), Electrical installations in ships—Part 503: Special features—AC supply systems with voltages in the range of above 1kV up to and including 15 kV, Second Edition, 2007–06 (''IEC 60092–503:2007''); IBR approved for § 111.30–5(a).

(30) IEC 60331–11:1999+A1:2009, Tests for electric cables under fire conditions—Circuit integrity—Part 11: Apparatus—Fire alone at a flame temperature of at least 750 °C, Edition 1.1, 2009–07, (''IEC 60331–11:2009''); IBR approved for § 113.30–25(j).

(31) IEC 60331–21:1999, Tests for electric cables under fire conditions—Circuit integrity—Part 21: Procedures and requirements—Cables of rated voltage up to and including 0.6/1.0kV, First Edition, 1999–04; IBR approved for § 113.30–25(j).

(32) IEC 60332–1–1:2015 (Consolidated Version), Tests on electric and optical fibre cables under fire conditions—Part 1–1: Test for vertical flame propagation for a single insulated wire or cable—Apparatus, Edition 1.1, 2015–07; IBR approved for § 111.30–19(b).

(33) IEC 60332–1–2:2015 (Consolidated Version), Tests on electric and optical fibre cables under fire conditions—Part 1–2: Test for vertical flame propagation for a single insulated wire or cable—Procedure for 1kW pre-mixed flame, Edition 1.1, 2015–07, IBR approved for § 111.30–19(b).

(34) IEC 60332–3–21:2018, Tests on electric and optical fibre cables under fire conditions—Part 3–21: Test for vertical flame spread of vertically-mounted bunched wires or cables—Category A F/R, Edition 2.0, 2018–07; IBR approved for §§ 111.60–1(b); 111.60–2; 111.107–1(c).

(35) IEC 60332–3–22:2018, Tests on electric and optical fibre cables under fire conditions—Part 3–22: Test for vertical flame spread of vertically-mounted bunched wires or cables—Category A, Edition 2.0, 2018–07; IBR approved for §§ 111.60–1(b); 111.60–2; 111.60–6(a); 111.107–1(c).

(36) IEC 60529:2013 (Consolidated Version), Degrees of protection provided by enclosures (IP Code), Edition 2.2, 2013–08, (''IEC 60529:2013''); IBR approved for §§ 110.15–1(a); 111.01–9(a), (c), and (d); 113.10–7; 113.20–3; 113.25–11(a); 113.30–25(e) and (i); 113.37–10(b); 113.40–10(b); 113.50–5(g).

(37) IEC 60533:2015, Electrical and electronic installations in ships—Electromagnetic compatibility—Ships with a metallic hull, Edition 3.0, 2015–08; IBR approved for § 113.05–7(a).

(38) IEC 60947–2:2019 (Consolidated Version), Low-voltage switchgear and controlgear—Part 2: Circuit-breakers, Edition 5.1, 2019–07, (''IEC 60947–2:2019''); IBR approved for § 111.54–1(b) and (c).

(39) IEC 61363–1:1998, Electrical installations of ships and mobile and fixed offshore units—Part 1: Procedures for calculating short-circuit currents in three-phase a.c., First Edition, 1998–02; IBR approved for § 111.51–4(b).

(40) IEC 61439–6:2012, Low-voltage switchgear and control gear assemblies—Part 6: Busbar trunking systems (busways), Edition 1.0, 2012–05; IBR approved for § 111.59–1.

(41) IEC 61660–1:1997, Short-circuit currents in d.c. auxiliary installations in power plants and substations—Part 1: Calculation of short-circuit currents, (''IEC 61660–1:1997''), including:

(i) IEC 61660–1:1997, First Edition, 1997–06; IBR approved for § 111.51–4(b);

(ii) IEC 61660–1:1997/COR1:1999, Corrigendum 1 (March 1999), First Edition; IBR approved for § 111.51–4(b); and

(iii) IEC 61660–1:1997/COR2:2000, Corrigendum 2 (March 2000), First Edition; IBR approved for § 111.51–4(b).

(42) IEC 61892–7:2019, Mobile and fixed offshore units—Electrical installations—Part 7: Hazardous areas, Edition 4.0, 2019–04; IBR approved for §§ 111.105–1; 111.105–3(b); 111.105–17(b); 111.108–3(b).

(43) IEC 62271–100:2017 (Consolidated Version), High-voltage switchgear and controlgear—Part 100: Alternating-current circuit-breakers, Edition 2.2, 2017–06; IBR approved for § 111.54–1(c).

(44) IEC/TR 60092–370:2009, Technical Report—Electrical installations in ships—Part 370: Guidance on the selection of cables for telecommunication and data transfer including radio-frequency cables, Edition 1.0, 2009–07; IBR approved for § 111.60–1(a).

(45) IEC/IEEE 80005–1:2019, Utility connections in port—Part 1: High voltage shore connection (HVSC) systems—General requirements, Edition 2.0, 2019–03; IBR approved for § 111.83–7.

(l) *International Maritime Organization (IMO Publications Section),* 4 Albert Embankment, London SE1 7SR, United Kingdom; +44 (0) 20 7735 7611; *sales@imo.org; www.imo.org.*

(1) SOLAS Consolidated Edition 2014, Consolidated Text of the International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1988: article, annexes and certificates, (Incorporating all amendments in effect from July 1, 2014), Sixth edition, 2014 (''IMO SOLAS 74''); IBR approved for §§ 111.99–5; 112.15–1(r); 113.25–6.

(2) IMO Resolution A.1023(26), Code for the Construction and Equipment of Mobile Offshore Drilling Units, 2009, January 18, 2010 (''2009 IMO MODU Code''); IBR approved for § 111.108–3(b).

(m) *International Standards Organization (ISO),* Chemin de Blandonnet 8, CP 401—1214 Vernier, Geneva, Switzerland; +41 22 749 01 11; *customerservice@iso.org; www.iso.org.*

(1) ISO 25861:2007(E), Ships and marine technology—Navigation—Daylight signalling lamps, First edition, December 1, 2007, (''ISO 25861''); IBR approved for § 111.75–18.

(2) [Reserved]

(n) *Lloyd's Register,* 71 Fenchurch Street, London EC3M 4BS, UK; +44–0–20–7709–9166; *www.lr.org/en/type-approval-test-specifications.*

(1) Lloyd's Register Type Approval System—Test Specification Number 1, March 2019; IBR approved for § 113.05–7(a).

(2) [Reserved]

(o) *National Electrical Manufacturers Association (NEMA),* 1300 North 17th Street, Suite 900, Arlington, VA 22209; 703–841–3200; *communications@nema.org; www.nema.org.*

(1) NEMA ICS 2–2000 (R2005), Industrial Control and Systems Controllers, Contactors, and Overload Relays, Rated 600 Volts, copyright 2006 (''NEMA ICS 2''); IBR approved for § 111.70–3(a).

(2) NEMA ICS 2.3–1995 (R2002, R2008), Instructions for the Handling, Installation, Operation, and Maintenance of Motor Control Centers Rated not More Than 600 Volts, copyright 2008 (''NEMA ICS 2.3''); IBR approved for § 111.70–3(a).

(3) NEMA ICS 2.4–2003 (R2012), NEMA and IEC Devices for Motor Service—A Guide for Understanding the Differences, copyright 2012 (''NEMA ICS 2.4''); IBR approved for § 111.70–3(a).

(4) NEMA 250–2018, Enclosures for Electrical Equipment (1000 Volts Maximum), 2018 (''NEMA 250''); IBR approved for §§ 110.15–1(b); 111.01–9(a), (b), (c), and (d); 113.10–7; 113.20–3; 113.25–11(a); 113.30–25(e) and (i); 113.37–10(b); 113.40–10(b); 113.50–5(g).

(5) ANSI/NEMA WC–70–2009, Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy, February 23, 2009, (''ANSI/NEMA WC–70''); IBR approved for § 111.60–13(a) and (c).

(p) *National Fire Protection Association (NFPA),* 1 Batterymarch Park, Quincy, MA 02169; 617–770–3000; *stds_admin@nfpa.org; www.nfpa.org.*

(1) NFPA 70, National Electrical Code, 2017 Edition, ANSI-approved August 24, 2016 (''NFPA 70''), IBR approved for §§ 110.15–1; 111.05–33; 111.20–15; 111.50–3(c),(e), and (g); 111.50–7(a); 111.50–9; 111.53–1(a); 111.54–1(a); 111.55–1(a); 111.59–1; 111.60–7; 111.60–13(a)–(c); 111.60–23(d) and (f); 111.81–1(d); 111.105–1; 111.105–3(b); 111.105–11(a) and (c); 111.105–17(b); 111.106–3(b); 111.106–5(c); 111.107–1(b); 111.108–3(b).

(2) NFPA 77, Recommended Practice on Static Electricity, 2019 Edition, ANSI-approved May 24, 2018, (''NFPA 77''); IBR approved for § 111.105–27(b).

(3) NFPA 99, Health Care Facilities Code, 2018 Edition, ANSI-approved September 6, 2017, (''NFPA 99''); IBR approved for § 111.105–37.

(4) NFPA 496, Standard for Purged and Pressurized Enclosures for Electrical Equipment, 2017 Edition, ANSI-approved June 2, 2016 (''NFPA 496 (2017)''); IBR approved for §§ 111.105–3(d); 111.106–3(c); 111.108–3(d).

(q) *UL,* Comm 2000, 151 Eastern Avenue, Bensenville, IL 60106; (888) 853–3512; *https://www.ul.com/customer-service*; *www.shopulstandards.com.*

(1) UL 44, Standard for Safety Thermoset-Insulated Wire and Cable, Nineteenth Edition, January 9, 2018 (''ANSI/UL 44''); IBR approved for § 111.60–11(c).

(2) UL 50, Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations, Thirteenth Edition, October 16, 2015 (''UL 50''); IBR approved for § 111.81–1(d).

(3) UL 62, Standard for Safety Flexible Cords and Cables, Twentieth Edition, July 6, 2018, (''ANSI/UL 62''); IBR approved for § 111.60–13(a).

(4) UL 83, Standard for Safety Thermoplastic-Insulated Wires and Cables, Sixteenth Edition, July 28, 2017 (''ANSI/UL 83''); IBR approved for § 111.60–11(c).

(5) UL 484, Standard for Safety Room Air Conditioners, Ninth Edition, February 7, 2014, (''ANSI/UL 484''); IBR approved for § 111.87–3(a).

(6) UL 489, Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, Thirteenth Edition, October 24, 2016 (''ANSI/UL 489''); IBR approved for §§ 111.01–15(c); 111.54–1(b).

(7) UL 514A, Standard for Safety Metallic Outlet Boxes, Eleventh Edition, February 1, 2013, (''ANSI/UL 514A''); IBR approved for § 111.81–1(d).

(8) UL 514B, Standard for Safety Conduit, Tubing, and Cable Fittings, Sixth Edition, revised November 21, 2014, (''ANSI/UL 514B''); IBR approved for § 111.81–1(d).

(9) UL 514C, Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers, Fourth Edition, revised December 10, 2014, (''ANSI/UL 514C''); IBR approved for § 111.81–1(d).

(10) UL 674, Standard for Safety Electric Motors and Generators for Use in Hazardous (Classified) Locations, Fifth Edition, May 31, 2011 (''ANSI/UL 674''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(11) UL 823, Electric Heaters for Use in Hazardous (Classified) Locations, Ninth Edition, revised November 15, 2007, (''ANSI/UL 823''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(12) UL 844, Standard for Safety Luminaires for Use in Hazardous (Classified) Locations, Thirteenth Edition, June 29, 2012, (''ANSI/UL 844''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(13) UL 913, Standard for Safety Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations, Eighth Edition, 2013, (''ANSI/UL 913''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(14) UL 1042, Standard for Safety Electric Baseboard Heating Equipment, Fifth Edition, revised September 9, 2014, (''ANSI/UL 1042''); IBR approved for § 111.87–3(a).

(15) UL 1072, Standard for Safety Medium-Voltage Power Cables, Fourth Edition, revised June 19, 2013, (''ANSI/UL 1072''); IBR approved for § 111.60–1(a).

(16) UL 1104, Standard for Safety for Marine Navigation Lights, Second Edition, October 29, 1998 (''ANSI/UL 1104''); IBR approved for § 111.75–17(d).

(17) UL 1203—Standard for Safety: Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations, Fifth Edition, revised April 24, 2015, (''ANSI/UL 1203''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(18) UL 1309, Standard for Safety Marine Shipboard Cables, Third Edition, Apr. 21, 2017 (''ANSI/UL 1309''); IBR approved for §§ 111.60–1(a); 111.106–5(a).

(19) UL 1598, Standard for Safety Luminaires, Fourth Edition, August 28, 2018 (''ANSI/UL 1598''); IBR approved for § 111.75–20(b).

(20) UL 1598A, Standard for Safety Supplemental Requirements for Luminaires for Installation on Marine Vessels, First Edition (with revisions through April 17, 2015), December 4, 2000 (''ANSI/UL 1598A''); IBR approved for § 111.75–20(a) and (b).

(21) UL 2021, Standard for Safety Fixed and Location-Dedicated Electric Room Heaters, Fourth Edition, September 30, 2015 (''ANSI/UL 2021''); IBR approved for § 111.87–3(a).

(22) UL 2225, Standard for Safety Cables and Cable-Fittings for use in Hazardous (Classified) Locations, Fourth Edition, September 30, 2013 (''ANSI/UL 2225''); IBR approved for §§ 111.105–3(b); 111.106–3(b); 111.108–3(b).

(23) UL 2556, Standard for Safety Wire and Cable Test Methods, Fourth Edition, Dec. 15, 2015 (''ANSI/UL 2556''); IBR approved for §§ 111.30–19(b); 111.60–2; 111.60–6(a).

(24) UL 60079–18, Standard for Safety Explosive Atmospheres—Part 18: Equipment Protection by Encapsulation ''m'', Fourth Edition, revised February 20, 2017, (''ANSI/UL 60079–18''); IBR approved for §§ 111.105–3(e); 111.106–3(d); 111.108–3(e).

■ 4. Amend § 110.15–1 by:
■ a. Revising paragraph (a);
■ b. In paragraph (b):
■ i. In the definition for ''Constructed'', redesignating paragraphs (1) and (2) as paragraphs (i) and (ii);
■ ii. Revising the definition for ''Corrosion resistant material or finish'';
■ iii. Removing the definition for ''Corrosive location'';
■ iv. Revising the definition for ''Dead ship condition'';
■ v. Adding, in alphabetical order, a definition for ''Drilling loads'';
■ vi. Removing the definition for ''Dripproof'';

■ vii. In the definition for ''IECEx System'', removing the text ''(incorporated'' and adding, in its place, the text ''(as incorporated'';
■ viii. Revising the definitions for ''Independent laboratory'', ''Location not requiring an exceptional degree of protection'';
■ ix. In the definition for ''Location requiring an exceptional degree of protection'', redesignating paragraphs (1) through (5) as paragraphs (i) through (v);
■ x. Revising the definitions for ''Non-hazardous'', ''Nonsparking fan'';
■ xi. Removing the definition for ''Ocean vessel'';
■ xii. Adding, in alphabetical order, a definition for ''Ship's service loads''; and
■ xiii. Revising the definition for ''Watertight''.

The revisions and additions read as follows:

§ 110.15–1 Definitions

* * * * *

(a) The electrical and electronic terms are defined in IEEE 100 or IEC 60092–101:2018 (both incorporated by reference; see § 110.10–1).

(b) * * *

Corrosion resistant material or *finish* means any material or finish that meets the testing requirements of ASTM B117 (incorporated by reference; see § 110.10–1) or test Kb in IEC 60068–2–52:2017.

Dead ship condition is where the entire machinery installation, including the power supply, is out of operation and that auxiliary services such as compressed air, starting current from batteries etc., for bringing the main propulsion into operation and for the restoration of the main power supply are not available.

Drilling loads means all loads associated exclusively with the drilling operation including power to the drill table, mud system, and positioning equipment.

* * * * *

Independent laboratory means a laboratory that is accepted by the Commandant under part 159 of this subchapter for the testing and listing or certification of electrical equipment.

* * * * *

Location not requiring an exceptional degree of protection means a location which is not exposed to the environmental conditions outlined in the definition for locations requiring exceptional degrees of protection. This location requires the degree of protection of § 111.01–9(c) or (d) of this subchapter. These locations include—

(i) An accommodation space;
(ii) A dry store room;
(iii) A passageway adjacent to quarters;
(iv) A water closet without a shower or bath;
(v) A radio, gyro and chart room; and
(vi) A location with similar environmental conditions.

* * * * *

Non-hazardous location means an area in which an explosive gas or dust atmosphere is not expected to be present in quantities that require special precautions for the construction, installation, and use of electrical equipment.

Nonsparking fan means nonsparking fan as defined in ABS Marine Vessel Rules (incorporated by reference; see § 110.10–1), section 4–8–3/11.

* * * * *

Ship's service loads means the electrical equipment for all auxiliary services necessary for maintaining the vessel in a normal, operational and habitable condition. Ship's service loads include, but are not limited to, all safety, lighting, ventilation, navigational, communications, habitability, and propulsion auxiliary loads. Electrical propulsion motor, bow thruster motor, cargo transfer, drilling, cargo refrigeration for other than Class 5.2 organic peroxides and Class 4.1 self-reactive substances, and other industrial type loads are not included.

* * * * *

Watertight means enclosed so that equipment meets at least a NEMA 250 Type 4 or 4X or an IEC 60529:2013 IP 56 rating.

* * * * *

■ 5. Amend § 110.25–1 as follows:
■ a. Designate the note immediately preceding paragraph (a) as Note 1 to § 110.25–1 introductory text;
■ b. In paragraph (a)(5), remove the text ''interrupting capacity of circuit breakers'' and add, in its place, the text ''interrupting capacity of overcurrent devices'';
■ c. In paragraph (a)(6), remove the text ''Subpart 111.52'' and add, in its place, the text ''subpart 111.51 of part 111 of this subchapter'';
■ d. In paragraph (i) introductory text, remove the text ''part 111, subpart 111.105 is'' and add, in its place, the text ''subparts 111.105, 111.106, and 111.108 of part 111 of this subchapter are'';
■ e. Redesignate paragraphs (i)(1) through (6) as paragraphs (i)(2) through (i)(7), respectively;
■ f. Add new paragraph (i)(1);
■ g. In paragraph (j), remove the text ''§ 111.105–11 of this chapter'' and add, in its place, the text ''§§ 111.105–11 and 111.106–5(c) of this subchapter'';
■ h. Designate the note to paragraph (m) as note 2 to paragraph (m);
■ i. In newly-designated note 2 to paragraph (m), remove the word ''signalling'' and add, in its place, the word ''signaling'';
■ j. Designate the note to paragraph (n) as note 3 to paragraph (n);
■ k. In newly-designated note 3 to paragraph (n), remove the text ''UL, ANSI, or'' and add, in its place, the text ''ANSI, NFPA, or''
■ l. In paragraph (o), remove the text ''of this chapter'' and add, in its place, the text ''of this subchapter''; and
■ m. Remove paragraphs (p) and (q).

The addition reads as follows:

§ 110.25–1 Plans and information required for new construction.

* * * * *

(i) * * *

(1) Method of classification, Division or Zone, used to determine hazardous locations;

* * * * *

■ 6. Revise § 110.25–3 to read as follows:

§ 110.25–3 Procedure for submitting plans.

(a) The plans required by § 110.25–1 must be submitted to one of the following Coast Guard offices:

(1) The Commanding Officer, Marine Safety Center, U.S. Coast Guard, 2703 Martin Luther King Jr. Avenue SE, Washington, DC 20593–7403, or by mail to: Commanding Officer (MSC), Attn: Marine Safety Center, U.S. Coast Guard Stop 7430, 2703 Martin Luther King Jr. Avenue SE, Washington, DC 20593–7430, or electronically to *MSC@uscg.mil*.

(2) The Officer in Charge, Marine Inspection at or nearest the place where the vessel is to be built.

(b) Three copies of each plan are required so that one can be returned to the submitter. If the submitter desires additional copies of approved plans, he should submit enough for the necessary distribution.

Note 1 to § 110.25–3: The Coast Guard and a Recognized Classification Society (RCS), IAW 46 CFR part 8, may coordinate plan review for vessels classed by the RCS to eliminate duplication of effort. An applicant for plan review of a vessel that is classed by an RCS should consult Commanding Officer, Marine Safety Center, to determine applicable procedures for submitting plans.

PART 111—ELECTRIC SYSTEMS—GENERAL REQUIREMENTS

■ 7. The authority citation for part 111 is revised to read as follows:

Authority: 46 U.S.C. 3306, 3703; DHS Delegation No. 00170.1, Revision No. 01.2. Section 111.05–20 and Subpart 111.106 also issued under sec. 617, Pub. L. 111–281, 124 Stat. 2905.

■ 8. Revise § 111.01–9 to read as follows:

§ 111.01–9 Degrees of protection.

(a) Interior electrical equipment exposed to dripping liquids or falling solid particles must be manufactured to at least NEMA 250 Type 2 or IEC 60529:2013 IP 22 (both incorporated by reference; see § 110.10–1 of this subchapter) degree of protection as appropriate for the service intended.

(b) Electrical equipment in locations requiring exceptional degrees of protection as defined in § 110.15–1 must be enclosed to meet at least the minimum degrees of protection in ABS Marine Vessel Rules (incorporated by reference; see § 110.10–1 of this subchapter), section 4–8–3, Table 2, or appropriate NEMA 250 type for the service intended. Each enclosure must be designed so that the total rated temperature of the equipment inside the enclosure is not exceeded.

(c) Central control consoles and similar control enclosures must be manufactured to at least NEMA 250 Type 2 or IEC 60529:2013 IP 22 degree of protection regardless of location.

(d) Equipment for interior locations not requiring exceptional degrees of protection must be manufactured to at least NEMA 250 Type 1 with dripshield or IEC 60529:2013 IP 11.

§ 111.01–15 [Amended]

■ 9. Amend § 111.01–15, in paragraph (c), by removing the text ''UL 489 (incorporated by reference, see 46 CFR 110.10–1)'' and adding, in its place, the text ''ANSI/UL 489 (incorporated by reference, see § 110.10–1 of this subchapter)''.

■ 10. Amend § 111.05–3 by revising paragraph (c) to read as follows:

§ 111.05–3 Design, construction, and installation; general.

* * * * *

(c) In a grounded distribution system, only grounded, three-prong appliances may be used. Adaptors that allow an ungrounded, two-prong appliance to fit into a grounded, three-prong, receptacle must not be used. This does not apply to double-insulated appliances or tools and low voltage appliances of 50 volts or less.

* * * * *

■ 11. Revise § 111.05–7 to read as follows:

§ 111.05–7 Armored and metallic sheathed cable.

When installed, the metallic armor or sheath must meet the installation requirements of Section 6 of IEEE 45.8–2016 (incorporated by reference; see § 110.10–1 of this subchapter).

■ 12. Revise § 111.05–9 to read as follows:

§ 111.05–9 Masts.

Each nonmetallic mast and topmast must have a lightning-ground conductor in accordance with section 10 of IEC 60092–401:1980 (incorporated by reference; see § 110.10–1 of this subchapter).

§ 111.05–33 [Amended]

■ 13. Amend § 111.05–33 as follows:

■ a. Remove the text ''NEC 2002'' wherever it appears and add, in its place, the text ''70''; and

■ b. Remove the text ''46 CFR 110.10–1'' and add, in its place, the text ''§ 110.10–1 of this subchapter''.

§ 111.10–1 [Removed and Reserved]

■ 14. Remove and reserve § 111.10–1.

■ 15. Amend § 111.10–9 by adding a sentence at the end of the note to § 111.10–9 to read as follows:

§ 111.10–9 Ship's service supply transformers; two required.

* * * * *

Note to § 111.10–9: * * * It is not the intent, nor is it required, that transformers fed by the ship's service switchboard, such as 480/120 transformers, be duplicated.

■ 16. Revise § 111.12–1 to read as follows:

§ 111.12–1 Prime movers.

Prime movers must meet § 58.01–5 and subpart 58.10 of this chapter except that those for mobile offshore drilling units must meet 6–1–3/3.3 and 6–1–3/3.5 of the ABS MOU Rules (incorporated by reference; see § 110.10–1 of this subchapter). Further requirements for emergency generator prime movers are in subpart 112.50 of this subchapter.

■ 17. Revise § 111.12–3 to read as follows:

§ 111.12–3 Excitation.

In general, excitation must meet sections 4–8–3/3.13.2(a), 4–8–5/5.5.1, 4–8–5/5.5.2, and 4–8–5/5.17.5(e) of the ABS Marine Vessel Rules (incorporated by reference; see § 110.10–1 of this subchapter), except that those for mobile offshore drilling units must meet sections 6–1–7/5.17.1 and 6–1–7/5.19.1 of the ABS MOU Rules (incorporated by reference; see § 110.10–1 of this subchapter). In particular, no static exciter may be used for excitation of an emergency generator unless it is provided with a permanent magnet or a residual-magnetism-type exciter that has the capability of voltage build-up after two months of no operation.

■ 18. Revise § 111.12–5 to read as follows:

§ 111.12–5 Construction and testing of generators.

Each generator must meet the applicable requirements for construction and testing in section 4–8–3 of the ABS Marine Vessel Rules (incorporated by reference; see § 110.10–1 of this subchapter) except that each one for a mobile offshore drilling unit must meet the requirements in section 6–1–7 of the ABS MOU Rules (incorporated by reference; see § 110.10–1 of this subchapter).

■ 19. Revise § 111.12–7 to read as follows:

§ 111.12–7 Voltage regulation and parallel operation.

(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 Marine Vessel Rules (incorporated by reference; see § 110.10–1 of this subchapter); and

(b) *For DC systems:* section 4–8–3/3.13.3(c) of the ABS Marine Vessel Rules, and IEC 60092–202:2016 and IEC 60092–301:1980 (both incorporated by reference; see § 110.10–1 of this subchapter); and

(c) *For mobile offshore drilling units:* sections 6–1–7/5.17.2, 6–1–7/5.17.3, 6–1–7/5.19.2, and 6–1–7/5.19.3 of the ABS MOU Rules (incorporated by reference; see § 110.10–1 of this subchapter).

■ 20. Amend § 111.12–11 by revising paragraph (g) to read as follows:

§ 111.12–11 Generator protection.

* * * * *

(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 switch-gear and semiconductor converter compartment on a mobile offshore drilling unit that is separate from but directly adjacent to and on the same level as the generator room.

* * * * *

§ 111.12–13 [Removed]

■ 21. Remove § 111.12–13.

■ 22. Amend § 111.15–2 by revising paragraph (b) to read as follows:

§ 111.15–2 Battery construction.

* * * * *

(b) Each fully charged lead-acid battery must have a specific gravity that meets Section 11 of IEEE 45.1–2017 (incorporated by reference; see § 110.10–1 of this subchapter).

* * * * *

§ 111.15–3 [Amended]

■ 23. Amend § 115.15–3 by removing the text ''kw'' wherever it appears in paragraphs (a)(1) through (3) and adding, in its place, the text ''kW''.

§ 111.15–10 [Amended]

■ 24. Amend § 111.15–10, in paragraph (b)(2)(i), after the text ''Group B'', by adding the text ''or its IEC equivalent designation of Zone 1, IIB + H2''.

§ 111.15–25 [Amended]

■ 25. Amend § 115.15–25, in paragraph (b), by removing the word ''rectifier'' and adding, in its place, the word ''converter''.

§ 111.15–30 [Amended]

■ 26. Amend § 115.15–30 by removing the text ''rectifiers,'' and adding, in its place, the text ''converters,''.

■ 27. Revise § 111.20–15 to read as follows:

§ 111.20–15 Protection of transformers against overcurrent.

Each transformer must have protection against overcurrent that meets Article 450 of NFPA 70 or IEC 60092–303:1980 (both incorporated by reference; see § 110.10–1 of this subchapter).

§ 111.25–5 [Removed and Reserved]

■ 28. Remove and reserve § 111.25–5.

■ 29. Revise § 111.30–1 to read as follows:

§ 111.30–1 Location and installation.

Each switchboard must meet the location and installation requirements in section 5.3 of IEEE 45.7–2012 or IEC 60092–302:1997 (both incorporated by reference; see § 110.10–1 of this subchapter), as applicable.

■ 30. Revise § 111.30–5 to read as follows:

§ 111.30–5 Construction.

(a) All low voltage and medium voltage switchboards (as low and medium are determined within the standard used) must meet—

(1) For low voltages, either section 6 (except section 6.3.3) of IEEE 45.7–2012 or of IEC 60092–302:1997 (both incorporated by reference; see § 110.10–1 of this subchapter), as appropriate.

(2) For medium voltages, either section 7 of IEEE 45.7–2012 or IEC 60092–503:2007 (incorporated by reference; see § 110.10–1 of this subchapter), as appropriate.

(b) Each switchboard must be fitted with a dripshield unless the switchboard is a deck-to-overhead mounted type which cannot be subjected to leaks or falling objects.

■ 31. Amend § 111.30–19 by revising paragraphs (a)(1) and (2) and (b)(4) to read as follows:

§ 111.30–19 Buses and wiring.

(a) * * *

(1) Section 5.10 of IEEE 45.7–2012 (incorporated by reference; see § 110.10–1 of this subchapter); or

(2) IEC 60092–302:1997 (clause 7) (incorporated by reference; see § 110.10–1 of this subchapter).

(b) * * *

(4) Flame-retardant meeting test VW–1 of ANSI/UL 2556 or IEC 60332–1–1:2015 and IEC 60332–1–2:2015 (all incorporated by reference; see § 110.10–1 of this subchapter); and

* * * * *

§ 111.30–24 [Amended]

■ 32. Amend § 115.30–24 by removing the text ''kw'' in the section heading and adding, in its place, the text ''kW''.

§ 111.30–25 [Amended]

■ 33. Amend 111.30–25 as follows:

■ a. In paragraph (b)(3), remove the text ''A pilot lamp'' and add, in its place, the text ''An indicator light'';

■ b. In paragraph (d)(2), remove the text ''An indicating'' and add, in its place, the text ''A'';

■ c. In paragraph (e)(1), remove the text ''Subpart'' and add, in its place, the text ''subpart'';

■ d. In paragraph (f)(2), remove the text ''A pilot'' and add, in its place, the text ''An indicator''; and

■ e. In paragraph (g) introductory text, remove the text ''paragraphs (b)(1), (b)(2), and (f)(1)'' and add, in its place, the text ''paragraphs (b)(1) and (2) and (f)(1) of this section''.

§ 111.30–27 [Amended]

■ 34. Amend § 111.30–27 as follows:

■ a. In paragraph (b)(4), remove the text ''A pilot lamp'' and add, in its place, the text ''An indicator light''; and

■ b. In paragraph (e) introductory text, remove the text ''Subpart'' and add, in its place, the text ''subpart''.

■ 35. Amend § 111.30–29 by:

■ a. Removing paragraph (d);

■ b. Redesignating paragraphs (e) through (h) as paragraphs (d) through (g) respectively; and

■ c. Revising newly-redesignated paragraph (d).

The revision reads as follows:

§ 111.30–29 Emergency switchboards.

* * * * *

(d) Each switchboard of an alternating-current emergency generator must have:

(1) A circuit breaker that meets § 111.12–11;

(2) A disconnect switch or link for each emergency generator conductor, except for a switchboard with a draw out or plug-in type generator circuit breaker that disconnects:

(i) Each generator conductor; and

(ii) If there is a switch in the generator neutral, each ungrounded conductor; and

(3) An indicator light connected between the generator and circuit breaker.

* * * * *

■ 36. Revise the heading of subpart 111.33 to read as follows:

Subpart 111.33—Power Semiconductor Converter Systems

§ 111.33–1 [Amended]

■ 37. Amend § 111.33–1 by removing the word ''rectifier'' and adding, in its place, the word ''converter''.

§ 111.33–3 [Amended]

■ 38. Amend § 111.33–3 as follows:

■ a. In paragraph (a) introductory text, remove the word ''rectifier'' and add, in its place, the word ''converter'';

■ b. In paragraph (a)(1), remove the text ''10.20.12 of IEEE 45–2002'' and add, in its place, the text ''4.31.19.12 of IEEE 45.2–2011'';

■ c. In paragraph (a)(2), remove the text ''60092–304'' and add, in its place, the text ''60092–304:1980''; and

■ d. In paragraph (c), remove the word ''rectifiers'' and add, in its place, the word ''converters''.

■ 39. Revise § 111.33–5 to read as follows:

§ 111.33–5 Installation.

Each semiconductor converter system must meet the installation requirements, as appropriate, of—

(a) Sections 4.31.19.2, 4.31.19.7, and 4.31.19.8 of IEEE 45.2–2011 (incorporated by reference; see § 110.10–1 of this subchapter); or

(b) IEC 60092–304:1980 (incorporated by reference; see § 110.10–1 of this subchapter).

§ 111.33–7 [Amended]

■ 40. Amend § 111.33–7 by removing the word ''rectifier'' and adding, in its place, the word ''converter''.

§ 111.33–9 [Amended]

■ 41. Amend § 111.33–9 by removing the word ''rectifier'' and adding, in its place, the word ''converter''.

■ 42. Revise § 111.33–11 to read as follows:

§ 111.33–11 Propulsion systems.

Each power semiconductor converter system in a propulsion system must meet sections 4–8–5/5.17.8 and 4–8–5/5.17.9 of ABS Marine Vessel Rules (incorporated by reference; see § 110.10–1 of this subchapter), except that each one for mobile offshore drilling units must meet the requirements in section 6–1–7/12 of ABS MOU Rules (incorporated by reference; see § 110.10–1 of this subchapter).

■ 43. Revise § 111.35–1 to read as follows:

§ 111.35–1 Electrical propulsion installations.

Each electric propulsion installation must meet Sections 4–8–5/5.5, 4–8–5/5.11, 4–8–5/5.13, 4–8–5/5.17.7(e), 4–8–5/5.17.8, and 4–8–5/5.17.9 of ABS Marine Vessel Rules (incorporated by reference; see § 110.10–1 of this subchapter), except that each one for mobile offshore drilling units must meet the requirements in section 6–1–7/12 of ABS MOU Rules (incorporated by reference; see § 110.10–1 of this subchapter).

■ 44. Revise § 111.40–1 to read as follows:

§ 111.40–1 Panelboard standard.

Each panelboard must meet Section 9.10.1 of IEEE 45.1–2017 (incorporated by reference; see § 110.10–1 of this subchapter).

§ 111.50–1 [Amended]

■ 45. Amend § 111.50–1 by:
■ a. In the introductory text, removing words ''of this chapter'';
■ b. In paragraphs (a) through (d), removing the word ''Subpart'' and adding, in its place, the word ''subpart''.

§ 111.50–3 [Amended]

■ 46. Amend § 115.50–3 as follows:
■ a. In paragraph (b) introductory text, remove the text ''of this chapter'';
■ b. In paragraphs (b)(1), (3), (4), and (5) remove the word ''Subpart'' and add, in its place, the word ''subpart'';
■ c. In paragraph (b)(2), remove the text ''subchapter F'' and add, in its place, the text ''subpart 58.25'';
■ c. In paragraph (c) introductory text remove the text ''NEC 2002'' and add. in its place. the text ''70'', and remove the text ''or IEC 60092–202'' and ''both'';
■ d. In paragraphs (c) introductory text and (c)(2), remove the word ''circuitbreakers'' wherever it appears and add. in its place, the words ''circuit breakers'';
■ e. In paragraphs (e) and (g)(2):
■ i. remove the text ''NEC 2002'' and add, in its place, the text ''70''; and
■ ii. remove the text ''60092–202'' and add, in its place, the text ''60092–202:2016 (both incorporated by reference; see § 110.10–1 of this subchapter)''.

§ 111.50–5 [Amended]

■ 47. Amend § 111.50–5 as follows:
■ a. In paragraph (a)(2), remove the text ''§ 111.30–25'' and add, in its place, the text ''§ 111.30–25(f)''; and
■ b. In paragraph (a)(4), remove the text ''single phase'' and ''(two wire with single voltage secondary)''.

§ 111.50–7 [Amended]

■ 48. Amend § 115.50–7(a) as follows:
■ a. Remove the text ''NEC 2002'' and add, in its place, the text ''70''; and
■ b. Remove the text ''46 CFR 110.10–1'' and add, in its place, the text ''§ 110.10–1 of this subchapter''.

§ 111.50–9 [Amended]

■ 49. Amend § 111.50–9 as follows:
■ a. Remove the text ''NEC 2002'' and add, in its place, the text ''70''; and
■ b. Remove the text ''46 CFR 110.10–1'' and add, in its place, the text ''§ 110.10–1 of this subchapter''.

■ 50. Revise subpart 111.51 to read as follows:

Subpart 111.51—Calculation of Short-Circuit Currents and Coordination of Overcurrent Protective Devices

Sec.

Subpart 111.51—Calculation of Short-Circuit Currents and Coordination of Overcurrent Protective Devices

§ 111.51–1 General.

Electrical installations must be protected against short circuits, by appropriate devices. The selection, arrangement and performance of various protective devices must provide coordinated automatic protection and selective operation in order to provide continuity of service for equipment vital to the propulsion, control, or safety of the vessel under short-circuit conditions through coordination and selective operation of overcurrent protective devices.

§ 111.51–2 Short-circuit calculations.

(a) The available short-circuit current must be computed—

(1) From the aggregate contribution of all generators that can simultaneously operate in parallel;

(2) From the largest probable motor load; and

(3) With a three-phase fault on the load terminals of the protective device.

(b) The calculated currents must be used to select suitably rated equipment and to allow the selection and setting of protective devices.

§ 111.51–3 Short-circuit calculations for systems below 1500 kilowatts.

The following short-circuit assumptions must be made for a system with an aggregate generating capacity below 1500 kilowatts, unless detailed computations in accordance with § 111.51–4 are submitted:

(a) The maximum short-circuit current of a direct current system must be assumed to be 10 times the aggregate normal rated generator currents plus 6 times the aggregate normal rated currents of all motors that may be in operation.

(b) The maximum asymmetrical short-circuit current for an alternating current system must be assumed to be 10 times the aggregate normal rated generator currents plus 4 times the aggregate normal rated currents of all motors that may be in operation.

(c) The average asymmetrical short circuit current for an alternating-current system must be assumed to be 8½ times the aggregate normal rated generator currents plus 3½ times the aggregate normal rated currents of all motors that may be in operation.

§ 111.51–4 Short-circuit calculations for systems 1500 kilowatts or above.

Short-circuit calculations must be submitted for systems with an aggregate generating capacity of 1500 kilowatts or more by utilizing one of the following methods:

(a) Exact calculations using actual impedance and reactance values of system components.

(b) Estimated calculations using IEC 61363–1:1998 for AC systems and IEC 61660–1:1997 for DC systems (both incorporated by reference; see § 110.10–1 of this subchapter).

(c) The estimated calculations using a commercially established analysis procedure for utility or industrial applications.

§ 111.51–5 Protection of vital equipment.

(a) The coordination of overcurrent protective devices must be demonstrated for all potential plant configurations.

(b) Protective relays and overcurrent protective devices must be installed so that:

(1) A short-circuit on a circuit that is not vital to the propulsion, control, or safety of the vessel does not trip equipment that is vital; and

(2) A short-circuit on a circuit that is vital to the propulsion, control, or safety of the vessel is cleared only by the protective device that is closest to the point of the short-circuit.

Subpart 111.52 [Removed and Reserved]

■ 51. Remove and reserve subpart 111.52, consisting of §§ 111.52–1, 111.52–3, and 111.52–5.

■ 52. Amend § 111.53–1 by revising paragraph (a)(1) and removing paragraph (a)(3) to read as follows:

§ 111.53–1 General.

(a) * * *

(1) Meet the general provisions of Article 240 of NFPA 70 or IEC 60092–202:2016 (both incorporated by reference; see ''§ 110.10–1 of this subchapter) as appropriate.

* * * * *

■ 53. Revise § 111.54–1 to read as follows:

§ 111.54–1 Circuit breakers.

(a) Each circuit breaker must—

(1) Meet the general provision of Article 240 of NFPA 70 or IEC 60092–202:2016 (both incorporated by reference; see § 110.10–1 of this subchapter) as appropriate;

(2) Meet subpart 111.55; and

(3) Have an interrupting rating sufficient to interrupt the maximum asymmetrical short-circuit current available at the point of application.

(b) No molded-case circuit breaker may be used in any circuit having a nominal voltage of more than 600 volts (1,000 volts for a circuit containing a circuit breaker manufactured to the standards of the IEC). Each molded-case circuit breaker must meet section 9 and marine supplement SA of ANSI/UL 489 or IEC 60947–2:2019 (both incorporated by reference; see § 110.10–1 of this subchapter), except as noted in paragraph (e) of this section.

(c) Each circuit breaker, other than a molded-case one, that is for use in any of the following systems must meet the following requirements:

(1) An alternating-current system having a nominal voltage of 600 volts or less (1,000 volts for such a system with circuit breakers manufactured to the standards of the IEC) must meet (all incorporated by reference; see § 110.10–1 of this subchapter):

(i) IEEE C37.13;

(ii) IEEE C37.27; or

(iii) IEC 60947–2:2019.

(2) A direct-current system of 3,000 volts or less (1,500 volts or less for such a system with circuit breakers manufactured to the standards of the IEC) must meet IEEE C37.14 or IEC 60947–2:2019 (both incorporated by reference; see § 110.10–1 of this subchapter).

(3) An alternating-current system having a nominal voltage greater than 600 volts (or greater than 1,000 volts for IEC standard circuit breakers) must meet (all incorporated by reference; see § 110.10–1 of this subchapter):

(i) IEEE C37.04, IEEE C37.010, and IEEE C37.12; or

(ii) IEC 62271–100:2017.

(d) A circuit breaker must not:

(1) Be dependent upon mechanical cooling to operate within its rating; or

(2) Have a long-time-delay trip element set above the continuous current rating of the trip element or of the circuit breaker frame.

(e) Each circuit breaker located in an engineroom, boilerroom, or machinery space must be calibrated for a 50 degree C ambient temperature. If the circuit breaker is in an environmentally controlled machinery control room where provisions are made for ensuring an ambient temperature of 40 degree C or less, a circuit breaker must have at least the standard 40 degrees C ambient temperature calibration.

§ 111.55–1 [Amended]

■ 54. Revise § 111.55–1(a) to read as follows:

§ 111.55–1 General.

(a) Each switch must meet Article 404 of NFPA 70 (incorporated by reference; see ''§ 110.10–1 of this subchapter).

* * * * *

§ 111.59–1 [Amended]

■ 55. Amend § 111.59–1, in paragraph (a), by removing the text ''NEC 2002 (incorporated by reference see 46 CFR 110.10–1)'' and adding, in its place, the text ''70 or IEC 61439–6:2012 (incorporated by reference; see § 110.10–1 of this subchapter)''.

■ 56. Revise § 111.60–1 to read as follows:

§ 111.60–1 Construction and testing of cable.

(a) Electric cables constructed of stranded copper conductors, thermoplastic, elastomeric or other insulation, moisture-resistant jackets, and, where applicable, armoring and outer-sheathing must meet all the requirements of IEC 60092–350:2014, 60092–352:2005, 60092–353:2016, 60092–354:2014, 60092–360:2014, IEC/TR 60092–370:2009, 60092–376:2017, IEEE 1580, ANSI/UL 1072, ANSI/UL 1309, or MIL–DTL–24640C or MIL–DTL–24643C (all incorporated by reference; see § 110.10–1 of this subchapter), including the respective flammability tests contained therein.

(b) IEC 60092 series cable must meet the Category A or A F/R flammability requirements of IEC 60332–3–22:2009 or 60332–3–21:2000 (both incorporated by reference; see § 110.10–1 of this subchapter).

§ 111.60–2 [Amended]

■ 57. Amend § 111.60–2 introductory text by removing the text ''VW–1 of UL 1581, or Category A of IEC 60332–3–22 (all three standards incorporated by reference; see 46 CFR 110.10–1)'' and adding, in its place, the text ''FV–2/VW–1 of ANSI/UL 2556, IEC 60332–3–21:2018, or IEC 60332–3–22:2018 (all incorporated by reference; see § 110.10–1 of this subchapter)''.

§ 111.60–3 [Removed and Reserved]

■ 58. Remove and reserve § 111.60–3.

§ 111.60–4 [Amended]

■ 59. Amend § 111.60–4 by removing ''#'' wherever it appears.

■ 60. Amend § 111.60–5 by revising paragraphs (a) and (b) to read as follows:

§ 111.60–5 Cable installation.

(a) Each cable installation must meet—

(1) Sections 6, of IEEE 45.8–2016 (incorporated by reference; see § 110.10–1 of this subchapter); or

(2) Cables manufactured to IEC 60092–353:2016 must be installed in accordance with IEC 60092–352:2005 (both incorporated by reference; see § 110.10–1 of this subchapter), including clause 8.

(b) Each cable installation made in accordance with clause 8 of IEC 60092–352:2005 must utilize the conductor ampacity values of Table I of IEC 60092–352:2005.

* * * * *

■ 61. Revise § 111.60–6(a) to read as follows:

§ 111.60–6 Fiber optic cable.

* * * * *

(a) Be constructed to pass the flammability test contained in IEEE 1202, test FV–2/VW–1 of UL 2556, or

IEC 60332–3–22:2018 (all three standards incorporated by reference; see 46 CFR 110.10–1); or

* * * * *

■ 62. Amend § 111.60–7 by revising table 111.60–7 to read as follows:

§ 111.60–7 Demand loads.

* * * * *

TABLE 1 TO § 111.60–7—DEMAND LOADS

Type of circuit	Demand load
Generator Cables	115 percent of continuous generator rating.
Switchboard bus-ties, except ship's service to emergency switchboard bus-ties.	75 percent of generating capacity of the larger switchboard.
Emergency switchboard bus-ties	115 percent of continuous rating of emergency generator.
Motor feeders	Article 430 of NFPA 70 (incorporated by reference; see § 110.10–1 of this subchapter).
Galley equipment feeders	100 percent of either the first 50 kW or one-half the connected load, whichever is the larger, plus 65 percent of the remaining connected load, plus 50 percent of the rating of the spare switches or circuit breakers on the distribution panel.
Lighting feeders	100 percent of the connected load plus the average active circuit load for the spare switches or circuit breakers on the distribution panels.
Grounded neutral of a dual voltage feeders.	100 percent of the capacity of the ungrounded conductors when grounded neutral is not protected by a circuit breaker overcurrent trip, or not less than 50 percent of the capacity of the ungrounded conductors when the grounded neutral is protected by a circuit breaker overcurrent trip or overcurrent alarm.

■ 63. Amend § 111.60–11 by revising paragraph (c) to read as follows:

§ 111.60–11 Wire.

* * * * *

(c) Wire, other than in switchboards, must meet the requirements in ANSI/UL 44, ANSI/UL 83, MIL–DTL–76E (all three standards incorporated by reference; see § 110.10–1 of this subchapter), or equivalent standard.

* * * * *

■ 64. Amend § 111.60–13 by revising paragraphs (a) through (e) to read as follows:

§ 111.60–13 Flexible electric cord and cables.

(a) *Construction and testing.* Each flexible cord and cable must meet the requirements in Sections 4.4.2. and 4.4.6 of IEEE 45.8–2016, Article 400 of NFPA 70, ANSI/NEMA WC–70, or ANSI/UL 62 (all incorporated by reference; see § 110.10–1 of this subchapter).

(b) *Application.* No flexible cord may be used except:

(1) As allowed under Sections 400.10 and 400.12 of NFPA 70; and

(2) In accordance with Table 400.4 in NFPA 70.

(c) *Allowable current-carrying capacity.* No flexible cord may carry more current than allowed under Table 400.5 in NFPA 70, or ANSI/NEMA WC–70.

(d) *Conductor size.* Each flexible cord must be 18 AWG (0.82 mm2) or larger.

(e) *Splices.* Each flexible cord and cable must be without splices or taps except for a cord or cable 12 AWG (3.3 mm2) or larger spliced for repairs in accordance with § 111.60–19.

* * * * *

■ 65. Amend § 111.60–19 by revising paragraph (b) to read as follows:

§ 111.60–19 Cable splices.

* * * * *

(b) Each cable splice must be made in accordance with Section 6.11 of IEEE 45.8–2016 (incorporated by reference; see § 110.10–1 of this subchapter).

■ 66. Revise § 111.60–21 to read as follows:

§ 111.60–21 Cable insulation tests.

All cable for electric power and lighting and associated equipment must be checked for proper insulation resistance to ground and between conductors. The insulation resistance must not be less than that in Section 5.1 of IEEE 45.6–2016 (incorporated by reference; see § 110.10–1 of this subchapter).

■ 67. Amend § 111.60–23 by revising paragraphs (d) and (f) to read as follows:

§ 111.60–23 Metal-clad (Type MC) cable.

* * * * *

(d) The cable must be installed in accordance with Article 326 of NFPA 70 (incorporated by reference; see § 110.10–1 of this subchapter).

* * * * *

(f) Equipment grounding conductors in the cable must be sized in accordance with Section 250.122 of NFPA 70. System grounding conductors must be of a cross-sectional area not less than that of the normal current carrying conductors of the cable. The metal sheath must be grounded but must not be used as a required grounding conductor.

* * * * *

■ 68. Amend § 111.70–1 by revising paragraph (a) introductory text to read as follows:

§ 111.70–1 General.

(a) Each motor circuit, controller, and protection must meet the requirements of sections 4–8–2/9.17, 4–8–4/9.5 and 4–8–3/5 of ABS Marine Vessel Rules; sections 6–1–7/9.9 and 6–1–7/9.15 of the ABS MOU Rules; or IEC 60092–301:1980 (all three standards incorporated by reference; see 46 CFR 110.10–1), as appropriate, except for the following circuits:

* * * * *

■ 69. Amend § 111.70–3 by revising paragraph (a) to read as follows:

§ 111.70–3 Motor controllers and motor-control centers.

(a) *General.* The enclosure for each motor controller or motor-control center must meet either NEMA ICS 2 and NEMA ICS 2.3, or Table 1 of IEC 60092–201:2019 (all incorporated by reference; see § 110.10–1 of this subchapter), as appropriate, for the location where it is installed. In addition, each such enclosure in a hazardous location must meet the requirements of subpart 111.105 of this part. NEMA ICS 2.4 (incorporated by reference; see § 110.10–1 of this subchapter) provides guidance on the differences between devices meeting NEMA and those meeting IEC for motor service.

* * * * *

■ 70. Amend § 111.75–5 by revising paragraph (b) to read as follows:

§ 111.75–5 Lighting Branch Circuits.

* * * * *

(b) *Connected load.* The connected loads on a lighting branch circuit must

not be more than 80 percent of the rating of the overcurrent protective device, computed on the basis of the fixture ratings and in accordance with Section 9.4.2 of IEEE 45.1–2017 (incorporated by reference; see § 110.10–1 of this subchapter).

* * * * *

■ 71. Amend § 111.75–17 by:
■ a. Removing paragraph (e); and
■ b. Revising paragraph (d)(2).

The revision reads as follows:

§ 111.75–17 Navigation lights.

* * * * *

(d) * * *

(2) Be certified by an independent laboratory to the requirements of ANSI/UL 1104 or EN 14744 (incorporated by reference; see § 110.10–1 of this subchapter) or an equivalent standard under § 110.20–1 of this subchapter. Portable battery powered navigation lights need only be certified to the requirements of ANSI/UL 1104 applicable to those lights.

* * * * *

■ 72. Revise § 111.75–18 to read as follows:

§ 111.75–18 Signaling lights.

Each self-propelled vessel over 150 gross tons when engaged on an international voyage must have on board an approved daylight signaling lamp that meets ISO 25861 (incorporated by reference, see § 110.10–1 of this subchapter).

■ 73. Revise § 111.75–20 to read as follows:

§ 111.75–20 Luminaries (lighting fixtures).

(a) The construction of each luminaire (lighting fixture) for a non-hazardous location must meet ANSI/UL 1598A, or IEC 60092–306:2009 (both incorporated by reference; see § 110.10–1 of this subchapter).

(b) Nonemergency and inside-type decorative luminaires in environmentally protected, nonhazardous locations must meet the applicable luminaire-type requirements of ANSI/UL 1598 or IEC 60092–306:2009 (both incorporated by reference; see § 110.10–1 of this subchapter). These luminaires must also meet Clauses 7.4, 8.1, 8.3, 11.2, 13.4, and 17.2 of ANSI/UL 1598A (incorporated by reference; see § 110.10–1 of this subchapter), except in an accommodation space, navigating bridge, gyro room, radio room, galley, or similar space where it is not subject to damage.

(c) Each tablelamp, desklamp, floorlamp, and similar equipment must be secured in place so that it cannot be displaced by the roll or pitch of the vessel.

§ 111.77–3 [Amended]

■ 74. Amend § 111.77–3 by removing the text ''UL'' and adding, in its place, the text ''ANSI/UL''.

■ 75. Amend § 111.81–1 by revising paragraph (d) to read as follows:

§ 111.81–1 Outlet boxes and junction boxes; general.

* * * * *

(d) As appropriate, each outlet-box or junction-box installation must meet the following standards (all incorporated by reference, see § 110.10–1 of this subchapter): Article 314 of NFPA 70; ANSI/UL 50; ANSI/UL 514A, ANSI/UL 514B, and ANSI/UL 514C; IEC 60092–101:2018; IEC 60092–201:2019; IEC 60092–306:2009; IEC 60092–352:2005; IEC 60092–401:1980; and IEC 60092–502:1999.

* * * * *

■ 76. Add § 111.83–7 to subpart 111.83 to read as follows:

§ 111.83–7 High voltage shore connection.

Ships connecting to shore power and receiving high voltage shore power (over 1000 volts) should meet the requirements of IEC/IEEE 80005–1:2019 (incorporated by reference; see § 110.10–1 of this subchapter).

■ 77. Amend § 111.87–3 by revising paragraph (a) to read as follows:

§ 111.87–3 General requirements.

(a) Each electric heater must meet applicable ANSI/UL 484, ANSI/UL 1042, or ANSI/UL 2021 construction standards (all incorporated by reference; see § 110.10–1 of this subchapter) or equivalent standards under § 110.20–1 of this subchapter.

* * * * *

§ 111.95–1 [Amended]

■ 78. Amend § 111.95–1, in paragraph (b), by removing the text ''in other parts of this chapter under which vessels are certificated and''.

§ 111.99–3 [Removed and Reserved]

■ 79. Remove and reserve § 111.99–3.

§ 111.99–5 [Amended]

■ 80. Amend § 111.99–5 by removing the text ''II 2/30.4.3'' and adding, in its place, the text ''II–2/9.4.1.1.5.3''.

■ 81. Amend § 111.103–1 by revising the introductory text to read as follows:

§ 111.103–1 Power ventilation systems except machinery space ventilation systems.

Each power ventilation system that is not a machinery space ventilation system must have:

* * * * *

■ 82. Amend § 111.103–3 by revising paragraph (a) to read as follows:

§ 111.103–3 Machinery space ventilation.

(a) Each power ventilation system for a machinery space must have two controls to stop the ventilation, one of which may be the supply circuit breaker.

* * * * *

■ 83. Amend § 111.103–7 by revising the introductory text to read as follows:

§ 111.103–7 Ventilation stop stations.

Each power ventilation system stop station must:

* * * * *

■ 84. Revise § 111.105–1 to read as follows:

§ 111.105–1 Applicability.

This subpart applies to installations in hazardous locations as defined in Articles 500 through 505 of NFPA 70, Clause 6 of IEC 60092–502:1999 or Clause 8 of IEC 61892–7:2019 (all incorporated by reference; see § 110.10–1 of this subchapter).

■ 85. Revise § 111.105–3 to read as follows:

§ 111.105–3 Approved equipment.

(a) Electrical equipment should not be installed in hazardous locations unless essential for operational purposes. When installed in these locations, special precautions should be taken to ensure that the electrical equipment is not a source of ignition.

(b) Electrical installations in hazardous locations must comply with paragraph (b)(1), (2), or (3) of this section.

(1) NFPA 70 Articles 500 through 504 (incorporated by reference, see § 110.10–1 of this subchapter). Equipment required to be identified for Class I locations must meet the provisions of Sections 500.7 and 500.8 of NFPA 70 and must be tested and listed by an independent laboratory to any of the following standards:

(i) ANSI/UL 674, ANSI/UL 823, ANSI/UL 844, ANSI/UL 913, ANSI/UL 1203, ANSI/ISA 12.12.01, or ANSI/UL 2225 (all incorporated by reference, see § 110.10–1 of this subchapter).

(ii) FM Approvals Class Number 3600 (1998), Class Number 3610, Class Number 3611, Class Number 3615, or Class Number 3620 (incorporated by

reference, see § 110.10–1 of this subchapter).

(iii) CSA C22.2 Nos. 0–10, 30–M1986, 157–92, or 213–16 (incorporated by reference, see § 110.10–1 of this subchapter).

Note 1 to paragraph (b)(1): See Article 501.5 of NFPA 70 (incorporated by reference, see § 110.10–1) for use of Zone equipment in Division designated spaces.

(2) NFPA 70 Article 505 (incorporated by reference, see § 110.10–1 of this subchapter). Equipment required to be identified for Class I locations must meet the provisions of Sections 505.7 and 505.9 of NFPA 70 and must be tested and listed by an independent laboratory to one or more of the types of protection in ANSI/ISA or ANSI/UL series of standards incorporated in NFPA 70.

Note 2 to paragraph (b)(2): See Article 505.9(C)(1) of NFPA 70 (incorporated by reference, see § 110.10–1 of this subchapter) for use of Division equipment in Zone designated spaces.

(3) Clause 8 of IEC 61892–7:2019 or clause 6 of IEC 60092–502:1999 (both incorporated by reference, see § 110.10–1 of this subchapter). Electrical apparatus in hazardous locations must be tested to IEC 60079–1:2014, IEC 60079–2:2014, IEC 60079–5:2015, IEC 60079–6:2015, IEC 60079–7:2015, IEC 60079–11:2011, IEC 60079–13:2017, IEC 60079–15:2017, IEC 60079–18:2017, IEC 60079–25:2010 or IEC 60079–30–1:2007 (incorporated by reference, see § 110.10–1) and certified by an independent laboratory under the IECEx System.

(c) System components that are listed or certified under paragraph (b)(1), (2), or (3) of this section must not be combined in a manner that would compromise system integrity or safety.

(d) As an alternative to paragraph (b)(1) of this section, electrical equipment that complies with the provisions of NFPA 496 (2017) (incorporated by reference, see § 110.10–1 of this subchapter) is acceptable for installation in Class I, Divisions 1 and 2. When equipment meeting this standard is used, it does not need to be identified and marked by an independent laboratory. The Commanding Officer, MSC, will evaluate equipment complying with this standard during plan review. The Commanding Officer, MSC, will generally consider it acceptable if a manufacturer's certification of compliance is indicated on a material list or plan.

(e) Equipment listed or certified to ANSI/UL 60079–18 or IEC 60079–18:2017, respectively, is not permitted in Class I Special Division 1 or Zone 0 hazardous location, unless the encapsulating compound of Ex ''ma'' protected equipment is not exposed to, or has been determined to be compatible with, the liquid or cargo in the storage tank.

§§ 111.105–5, 111.105–7, and 111.105–9 [Removed and Reserved]

■ 86. Remove and reserve §§ 111.105–5, 111.105–7, and 111.105–9.

■ 87. Revise § 111.105–11 to read as follows:

§ 111.105–11 Intrinsically safe systems.

(a) As part of plan approval, the manufacturer must provide appropriate installation instructions and restrictions on approved system components or the control drawing in Section 504.10(A) of NFPA 70 (incorporated by reference, see § 110.10–1 of this subchapter). Typical instructions and restrictions include information addressing—

(1) Voltage limitations;

(2) Allowable cable parameters;

(3) Maximum length of cable permitted;

(4) Ability of system to accept passive devices;

(5) Acceptability of interconnections with conductors or other equipment for other intrinsically safe circuits; and

(6) Information regarding any instructions or restrictions which were a condition of approval of the system or its components.

(b) Each intrinsically safe system must meet ANSI/ISA–RP12.06.01–2003 (incorporated by reference, see § 110.10–1 of this subchapter).

(c) For intrinsically safe systems under the standards cited in § 111.105–3(a)(1) and (2) the wiring methods must meet Sections 504.30, 504.50 and 504.60 of NFPA 70 (incorporated by reference, see § 110.10–1 of this subchapter). For intrinsically safe systems under the standards cited in § 111.105–3(b)(3) of this subpart, the installation and wiring must meet Clause 7, except for Clause 7.3.1, of IEC 60092–502:1999 (incorporated by reference, see § 110.10–1 of this subchapter).

§ 111.105–15 [Removed and Reserved]

■ 88. Remove and reserve § 111.105–15.

■ 89. Revise § 111.105–17 to read as follows:

§ 111.105–17 Wiring methods for hazardous locations.

(a) Through runs of marine shipboard cable meeting subpart 111.60 of this part are required for all hazardous locations. Armored cable may be used to enhance ground detection capabilities. Additionally, Type MC cable may be used subject to the restrictions in § 111.60–23.

(b) Where conduit is installed, the applicable requirements of NFPA 70, Clause 9 of IEC 61892–7: 2019, or Clause 7 of IEC of 60092–502: 1999 (all incorporated by reference; see § 110.10–1 of this subchapter) must be followed. Alternatively, the conduit and cable seals and sealing methods in Clause 6.8 of API RP 14F or API RP 14FZ (both incorporated by reference; see § 110.10–1 of this subchapter) may be followed. Where required by the standard that is applicable to the listed or certified electrical equipment, seal fittings, termination fittings, or glands must be listed or certified by an independent laboratory for use in hazardous locations.

(c) Each cable entrance into Class II and Class III (Zone 20, 21, and 22) equipment must be made with dust tight cable entrance seals approved for the installation.

■ 90. Revise § 111.105–19 to read as follows:

§ 111.105–19 Switches.

A switch that is explosionproof or flameproof, or that controls any explosionproof or flameproof equipment must have a pole for each ungrounded conductor.

■ 91. Add § 111.105–28 to read as follows:

§ 111.105–28 Internal combustion engines.

Internal combustion engines installed in Class I Divisions 1 and 2 (Zones 1 and 2) must meet the provisions of ASTM F2876–10 (incorporated by reference, see § 110.10–1 of this subchapter).

■ 92. Amend § 111.105–31 by:

■ a. Redesignating paragraphs (e) through (n) as paragraphs (f) through (o);

■ b. Adding new paragraph (e); and

■ c. Revising newly redesignated paragraph (o).

The addition and revision read as follows:

§ 111.105–31 Flammable or combustible cargo with a flashpoint below 60 °C (140 °F), carriers of liquid-sulphur or inorganic acid.

* * * * *

(e) *Submerged pump motors.* Submerged pump motors that do not meet requirements of paragraph (d) of this section must receive concept approval by the Commandant (CG–ENG) and plan approval by the Commanding Officer, MSC.

* * * * *

(o) *Duct keels.* The lighting and ventilation systems, and the gas detection system, if installed, for each pipe tunnel must meet section 5C–1–7/31.17 of ABS Marine Vessel Rules

(incorporated by reference; see 46 CFR 110.10–1).

§ 111.105–35 [Amended]

■ 93. Amend § 111.105–35 as follows:
■ a. In paragraph (a) introductory text, remove the text ''10 or Z'' and add, in its place, the text ''20''; and
■ b. In paragraph (c), remove the text ''11 or Y'' and add, in its place, the text ''22''.

§ 111.105–39 [Amended]

■ 94. In § 111.105–39 amend the introductory text and paragraph (a) as follows:
■ a. Remove the text ''Steel'' and add, in its place, the text ''Marine''; and
■ b. Remove the text ''5–10–4/3'' and add, in its place, the text ''5C–10–4/3''.

§ 111.105–40 [Amended]

■ 95. Amend § 111.105–40 by removing the text ''Steel'' in paragraph (a) and paragraph (c) introductory text and adding, in its place, the text ''Marine''.

§ 111.105–41 [Amended]

■ 96. Amend § 111.105–41 by removing the text ''IEEE 45–1998'' and adding, in its place, the text ''IEEE 45.1''.

§ 111.105–45 [Amended]

■ 97. Amend § 111.105–45 as follows:
■ a. In paragraph (a) introductory text, remove the text ''10 or Z'' and add, in its place, the text ''20'';
■ b. In paragraph (b) introductory text, remove the text ''11 or Y'' and add, in its place, the text ''22''; and
■ c. In paragraph (b)(1), remove the text ''10 or Z'' and add, in its place, the text ''20''.

■ 98. Add § 111.105–50 to subpart 111.105 to read as follows:

§ 111.105–50 Alternative standard to the classification of hazardous locations requirements of this subchapter.

This section contains alternative standards to the classification of hazardous locations requirements in §§ 111.105–29, 111.105–31, 111.105–32, 111.106–9, and 111.106–11.

(a) Classification of hazardous locations may be in accordance with IEC 60092–502:1999 (incorporated by reference, see § 110.10–1 of this subchapter).

(b) If IEC 60092–502:1999 is chosen as an alternative standard as allowed in paragraph (a) of this section, it shall be used exclusively and not in combination with §§ 111.105–29, 111.105–31, 111.105–32, 111.106–9, and 111.106–11.

(c) If IEC 60092–502:1999 is chosen as an alternative standard as allowed by paragraph (a), the following ventilation system requirements apply in addition to the requirements of IEC 60092–502:1999:

(1) Tank vessels that carry combustible or flammable cargo, carriers of liquid-sulphur or inorganic acid, and hydrocarbon pump rooms must meet the requirements in § 32.60–20(c) of this chapter,

(2) Bulk liquefied flammable gas and ammonia carriers must meet the requirements in § 38.20–10 of this chapter, and

(3) Mechanical ventilation on all applicable vessels must be capable of at least 30 air changes per hour, based upon the gross volume of the space, and must be provided for the following spaces:

(i) Cargo handling or pump rooms, and

(ii) Other spaces where hazardous location classification is dependent upon ventilation.

■ 99. Amend § 111.106–3 by:
■ a. Revising paragraphs (b)(1) introductory text, (b)(1)(i) and (iii);
■ b. Designating Note to paragraph (b)(1) as Note 1 to paragraph (b)(1);
■ c. Revising paragraphs (b)(2), (b)(3) introductory text, (b)(3)(vi);
■ d. Designating Note to § 111.106–3(b) as Note 3 to § 111.106–3(b); and
■ e. Revising paragraphs (c), and (d).

The revisions read as follows:

§ 111.106–3 General requirements.

* * * * *

(b) * * *

(1) NFPA 70 Articles 500 through 504 (incorporated by reference, see § 110.10–1 of this subpart). Equipment identified for Class I locations must meet the provisions of Sections 500.7 and 500.8 of NFPA 70 and must be tested and listed by an independent laboratory to any of the following standards:

(i) ANSI/UL 674, ANSI/UL 823, ANSI/UL 844, ANSI/UL 913, ANSI/UL 1203, ANSI/ISA 12.12.01, and/or ANSI/UL 2225 (incorporated by reference, see § 110.10–1).

* * * * *

(iii) CSA C22.2 Nos. 0–10, 30–M1986, 157–92, and/or 213–16 (incorporated by reference, see § 110.10–1).

* * * * *

(2) NFPA 70 Article 505 (incorporated by reference, see § 110.10–1 of this subchapter). Equipment identified for Class I locations must meet the provisions of Sections 505.7 and 505.9 of NPFA 70 and be tested and listed by an independent laboratory to the ANSI/ISA Series of standards incorporated in NFPA 70.

Note 2 to paragraph (b)(2): See sections 505.9(C) and 505.20 of the NFPA 70 for use of Division equipment in Zone designated spaces.

(3) IEC 60092–502:1999 (incorporated by reference, see § 110.10–1), with the following exceptions:

* * * * *

(vi) Electrical apparatus in hazardous locations must meet one or the combination of IEC 60079–1:2014, IEC 60079–2:2014, IEC 60079–5:2015, IEC 60079–6:2015, IEC 60079–7:2015, IEC 60079–11:2011, IEC 60079–13:2017, IEC 60079–15:2017, IEC 60079–18:2017, IEC 60079–25:2010 or IEC 60079–30–1:2007 (all incorporated by reference, see § 110.10–1 of this subchapter) in lieu of Clause 6.5.

* * * * *

(c) As an alternative to paragraph (b)(1) of this section, electrical equipment that complies with the provisions of NFPA 496 (2017) (incorporated by reference, see § 110.10–1 of this subchapter) is acceptable for installation in Class I, Divisions 1 and 2. When equipment meeting this standard is used, it does not need to be identified and marked by an independent laboratory. The Commanding Officer, Marine Safety Center (MSC) will evaluate equipment complying with this standard during plan review. It is normally considered acceptable if a manufacturer's certification of compliance is indicated on a material list or plan.

(d) Equipment listed or certified to ANSI/UL 60079–18 or IEC 60079–18:2017, respectively (both incorporated by reference, see § 110.10–1), is not permitted in Class I Special Division 1 or Zone 0 hazardous location, unless the encapsulating compound of Ex ''ma'' protected equipment is not exposed to, or has been determined to be compatible with, the liquid or cargo in the storage tank.

* * * * *

§ 111.106–5 [Amended]

■ 100. Amend § 111.106–5 as follows:
■ a. In paragraph (a):
■ i. Remove the text ''UL'' and add, in its place, the text ''ANSI/UL'';
■ ii. Remove the text ''60092–350:2008'' and add, in its place, the text ''60092–350:2014''; and
■ iii. Remove the text ''IEC 60092–353:2011'' and add, in its place, the text IEC ''60092–353:2016''; and
■ b. In paragraph (c), remove the text ''60092–502'' and add, in its place, the text ''60092–502:1999''.

§ 111.106–15 [Amended]

■ 101. Amend § 111.106–15, in paragraph (a), by removing the text ''60092–502'' wherever it appears and

adding, in its place, the text ''60092–502:1999''.

■ 102. Amend § 111.107–1 as follows:

■ a. In paragraph (a)(1), remove the text ''111.10–1'' and add, in its place, the text ''110.15–1'';

■ b. In paragraph (b) introductory text, remove the text ''NEC 2002 (incorporated by reference, see 46 CFR 110.10–1)'' and add, in its place, the text ''70 (incorporated by reference; see § 110.10–1 of this subchapter)'';

■ c. Remove paragraph (b)(1);

■ d. Redesignate paragraphs (b)(2) through (5) as paragraphs (b)(1) through (4);

■ e. Add new paragraph (b)(5); and

■ f. In paragraph (c)(1), remove the text ''or Category A of IEC 60332–3–22 (both incorporated by reference; see 46 CFR 110.10–1)'' and add, in its place, the text '', IEC 60332–3–22:2018, or IEC 60332–3–21:2018, Category A or A F/R (all incorporated by reference; see § 110.10–1 of this subchapter)''.

The addition reads as follows:

§ 111.107–1 Industrial systems.

* * * * *

(b) * * *

(5) Sections 111.30–1, 111.30–5(a), and 111.30–19(a)—Switchgear.

* * * * *

■ 103. Revise § 111.108–1 to read as follows:

§ 111.108–1 Applicability.

This subpart applies to MODUs, floating OCS facilities, and vessels, other than offshore supply vessels regulated under 46 CFR subchapter L of this chapter, constructed after April 2, 2018 that engage in OCS activities.

■ 104. Amend § 111.108–3 by:

■ a. Revising paragraphs (b)(1)(i) through (iii);

■ b. Designating Note to paragraph (b)(1) as Note 1 to paragraph (b)(1); and

■ c. Revising paragraphs (b)(2) and (3), (d) introductory text, and (e).

The revisions read as follows:

§ 111.108–3 General requirements.

* * * * *

(b) * * *

(1) * * *

(i) ANSI/UL 674, ANSI/UL 823, ANSI/UL 844, ANSI/UL 913, ANSI/UL 1203, ANSI/ISA 12.12.01, or ANSI/UL 2225 (all incorporated by reference, see § 110.10–1 of this subchapter).

(ii) FM Approvals Class Number 3600, Class Number 3610, Class Number 3611, Class Number 3615, or Class Number 3620 (all incorporated by reference, see § 110.10–1 of this subchapter).

(iii) CSA C22.2 Nos. 0–10, 30–M1986, 157–92, or 213–16 (all incorporated by reference, see § 110.10–1 of this subchapter).

* * * * *

(2) NFPA 70 Article 505 (incorporated by reference, see § 110.10–1 of this subchapter). Equipment required to be identified for Class I locations must meet the provisions of Sections 505.7 and 505.9 of NFPA 70 and must be tested and listed by an independent laboratory to one or more of the types of protection in ANSI/ISA Series of standards incorporated in NFPA 70.

Note 2 to paragraph (b)(2): See sections 505.9(C) of the NFPA 70 for use of Division equipment in Zone designated spaces.

(3) Clause 8 of IEC 61892–7:2019 (incorporated by reference, see § 110.10–1 of this subchapter) for all U.S. and foreign floating OCS facilities and vessels on the U.S. OCS or on the waters adjacent thereto; chapter 6 of 2009 IMO MODU Code (incorporated by reference, see § 110.10–1 of this subchapter) for all U.S. and foreign MODUs; or clause 6 of IEC 60092–502:1999 (incorporated by reference, see § 110.10–1 of this subchapter) for U.S. tank vessels that carry flammable and combustible cargoes. Electrical apparatus in hazardous locations must be tested to IEC 60079–1:2014, IEC 60079–2:2014, IEC 60079–5:2015, IEC 60079–6:2015, IEC 60079–7:2015, IEC 60079–11:2011, IEC 60079–13:2017, IEC 60079–15:2017, IEC 60079–18:2017, IEC 60079–25:2010 or IEC 60079–30–1:2007 (incorporated by reference, see § 110.10–1 of this subchapter) and certified by an independent laboratory under the IECEx System.

* * * * *

(d) As an alternative to paragraph (b)(1) of this section, electrical equipment that complies with the provisions of NFPA 496 (2017) (incorporated by reference, see § 110.10–1 of this subchapter) is acceptable for installation in Class I, Divisions 1 and 2. When equipment meeting this standard is used, it does not need to be identified and marked by an independent laboratory. The Commanding Officer, MSC, will evaluate equipment complying with this standard during plan review.

* * * * *

(e) Equipment listed or certified to ANSI/UL 60079–18 or IEC 60079–18:2017, respectively, (both incorporated by reference, see § 110.10–1 of this subchapter) is not permitted in Class I, Special Division 1, or Zone 0 hazardous locations unless the encapsulating compound of Ex ''ma'' protected equipment is not exposed to, or has been determined to be compatible with, the liquid or cargo in the storage tank.

* * * * *

PART 112—EMERGENCY LIGHTING AND POWER SYSTEMS

■ 105. The authority citation for part 112 is revised to read as follows:

Authority: 46 U.S.C. 3306, 3703; DHS Delegation No. 00170.1, Revision No. 01.2.

■ 106. Revise § 112.01–20 to read as follows:

§ 112.01–20 Final emergency power source.

A final emergency power source is one that automatically supplies power to the emergency loads under § 112.15–5 and automatically transfers the temporary emergency loads under § 112.15–1 when the potential of the final emergency source reaches 85 to 95% of normal value.

■ 107. Amend § 112.05–5 by:

■ a. Revising paragraph (a) introductory text;

■ b. Redesignating Table 112.05–5(a) as Table 1 to § 112.05–5(a); and

■ c. In footnote 2 to newly redesignated Table 1 to § 112.05–5(a), removing the text ''§ 111.93'' and add, in its place, the text ''§ 58.25–65''.

The revision reads as follows:

§ 112.05–5 Emergency power source.

(a) The emergency power source must meet Table 1 to 112.05–5 and have the capacity to supply all loads, at a unity (1.0) service factor, that are simultaneously connected to it, except a load on a bus-tie to the main switchboard or non-required loads that are connected in accordance with § 112.05–1(c).

* * * * *

■ 108. Add § 112.05–7 to subpart 112.05 to read as follows:

§ 112.05–7 Use of emergency generator in port.

The emergency generator may be used during lay time in port for supplying power to the vessels, provided the following:

(a) The fuel oil tank for the emergency generator prime mover must be appropriately sized and provided with a level alarm, which is to be set to alarm at a level where there is sufficient fuel oil capacity for the emergency services for the period of time required by § 112.05–5(a).

(b) The emergency generator prime mover is to be rated for continuous service.

(c) The prime mover is to be fitted with alarms, displays and automatic

shutdown arrangements that meet ABS Marine Vessel Rules (incorporated by reference, see § 110.10–1 of this subchapter), section 4–8–2/5.19 Table 2, except that for fuel oil tank low-level alarm, in paragraph (a) of this section is to apply instead. The displays and alarms are to be provided in the centralized control station. Monitoring at the engineers' quarters must meet ABS Marine Vessel Rules, section 4–9–6/19.

(d) The emergency generator room is to be fitted with fire detectors. Where the emergency generator is located in a space separated from the emergency switchboard, fire detectors are to be located in each space. The fire detection and alarm system must meet the requirements of subpart 113.10 of this subchapter.

(e) The power supply circuits, including control and monitoring circuits, for the use of an emergency generator in port are to be so arranged and protected that any electrical fault, except for the emergency generator and the emergency switchboard, will not affect the operation of the main and emergency services.

(f) Means are to be provided to readily change over to emergency operation.

(g) The generator is to be safeguarded against overload by automatically shedding such other loads so that the supply to the required emergency loads is always available.

(h) Operational instructions such as that on the fuel oil tank level, harbor/seagoing mode changeover arrangements, etc. are to be provided on board. Before the vessel is under way, all valves, switches, etc., are to be in the positions for the intended mode of operation of the emergency generator and the emergency switchboard. Such instructions are to be distinctly posted at the emergency generator room. Planned maintenance is to be carried out only while in port.

■ 109. Amend § 112.15–1 as follows:

■ a. In paragraph (r), remove the text ''46 CFR 110.10–1'' and add, in its place, the text ''§ 110.10–1 of this subchapter''; and

■ b. Add paragraph (s) to read as follows:

§ 112.15–1 Temporary emergency loads.

* * * * *

(s) Engineer's assistance-needed alarm.

§ 112.43–13 [Removed and Reserved]

■ 110. Remove and reserve § 112.43–13.

■ 111. Amend § 112.50–1 by revising paragraphs (g) and (h) to read as follows:

§ 112.50–1 General.

* * * * *

(g) The following automatic shutdowns are required for the generator set:

(1) Overspeed; and

(2) Operation of a fixed fire extinguishing system in the emergency generator room.

(h) The following audible alarms are required for the generator set if the prime mover is a diesel engine:

(1) Low oil pressure; and

(2) High cooling water temperature.

* * * * *

PART 113—COMMUNICATION AND ALARM SYSTEMS AND EQUIPMENT

■ 112. The authority citation for part 113 is revised to read as follows:

Authority: 46 U.S.C. 3306, 3703; DHS Delegation No. 00170.1, Revision No. 01.2.

■ 113. Revise § 113.05–7 to read as follows:

§ 113.05–7 Environmental tests.

(a) Communication, alarm system, control, and monitoring equipment, with the exception of fire and smoke detection and alarm systems, must meet the environmental tests of—

(1) Section 4–9–9, Table 1, of ABS Marine Vessel Rules (incorporated by reference; see § 110.10–1 of this subchapter) or the applicable ENV category of Lloyd's Register Type Approval System—Test Specification Number 1 (incorporated by reference; see § 110.10–1 of this subchapter); and

(2) IEC 60533:2015 (incorporated by reference; see § 110.10–1 of this subchapter) as appropriate.

(b) Components of smoke detection and alarm systems must be tested in accordance with 46 CFR 161.002.

§ 113.10–7 [Amended]

■ 114. In § 113.10–7, remove the text ''IEC 60529'' and add, in its place, the text ''IEC 60529:2013''.

§ 113.20–3 [Amended]

■ 115. In § 113.20–3, remove the text ''IEC 60529'' and add, in its place, the text ''IEC 60529:2013''.

§ 113.25–7 [Amended]

■ 116. Amend § 113.25–7, in paragraph (b), by removing the text ''as allowed under § 113.25–6(e)(2)''.

§ 113.25–11 [Amended]

■ 117. Amend § 113.25–11, in paragraph (a), by removing the text ''IEC 60529 (both incorporated by reference; see 46 CFR 110.10–1)'' and adding, in its place, the text ''IEC 60529:2013 (both incorporated by reference; see § 110.10–1 of this subpart)''.

§ 113.30–25 [Amended]

■ 118. Amend § 113.30–25 as follows:

■ a. In paragraph (e), remove the text ''IEC 60529 (both incorporated by reference; see 46 CFR 110.10–1)'' and add, in its place, the text ''IEC 60529:2013 (both incorporated by reference; see § 110.10–1 of this subpart)'';

■ b. In paragraph (i), remove the text ''IEC 60529'' and add, in its place, the text ''IEC 60529:2013''; and

■ c. In paragraph (j)(2), remove the phrase ''IEC 60331–11 and IEC 60331–21 (both incorporated by reference; see 46 CFR 110.10–1)'', and add in its place, the phrase ''60331–11:2009 and 60331–21:1999 (both incorporated by reference; see § 110.10–1 of this subpart)''.

§ 113.37–10 [Amended]

■ 119. Amend § 113.37–10, in paragraph (b), by removing the text ''IEC 60529 (both incorporated by reference; see 46 CFR 110.10–1)'' and adding, in its place, the text ''IEC 60529:2013 (both incorporated by reference; see § 110.10–1 of this subpart)''.

§ 113.40–10 [Amended]

■ 120. Amend § 113.40–10, in paragraph (b), by removing the text ''IEC 60529 (both incorporated by reference; see 46 CFR 110.10–1)'' and adding, in its place, the text ''IEC 60529:2013 (both incorporated by reference; see § 110.10–1 of this subpart).''.

§ 113.50–5 [Amended]

■ 121. Amend § 113.50–25 as follows:

■ a. In paragraphs (b) and (d), after the word ''maker'', add the words ''or initiating device''; and

■ b. In paragraph (g), remove the text ''IEC 60529 (both incorporated by reference; see 46 CFR 110.10–1)'' and add, in its place, the text ''IEC 60529:2013 (both incorporated by reference; see § 110.10–1 of this subpart)''.

■ 122. Revise § 113.65–5 to read as follows:

§ 113.65–5 General requirements.

Each whistle operator must meet Section 18 of IEEE 45.1–2017 (incorporated by reference; see § 110.10–1 of this subchapter).

Dated: February 27, 2023.

W.R. Arguin,

Rear Admiral, U.S. Coast Guard, Assistant Commandant for Prevention Policy.

[FR Doc. 2023–04370 Filed 3–15–23; 8:45 am]

BILLING CODE 9110–04–P