

NFPA® 110

Standard for  
Emergency and Standby  
Power Systems  
Handbook 2016



NFPA®, 1 Batterymarch Park, Quincy, MA 02169-7471, USA  
An International Codes and Standards Organization

# NFPA® 110 Standard for Emergency and Standby Power Systems Handbook 2016

## Third Edition

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An International Codes and Standards Organization

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**NFPA®110**

**Standard for**

**Emergency and Standby Power Systems**

**2016 Edition**

This edition of NFPA 110, *Standard for Emergency and Standby Power Systems*, was prepared by the Technical Committee on Emergency Power Supplies and released by the Correlating Committee on National Electrical Code®. It was issued by the Standards Council on May 26, 2015, with an effective date of June 15, 2015, and supersedes all previous editions.

This edition of NFPA 110 was approved as an American National Standard on June 15, 2015.

**▲ Origin and Development of NFPA 110**

The Technical Committee on Emergency Power Supplies was organized in 1976 by NFPA in recognition of the demand for viable guidelines for the assembly, installation, and performance of electrical power systems used to supply critical and essential needs during outages of the primary power source. The intent was to establish the equipment requirements necessary to achieve an on-site auxiliary electrical power source suitable to the needs of the applicable requirements and user criteria.

In 1979, the Committee's report proposing adoption of NFPA 110 was published but withdrawn because of issues involving the scope of the committee. In 1981, a revised report was returned to the Committee to resolve differences with other NFPA documents. At the 1982 NFPA Fall Meeting, the Committee's report was adopted as a tentative standard (NFPA 110T-1983) in order to expose the document to public review.

NFPA 110 was formally adopted as a standard at the 1984 NFPA Fall Meeting and designated as the 1985 edition, which clarified scope statements, prototype testing, battery and bypass-isolation switch requirements, and revised maintenance requirements.

The 1988 edition included several new definitions and further clarified transfer switch and installation testing requirements.

The 1993 edition reflected the adoption of NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*, a basic requirement for one-step loading for all prime movers, an update on battery technology, restrictions on unnecessary transferring of loads, and the need for battery maintenance.

The 1996 edition added revised monthly load testing requirements for generator sets, consideration for potential wet stacking, various types of fuel tanks and spillage considerations, restrictions on the types of permitted batteries, and working space requirements. It also clarified the minimum number of cranks that an engine must be capable of completing, cooling system requirements, and timing devices in health care facilities for testing a generator.

The 1999 edition deleted the testing of generator sets at 50 percent of the emergency power supply system load because the relevant measure is the nameplate rating. The exception for wet stacking was also deleted. Exhaust temperature monitoring was added because it is an acceptable performance measure of proper emergency power supply loading.

The 2002 edition was restructured to comply with the *Manual of Style for NFPA Technical Committee Documents*. Introductory material in Chapter 1 was formatted for consistency among all NFPA documents. Referenced publications were relocated from the last chapter to Chapter 2, resulting in the renumbering of chapters. Definitions in Chapter 3 were made consistent with definitions in other NFPA documents, systematically aligned, and individually numbered. Paragraphs were revised to provide one mandatory requirement per section, subsection, or paragraph. Information that accompanied many of the requirements was moved to Annex A, Explanatory Material. Many exceptions were deleted or rephrased into mandatory text.

Changes in the 2002 edition included definitive and broad-based requirements regarding electrical installations in accordance with *NFPA 70®*, *National Electrical Code®*; additional EPS controls and safeguards, such as alerting staff of impending failure of the EPS to start; access and working space around the generator set; ventilation; energy converters; and EPSS testing requirements.

The 2005 edition revised clearance distances between transfer switches and service equipment, revised the definitions for both lead-acid (flooded) and valve-regulated lead-acid (VRLA) batteries, and changed the testing and maintenance section to include testing for spark-ignited engines that parallels those for diesel. Changes also included new annex material for diesel fuel testing and maintenance procedures, as well as transfer switches.

Significant revisions to the 2010 edition included the following:

- (1) Clarified that the requirements to systems classed as optional standby is not mandatory
- (2) Clarified that the operation testing and routine maintenance requirements of Chapter 8 cover both new and existing EPSSs
- (3) Aligned the definitions of transfer switch types with NFPA 111 and relevant product standards
- (4) Revised the Chapter 7 requirements for acceptance testing and differentiated what is required for new and unoccupied buildings and facilities from what is required for existing occupied buildings and facilities
- (5) Revised the Chapter 8 requirements for operational test durations, loading conditions, and method of test initiation for the emergency power supply

A noteworthy change for the 2013 edition was the deletion of the mandatory 96-hour fuel supply requirement (5.1.2) for seismic categories. The need for continued operation and the minimum operational time without refueling is a design consideration or is directed by another standard. Several references to ASTM standards and additional annex material were added to address fuel quality and storage issues. The prime mover cooling and ventilation system construction and installation requirements were reorganized.

The 2016 edition prohibits the installation of an automatically actuated valve into the fuel lines, in order to prevent the inadvertent cutoff of fuel at critical times. The proper operation of systems connected in parallel has been addressed by adding acceptance testing and maintenance items for paralleling gear. In order to test all transfer switches, a requirement to rotate the transfer switch initiating the monthly test has been added where multiple transfer switches are installed. A new section consolidates record management and defines record retention requirements.

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