

NFPA®

111

Standard on
Stored Electrical Energy
Emergency and Standby
Power Systems

2022



NFPA® 111

Standard on Stored Electrical Energy Emergency and Standby Power Systems

2022 Edition



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NFPA® 111

Standard on

Stored Electrical Energy Emergency and Standby Power Systems

2022 Edition

This edition of NFPA 111, *Standard on Stored Electrical Energy 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 January 22, 2021, with an effective date of February 11, 2021, and supersedes all previous editions.

This edition of NFPA 111 was approved as an American National Standard on February 11, 2021.

Origin and Development of NFPA 111

The Technical Committee on Emergency Power Supplies was organized in 1976 by NFPA in recognition of the demand for guidelines on the assembly, installation, and performance of electrical power systems to supply critical and essential needs during outages of the normal power source. During the development of a base standard (NFPA 110, *Standard for Emergency and Standby Power Systems*), it was determined that several power sources were available for emergency and standby power systems. The committee determined that sufficient differences existed between these sources to justify separate documents providing clearly defined specifics. Each document would follow the basic format of NFPA 110 to provide a consistent basis for comparison and usage and would remain under the jurisdiction of the Technical Committee on Emergency Power Supplies.

Because of the unique knowledge necessary to provide an authoritative document, the technical committee authorized a subcommittee in 1982 to prepare a draft document on systems using stored energy sources. In 1986, a document tentatively titled NFPA 110A, *Stored Energy Emergency and Standby Power Systems*, was submitted for adoption at the 1989 NFPA Annual Meeting.

Formally designated as NFPA 111, this document addressed the performance of stored energy systems with appropriate equipment detail. The requirements of the standard were considered necessary to obtain the minimum level of reliability and performance and to achieve an on-site stored energy auxiliary electrical power source suitable to the needs of the applicable requirements. If followed, its use would result in a system suitable for various situations as required by other codes and standards.

The second edition in 1993 contained only minor changes.

For the 1996 edition, a section was added to cover the acceptability of systems, methods, and devices other than those listed in the document.

The 2001 edition contained two changes: informational text was moved to the appendix, and the operational testing requirements were expanded.

The 2005 edition underwent a complete rewrite in accordance with the *Manual of Style*. Along with the rewrite, some of the definitions were revised and located in Chapter 3. Other data in the document were transferred to the table format for better usability.

The 2010 edition revised the document scope to clarify that an uninterruptible power supply (UPS) supplied through an emergency power supply (EPS) is not a stored emergency power supply system (SEPS). The definitions of *automatic transfer switch* and *nonautomatic transfer switch* were revised to correlate with NFPA 110. New definitions covered battery cell types, bridging systems, and electrochemical energy storage devices. Energy sources, converters, inverters, and accessories were covered by Chapter 5 revisions that clarified existing requirements, recognized new battery types, and provided requirements covering stored energy sources other than batteries. Revisions to area ventilation requirements acknowledged that there might be flammable gases other than hydrogen associated with energy sources that are not batteries. Annex diagrams were added to illustrate flywheel and rotating EPS systems, different UPS systems, and basic switching points of an SEPS.

A rectifier plant, which is often used in the telecommunications industry, was added in the 2013 edition as a potential stored emergency power supply system (SEPSS). These rectifier plants were also included as a suitable bridging system. The location of SEPSS equipment serving Level 1 EPSS loads was revised to correlate with the requirements of NFPA 110.

Throughout the 2016 edition, references to a *stored emergency power supply system* were revised to a *stored-energy emergency power supply system* to describe the type of system more appropriately. Requirements for baseline measurements were revised to provide more accurate data. The load test was revised to correlate with the IEEE 450 rate-adjusted and time-adjusted capacity tests.

In the 2019 edition, Table 4.2.2 was revised to cover the interruption time without reference to specific SEPSS types.

For the 2022 edition, changes have been incorporated to align with the first (2020) edition of NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*.

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NFPA 111

Standard on

Stored Electrical Energy Emergency and Standby Power Systems

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Information on referenced and extracted publications can be found in Chapter 2 and Annex C.

Chapter 1 Administration

1.1 Scope.

1.1.1* This standard shall cover performance requirements for stored electrical energy systems providing an alternate source of electrical power in buildings and facilities in the event that the normal electrical power source fails.

1.1.2 Systems covered in this standard shall include power sources, transfer equipment, controls, supervisory equipment, and accessory equipment, including integral accessory equipment, needed to supply electrical power to the selected circuits.

1.1.3 This standard shall cover installation, maintenance, operation, and testing requirements as they pertain to the performance of the stored-energy emergency power supply system (SEPSS).

1.1.4 Exclusions.

1.1.4.1* This standard shall not cover the following:

- (1) Application of the SEPSS
- (2) Distribution wiring
- (3) Systems having total outputs less than 500 VA or less than 24 V or systems less than Class 0.033 in accordance with Section 4.3
- (4) Unit equipment
- (5) Nuclear sources, solar systems, and wind stored-energy systems
- (6) Uninterruptible power systems (UPS) supplied by an emergency power supply system (EPSS) or a UPS supplied by an SEPSS
- (7) Optional standby systems

1.1.4.2 The following shall not be within the scope of this standard:

- (1) Specific buildings or facilities, or both, requiring an SEPSS
- (2) Specific loads to be served by the SEPSS
- (3) Type, class, or level to be assigned to any specific load (See Section 4.1.)

1.2 Purpose.

1.2.1 This standard shall provide performance requirements for SEPSS and also shall be used in conjunction with other standards.

1.2.2 It shall be the role of other NFPA standards to specify which occupancies require an SEPSS and the applicable level, type, and class.

1.2.3 This standard shall not specify where an SEPSS is required. (See 1.1.4.2.)

1.2.4 This standard shall provide guidance for inspectors, designers, installers, manufacturers, and users of an SEPSS and shall serve as a basis for communication between the parties involved.

1.2.5 This standard shall not be considered a design manual.

1.2.6 Compliance with this standard shall not absolve the parties involved of their respective responsibilities for the design, installation, maintenance, performance, or compliance with other applicable standards and codes.

1.2.7 The installation of a stored-energy system(s) conforming to this standard shall ensure that alternate power is available to minimize life safety hazards resulting from power loss to certain continuous chemical or industrial processes, computer controlled systems, emergency lighting, and the like.

1.3 Application.

1.3.1 This document shall apply to new installations of SEPSS.

1.3.2 Existing systems shall not be required to be modified to conform except where the authority having jurisdiction determines that nonconformity presents a distinct hazard to life.

1.4 Equivalency. Nothing in this standard shall be intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety to those prescribed by this document, provided the requirements of 1.4.1 and 1.4.2 are met.

1.4.1 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.