NFPA® 111

Standard on Stored Electrical Energy Emergency and Standby Power Systems

2025 Edition

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NFPA® 111

Standard on

Stored Electrical Energy Emergency and Standby Power Systems

2025 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 of the National Electrical Code®. It was issued by the Standards Council on April 22, 2024, with an effective date of May 12, 2024, and supersedes all previous editions.

This edition of NFPA 111 was approved as an American National Standard on May 12, 2024.

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 the 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*, and it 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 the appropriate equipment details. The requirements of the standard were considered necessary to meet the minimum level of reliability and performance and maintain a suitable on-site stored energy auxiliary electrical power source. 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 moved to Chapter 3. Other data in the document was consolidated into tables 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 (SEPSS). 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. In addition, energy sources, converters, inverters, and accessories were covered by Chapter 5 revisions that clarified existing requirements, recognized new battery types, and provided requirements for 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. Finally, annex diagrams were added to illustrate flywheel and rotating EPS systems, different UPS systems, and basic switching points of an SEPSS.

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Requirements for rectifier plants, which are often used in the telecommunications industry, were added in the 2013 edition for use as potential stored emergency power supply systems (SEPSS). These rectifier plants were also included as a suitable bridging system. The location of SEPSS equipment serving Level 1 EPSS loads was also 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 interruption time without reference to specific SEPSS types.

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

The 2025 edition contains only minor changes.

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Committee Scope: This Committee shall have primary responsibility for documents on performance criteria for the selection and assembly of the components for emergency power systems in buildings and facilities, including categories of power supplies, transfer equipment, controls, supervisory equipment, and all related electrical and mechanical auxiliary or accessory equipment needed to supply emergency power to the utilization equipment. The Committee also shall be responsible for criteria on the maintenance and testing of the system. This Committee does not cover requirements for the application of emergency power systems, self-contained emergency lighting units, and electrical wiring, except that wiring that is an integral part of the system up to the load side of the transfer switch(es). This Committee shall report to Correlating Committee of the National Electrical Code.

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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.

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1.4.2 The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.5 Function.

1.5.1 SEPSS shall provide a source of electrical power of required capacity, reliability, and quality to loads for a given length of time within a specified time after loss, failure, or disruption of the normal power supply.

1.5.2 An SEPSS shall include a means to recharge the stored-energy system.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1, *Fire Code,* 2024 edition.

NFPA 70®, National Electrical Code®, 2023 edition.

NFPA 72®, National Fire Alarm and Signaling Code®, 2025 edition.

NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems,* 2023 edition.

2.3 Other Publications.

2.3.1 ASCE Publications. American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191-4400.

ASCE/SEI 7, *Minimum Design Loads for Buildings and Other Structures,* 2010.

2.3.2 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2020.

2.4 References for Extracts in Mandatory Sections.

NFPA 1, *Fire Code,* 2021 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems,* 2019 edition.

NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems,* 2023 edition.

Chapter 3 Definitions

Δ **3.1 General.**

N **3.1.1** The definitions contained in this chapter shall apply to the terms used in this standard.

N **3.1.2** Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used.

N **3.1.3** *Merriam-Webster's Collegiate Dictionary,* 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.5 Shall. Indicates a mandatory requirement.

3.2.6 Should. Indicates a recommendation or that which is advised but not required.

3.2.7 Standard. An NFPA standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA manuals of style. When used in a generic sense, such as in the phrases "standards development process" or "standards development activities," the term "standards" includes all NFPA standards, including codes, standards, recommended practices, and guides.

3.3 General Definitions.

3.3.1 Battery. One or more cells connected together electrically in series, in parallel, or both, to provide the required operating voltage and current levels. [**855,** 2023]

3.3.1.1* ***Lead-Acid (LA) Cell.*** A secondary cell in which the active material of the positive electrode is lead dioxide, the active material of the negative electrode is lead, and the electrolyte is dilute sulfuric acid.

3.3.1.1.1* ***Valve-Regulated (VRLA).*** A lead-acid battery consisting of sealed cells furnished with a valve that opens to vent the battery whenever the internal pressure of the battery exceeds the ambient pressure by a set amount. [**1,** 2021]

3.3.1.1.2* ***Vented (Flooded).*** A lead-acid battery consisting of cells that have electrodes immersed in liquid electrolyte. [**1,** 2021]

3.3.1.2 ***Nickel-Cadmium (NiCd) Cell.*** A secondary cell in which the active material of the positive electrode is nickel oxyhydroxide, the active material of the negative electrode is cadmium, and the electrolyte is dilute potassium hydroxide.

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