NFPA®

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Standard for the Installation of Stationary Energy Storage Systems

2020

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NFPA® 855

Standard for the

Installation of Stationary Energy Storage Systems

2020 Edition

This edition of NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*, was prepared by the Technical Committee on Energy Storage Systems and acted on by NFPA at its Association Technical Meeting held June 17–20, 2019, in San Antonio, TX. It was issued by the Standards Council on August 5, 2019, with an effective date of August 25, 2019.

This edition of NFPA 855 was approved as an American National Standard on August 25, 2019.

Origin and Development of NFPA 855

The energy storage system project that led to this first edition of NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*, was approved by the NFPA Standards Council in April of 2016, after which a call for members was posted. The original request was submitted by an individual on behalf of the California Energy Storage Alliance in order to address gaps in regulation identified in workshops held by the U.S. Department of Energy and the Fire Protection Research Foundation. In August of that same year, the Standards Council appointed the first NFPA Technical Committee on Energy Storage Systems. The initial draft was developed over the course of three meetings by the technical committee and was released to the public in 2017. Over the past 2 years, the technical committee has met several times to review feedback from the public and to make improvements to the standard.

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This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This committee shall have primary responsibility for documents on the fire prevention, fire protection, design, construction, installation, commissioning, operation, maintenance, and decommissioning of stationary, mobile, and temporary energy storage systems.

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Standard for the

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2020 Edition

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

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

Chapter 1 Administration

1.1 Scope. (Reserved)

1.2 Purpose. This standard provides the minimum requirements for mitigating the hazards associated with ESS.

1.3* Application. This standard applies to ESS exceeding the values shown in Table 1.3.

1.3.1 ESS shall comply with the requirements of this standard as applicable.

1.3.2 ESS installed in one- and two-family dwellings and townhouse units shall only comply with Chapter 15.

1.3.3 Mobile ESS deployed at an electric utility substation or generation facility for 90 days or less shall not add to the threshold values in Table 1.3 for the stationary ESS installation if both of the following conditions apply:

(1) The mobile ESS complies with Section 4.5.

(2) The mobile ESS is only being used during periods in which facility's stationary ESS is being tested, repaired, retrofitted, or replaced.

Table 1.3 Threshold Quantities

ESS Technology	Aggregate Capacity[a] kWh	MJ
Battery ESS		
Lead-acid, all types	70	252
Nickel including Ni-Cad, Ni-MH, and Ni-Zn[b]	70	252
Lithium-ion, all types	20	72
Sodium nickel chloride	20	72
Flow batteries[c]	20	72
Other battery technologies	10	36
Batteries in one- and two-family dwellings and townhouse units	1	3.6
Capacitor ESS		
Electrochemical double layer capacitors[d]	3	10.8
Other ESS		
All other ESS	70	252

[a]For ESS units rated in amp-hrs, kWh equals maximum rated voltage multiplied by amp-hr rating divided by 1000.
[b]Nickel battery technologies include nickel cadmium (Ni-Cad), nickel metal hydride (Ni-MH), and nickel zinc (Ni-Zn).
[c]Includes vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.
[d]Capacitors used for power factor correction, filtering, and reactive power flow are exempt.

1.4 Retroactivity.

1.4.1 Unless otherwise specified, the provisions of this standard shall not apply to ESS installations that existed or were approved for construction or installation prior to the effective date of this standard.

1.4.2* In those cases where the authority having jurisdiction (AHJ) determines that an existing situation presents an unacceptable degree of risk, the AHJ shall be permitted to apply retroactively any portions of this standard deemed appropriate.

1.5* Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, reliability, and safety over those prescribed in this standard.

1.6 Units and Formulas. Metric units in this standard shall be in accordance with the International System of Units, which is officially abbreviated SI in all languages.

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*, 2018 edition.

NFPA 2, *Hydrogen Technologies Code*, 2016 edition.

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*, 2018 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2019 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, 2017 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, 2019 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 2018 edition.

NFPA 52, *Vehicular Natural Gas Fuel Systems Code*, 2019 edition.

NFPA 54, *National Fuel Gas Code*, 2018 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 2017 edition.

NFPA 68, *Standard on Explosion Protection by Deflagration Venting*, 2018 edition.

NFPA 69, *Standard on Explosion Prevention Systems*, 2019 edition.

NFPA 70®, National Electrical Code®, 2017 edition.

NFPA 72®, National Fire Alarm and Signaling Code®, 2019 edition.

NFPA 76, *Standard for the Fire Protection of Telecommunications Facilities*, 2016 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems*, 2019 edition.

NFPA 853, *Standard for the Installation of Stationary Fuel Cell Power Systems*, 2015 edition.

NFPA 1142, *Standard on Water Supplies for Suburban and Rural Fire Fighting*, 2017 edition.

NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*, 2018 edition.

NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*, 2015 edition.

2.3 Other Publications.

2.3.1 ANSI Publications. American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.

ANSI Z535.1, *American National Standard for Safety Colors*, 2011.

ANSI Z535.2, *American National Standard for Environmental and Facility Safety Signs*, 2011.

ANSI Z535.3, *American National Standard for Criteria for Safety Symbols*, 2011.

ANSI Z535.4, *American National Standard for Product Safety Signs and Labels*, 2011.

ANSI Z535.5, *American National Standard for Safety Tags and Barricade Tapes*, 2011.

ANSI Z535.6, *American National Standard for Product Safety Information in Product Manuals, Instructions and Other Collateral Materials*, 2011.

2.3.2 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings*, 2017.

ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2016.

2.3.3 IAPMO Publications. International Association of Plumbing and Mechanical Officials, 4755 E. Philadelphia Street, Ontario, CA 91761.

Uniform Plumbing Code, 2015.

2.3.4 ICC Publications. International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001.

International Plumbing Code, 2015.

2.3.5 IEEE Publications. IEEE, 3 Park Avenue, 17th Floor, New York, NY 10016-5997.

IEEE C2, *National Electrical Safety Code*, 2017.

2.3.6 NERC Publications. North American Electric Reliability Corporation, 1325 G Street, NW, Suite 600, Washington, DC 20005.

PRC-005, *Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance*, 2016.

2.3.7 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 263, *Standard for Fire Tests of Building Construction and Materials*, 2018.

UL 790, *Standard Test Methods for Fire Tests of Roof Coverings*, 2014.

UL 1564, *Standard for Industrial Battery Chargers*, 2013.

UL 1741, *Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources*, 2016.

UL 1778, *Uninterruptible Power Systems*, 2014, revised 2017.

UL 1973, *Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications*, 2016.

UL 1974, *Evaluation for Repurposing Batteries*, 2018.

UL 9540, *Safety of Energy Storage Systems and Equipment*, 2016.

UL 9540A, *Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems*, 2018.