**Chapter 52 Energy Storage Systems**

52.1 General

52.1.1\*

Energy storage systems (ESS) having an aggregate capacity exceeding the threshold quantities established in Table 1.3 of NFPA 855 shall comply with Chapter 52.

52.1.2 Permits

52.1.2.2

Prior to installation, plans shall be submitted and approved by the AHJ.

52.1.2.3

Construction documentation shall include the documents required in 4.1.2.1 of NFPA 855.

52.1.3 Documentation Location

A copy of the operations and maintenance manual shall be placed in an approved location to be accessible to AHJs and emergency responders. [855:4.1.2.3.2]

52.1.4 Emergency Operations Plan

An emergency operations plan shall be readily available for use by facility operations and maintenance personnel. [855:4.1.3.2.1]

52.1.4.1

The emergency operations plan shall be readily available to emergency responders as required in 52.1.4.

52.1.4.2

Emergency contact numbers for the owner representative/operations and maintenance staff shall be accessible to emergency responders as required in 52.1.4.

52.1.5 System Commissioning and Decommissioning

System commissioning of ESS shall be both of the following:

Performed in accordance with Chapter 6 of NFPA 855

Approved prior to putting the system into service

52.1.5.1

A commissioning plan meeting the provisions of Chapter 6 shall be provided to the building owner or their authorized agent and the AHJ. [855:4.1.2.4]

52.1.5.2

A decommissioning plan shall be both of the following:

Prepared in accordance with Chapter 8 of NFPA 855

Approved prior to putting the system in service

52.1.5.3

The AHJ shall be notified prior to decommissioning an ESS. [855:8.2.1]

52.1.5.4

Recommissioning of existing ESS that have undergone alterations, additions, repositioning, or renovations to the system or any of its components shall be in accordance with Chapter 6 of NFPA 855.

52.1.6 Operation, Maintenance, and Testing

Operation, maintenance, and testing of ESS shall be in accordance with Chapter 7 of NFPA 855.

52.1.7\* Installations and Locations

The installation of ESS and related systems shall be in accordance with NFPA 855.

52.1.8 Mobile ESS Equipment and Operations

52.1.8.1

The charging, storage, and deployment of mobile ESS shall be in accordance with Section 4.5 of NFPA 855.

52.1.8.2

Operadonal permits might be required, see Table 1.12.8(a).

52.1.9 System Interconnections

All electrical connections and wiring to and from an ESS or the components of an ESS, and connections to fuel gas, liquid fuel, or water shall be in accordance with Chapter 5 of NFPA 855.

52.1.10 Combustible Storage

52.1.10.1

Combustible materials not related to the ESS shall not be stored in rooms, cabinets, or enclosures containing ESS equipment. [855:4.1.6.1]

52.1.10.2

Combustible materials related to the ESS shall not be stored within 3 ft (914 mm) from ESS equipment. [855:4.1.6.2]

52.1.10.3

Combustible materials in occupied work centers shall comply with Section 10.19 or other applicable fire codes. [855:4.1.6.3]

52.1.11 Equipment

52.1.11.1 Repairs

Repairs of ESS shall only be done by qualified persons and documented in the maintenance, testing, and events log required in 4.1.2.3 of NFPA 855. [855:4.2.2.1]

52.1.11.2 Retrofits

52.1.11.2.1

Retrofitting of ESS shall comply with the following:

Battery systems and modules and capacitor systems and modules shall be listed in accordance with UL 1973.

Battery management and other monitoring systems shall be connected and installed in accordance with the manufacturer's instructions.

The overall installation shall continue to comply with UL 9540 listing requirements, where applicable.

Retrofits shall be documented in the maintenance, testing, and events log required in 4.1.2.3 of NFPA 855.

[855:4.2.3.1]

52.1.11.2.2

Changing out or retrofitting existing lead-acid or nickel-cadmium battery systems with other lead-acid or nickel-cadmium battery systems less than 50 V ac, 60 V dc in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76 shall be considered repairs when there is no increase in system size or capacity greater than 10 percent from the original design. [855:4.2.3.2]

52.1.11.2.3\*

Changing out or retrofitting existing lead-acid or nickel-cadmium battery systems with other lead-acid or nickel-cadmium battery systems that are designed in accordance with IEEE C2, used for dc power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations shall be considered repairs when there is no increase in system size or capacity greater than 10 percent from the original design. [855:4.2.3.3]

52.1.11.2.4

Changing out or retrofitting existing lead-acid battery systems with other lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778 and utilized for standby power applications shall be considered repairs where there is no increase in system size or capacity greater than 10 percent from the original design. [855:4.2.3.4]

52.1.11.3 Replacements

Replacement of ESS shall be considered new ESS installations and comply with the provisions applicable to new ESS. [855:4.2.4.1]

52.1.12 Increase in Power Rating or Maximum Stored Energy

52.1.12.1

A complete new ESS that is added to an existing installation of one or more existing systems (including traditional standby systems) shall be treated as a new system and meet the applicable requirements of this standard. [855:4.2.5.1]

52.1.12.2

An increase in maximum stored energy or power rating to an existing ESS shall be considered a retrofit and comply with 52.1.11.2.1. [855:4.2.5.2]

52.1.13 Environment

The temperature, humidity, and other environmental conditions in which an ESS is located shall be maintained in accordance with the listing (if listed) and the manufacturer's specifications. [855:4.2.6]

52.1.14\* Working Space

At a minimum, ESS equipment shall be provided with working space in accordance with NFPA 70 or IEEE C2, as appropriate, for operation, inspection, troubleshooting, maintenance, or replacement. [855:4.3.2]

52.1.15 Security of Installations

52.1.15.1

ESS shall be secured against unauthorized entry and safeguarded in an approved manner. [855:4.3.8.1]

52.1.15.2

Security barriers, fences, landscaping, and other enclosures shall not inhibit the required air flow to or exhaust from the ESS and its components. [855:4.3.8.2]

52.1.16 Fire Command Centers

In buildings containing ESS and equipped with a fire command center, the command center shall include signage or readily available documentation that describes the location and type of ESS, operating voltages, and location of electrical disconnects as required by NFPA 70. [855:4.3.12]

52.1.17 Reused or Repurposed Equipment

Storage batteries previously used in other applications, such as electric vehicle propulsion, shall not be permitted unless the equipment is repurposed by a UL 1974 compliant battery repurposing company when reused in ESS applications and the system complies with 4.2.1 of NFPA 855. [855:4.2.10.1]

52.1.18 Signage

52.1.18.1

Approved signage shall be provided in the following locations:

On the front doors to rooms or areas containing ESS or in approved locations near entrance to ESS rooms

On the front doors to outdoor occupiable ESS containers

In approved locations on outdoor ESS that are not enclosed in occupiable containers or otherwise enclosed

[855:4.3.5.1]

52.1.18.2\*

The signage required in 52.1.18.1 shall be in compliance with ANSI Z535 and include the following information as shown in Figure 52.1.18.2.

"Energy Storage Systems" with symbol of lightning bolt in a triangle

Type of technology associated with the ESS

Special hazards associated as identified in Chapters 9 through 15 of NFPA 855

Type of suppression system installed in the area of the ESS

Emergency contact information

[855:4.3.5.2]

FIGURE 52.1.18.2 Example of ESS Signage. [855:Figure 4.3.5.2]

52.1.19 Impact Protection

52.1.19.1

ESS shall be located or protected to prevent physical damage from impact where such risks are identified. [855:4.3.7.1]

52.1.19.2

Vehicle impact protection consisting of guard posts or other approved means shall be provided where ESS are subject to impact by motor vehicles. [855:4.3.7.2]

52.1.20 Means of Egress

52.1.20.1

All areas containing ESS shall provide egress from the area in which they are located in accordance with the local building code. [855:4.3.10.1]

52.1.20.2

Required egress doors shall be provided with emergency lighting as required by the local building code. [855:4.3.10.2]

52.1.21 Spill Control

Rooms, buildings, or areas containing ESS with free-flowing liquid electrolyte in individual vessels having a capacity of more than 55 gal (208 L) or multiple vessels having an aggregate capacity exceeding 1000 gal (3785 L) shall be provided with spill control to prevent the flow of liquids to adjoining areas. [855:4.14.1]

52.1.22 Fire Suppression and Control

Where fire suppression and control is provided it shall be in accordance with 4.4.4.3 of NFPA 855.

52.1.23\* Ventilation

W lie re ventilation is provided it shall be in accordance with Section 4.9 of NFPA 855.

52.1.24 Smoke and Fire Detection

Where smoke and fire detection is provided it shall be in accordance with Section 4.10 of NFPA 855.

52.1.25 Water Supply

Where water supplies are provided they shall be in accordance with Section 4.13 of NFPA 855.

52.2 Remediation Measures

Remediation measures shall be provided in accordance with Section 4.16 of NFPA 855.

52.2.1

When, in the opinion of the AHJ, it is essential for public safety that trained personnel be on site to respond to possible ignition or reignition of a damaged or decommissioned ESS, the owner, agent, or lessee shall provide one or more fire mitigation personnel, as required and approved, at their expense. [855:4.16.2.1]

52.2.2

These personnel shall remain on duty continuously after the fire department leaves the premises until the damaged ESS is removed from the premises or the AHJ indicates they can leave. [855:4.16.2.2]

52.2.3

On-duty fire mitigation personnel shall have the following responsibilities:

Keep diligent watch for fires, obstructions to means of egress, and other hazards

Immediately contact the fire department if their assistance is needed to mitigate any hazards

Take prompt measures for remediation of hazards and extinguishment of fires that occur

Take prompt measures to assist in the evacuation of the public from the structures

[855:4.16.2.3]

Where interconnections are provided they shall be in accordance with Section 5.1 of NFPA 855.

52.4 Operation and Maintenance

Operations and maintenance shall be in accordance with Chapter 7 of NFPA 855.

52.5 Electrochemical Energy Storage Systems

Where electrochemical energy storage systems are provided they shall be in accordance with Chapter 9 of NFPA 855.

52.6 Capacitor Energy Storage Systems

Where capacitor energy storage systems are provided they shall be in accordance with Chapter 10 of NFPA 855.

52.7 Fuel Cell Energy Storage Systems

Where fuel cell energy storage systems are provided they shall be in accordance with Chapter 11 of NFPA 855.

52.8 Storage of Used or Off-Specification Batteries

Where storage of used or off-specification batteries is provided it shall be in accordance with Chapter 14 of NFPA 855.

52.9\* One- And Two-Family Dwelling and Townhouse Units

Where one-and two-family dwellings and townhouse units are provided they shall be in accordance with Chapter 15 of NFPA 855.