NFPA 855

Standard for the Installation of Stationary Energy Storage Systems

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Brian O’Connor, P.E.
NFPA
NFPA 855, Standard on the Installation of Energy Storage Systems

NFPA 855
Standard for the Installation of Stationary Energy Storage Systems
2020
NFPA 855 – Scope

• [Reserved]
# NFPA 855 – Application

<table>
<thead>
<tr>
<th>ESS TECHNOLOGY</th>
<th>Aggregate CAPACITY&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BATTERY ESS</strong></td>
<td></td>
</tr>
<tr>
<td>Lead acid</td>
<td>70 KWh</td>
</tr>
<tr>
<td>Nickel cadmium</td>
<td>70 KWh</td>
</tr>
<tr>
<td>Lithium-Ion</td>
<td>20 KWh</td>
</tr>
<tr>
<td>Sodium</td>
<td>20 KWh</td>
</tr>
<tr>
<td>Flow batteries</td>
<td>20 KWh</td>
</tr>
<tr>
<td>Other battery technologies</td>
<td>10 KWh</td>
</tr>
<tr>
<td>Batteries in residential occupancies</td>
<td>1 KWh</td>
</tr>
<tr>
<td><strong>CAPACITOR ESS</strong></td>
<td></td>
</tr>
<tr>
<td>Capacitors, all types</td>
<td>3 KWh</td>
</tr>
<tr>
<td><strong>OTHER ESS</strong></td>
<td></td>
</tr>
<tr>
<td>All other ESS</td>
<td>70 KWh</td>
</tr>
</tbody>
</table>
Types of ESS
NFPA 855 – Emergency Planning

- Emergency Operations Plan
  - Safe shutdown
  - Emergency procedures
  - Response considerations (SDS)
  - Removal of damaged ESS
  - Annual staff training

- Hazard Mitigation Analysis (HMA)

- Fire Mitigation Personnel
NFPA 855 – Equipment

- System listed to UL 9540
- Charge Controllers
- Inverters & Converters
- Energy Storage Management System
- Reused and Repurposed Equipment

[Image of equipment]
NFPA 855 - Electrical Installations

- NFPA 70 or IEEE C2
- ESS Signage
- Separation (Fire Rating)
- Impact Protection
- Security
- Elevation
- Open Rack

ENERGY STORAGE SYSTEM

TYPE OF TECHNOLOGY: Lithium-Ion Batteries
SPECIAL HAZARDS: Reignition Possible
EMERGENCY NUMBER: 1-(732)-867-5309
SUPPRESSION SYSTEM: Automatic Sprinkler System
NFPA 855 – Location: Indoors

- Dedicated Use Buildings
- Non-dedicated Use Buildings
- Dwelling and Sleeping Units
NFPA 855 – Location: Outdoors

- Remote
- Near Exposures
- Rooftop & Open Parking
- Garage
NFPA 855 - Mobile ESS Equipment and Operations

• Charging and Storage

• Deployed
NFPA 855 - Size and Separation

- 50kWh groups
- Spaced 3ft from groups & walls
- Other arrangements based on large scale fire test
- Exempt: Remote Outdoor Locations
NFPA 855 - Maximum Stored Energy

Table 4.8 Maximum Stored Energy

<table>
<thead>
<tr>
<th>ESS Type</th>
<th>Maximum Stored Energy(^a) (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead-acid batteries, all types</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Nickel batteries(^b)</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Lithium-ion batteries, all types</td>
<td>600</td>
</tr>
<tr>
<td>Sodium nickel chloride batteries</td>
<td>600</td>
</tr>
<tr>
<td>Flow batteries(^d)</td>
<td>600</td>
</tr>
<tr>
<td>Other battery technologies</td>
<td>200</td>
</tr>
<tr>
<td>Storage capacitors</td>
<td>20</td>
</tr>
</tbody>
</table>

Exempt: Dedicated use buildings and remote locations
NFPA 855 - Ventilation and Detection

• Exhaust Ventilation
  — 1 ft³/min/ft²
  — Designed to keep flammable gases under 25% of LFL
  — Exhaust away from openings

• Smoke and Fire Detection
  — Gas detection activates ventilation
  — Smoke detection per NFPA 72
Fire Control & Suppression

• Sprinkler System 0.3gpm/ft² over 2,500 ft²

• Other Fire Protection Systems
  — Large Scale Fire Test
  — UL 9540A

• Explosion Control
  — ESS exceeds 25% LFL
Exemptions

Telecommunication

- Listings
- Retrofits
- Energy Storage Management System
- Elevation Restrictions
- Size and Separation
- Smoke and Fire Detection
- Fire Suppression
- Water Supply
- System Interconnections
- Commissioning
- Decommissioning
- Explosion Control

Electric Power Utility Exemptions

- Temporary ESS out of scope
- Plans and specifications
- Emergency Operations Plan
- Listing
- Retrofits
- Energy Storage Management System
- Elevation Restrictions
- Mobile ESS
- Size and Separation
- Smoke and Fire Detection
- Fire Suppression
- Water Supply
- System Interconnections
- Commissioning
- Operations
- Decommissioning
- Explosion Control
NFPA 855 – Annexes (Informational)

Annex B, Energy Storage System Hazards

Annex C, Firefighting Considerations (Operations)

Annex D, Overview of Energy Storage System Technologies

Annex E, Permits, Inspections, Approvals and Connections
Fire Code 2021

Chapter 52
Extracts & References
NFPA 855

Schedule:
- NITMAMs June 2020
- Published August 2020
NFPA 70, National Electrical Code, 2020

NEC 2020

Article 706
- Installation
- Disconnecting Means
- Circuits

Public Input Closes
September 2020
Questions?

More Information:
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www.NFPA.org/ESS

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