

NFPA 855: Improving Energy Storage System Safety

What is NFPA 855?

NFPA 855—the second edition (2023) of the *Standard for the Installation of Stationary Energy Storage Systems*—provides mandatory requirements for, and explanations of, the safety strategies and features of energy storage systems (ESS). Applying to all energy storage technologies, the standard includes chapters for specific technology classes.

The depth of this standard makes it a valuable resource for all Authorities Having Jurisdiction.

The focus of the following overview is on how the standard applies to electrochemical (battery) energy storage systems in Chapter 9 and specifically on lithium-ion (Li-ion) batteries.

Fire Codes and NFPA 855

While NFPA 855 is a standard and not a code, its provisions are enforced by NFPA 1, *Fire Code*, in which Chapter 52 provides an outline of requirements along with references to specific sections in NFPA 855. The *International Fire Code* (IFC) has its own provisions for ESS in Section 1207, which are largely harmonized with those in NFPA 855.

The revision process for the 2026 edition of NFPA 855 is already underway, with 26 Task Groups addressing specific topics. The Task Groups comprise fire safety professionals, industry experts, and other interested parties, and they engage in robust debate of public inputs aimed at improving the standard.

While locally adopted fire codes take precedence over NFPA 855, the depth of this standard—plus the wealth of tutorial information in its annexes—make it a valuable resource for all Authorities Having Jurisdiction (AHJs).

Authority Having Jurisdictions (AHJ) and NFPA 855

NFPA 855 includes a range of prescriptive requirements for metrics such as maximum energy and spacing between units. The standard also lists several submittals that must be made to the AHJ, including the following:

- Hazard mitigation analysis (HMA)
- Emergency response plan
- Details of all safety systems
- Results of fire and explosion testing to UL 9540A or equivalent

This information—especially the UL 9540A results—allows for government partners to assess the individual safety characteristics of a particular project.

The fire codes require ESS to be listed to UL 9540. For existing ESS that were not listed to UL 9540, NFPA 855 provides a measure of retroactivity, requiring the operator to provide an HMA and empowering the AHJ to require safety upgrades based on the HMA findings. (This provision is not included in the 2021 IFC but is likely to be included in the 2024 edition.)

The AHJ oversees the entire lifecycle of an ESS, including plans for commissioning and decommissioning.

Explosion Control and Fire Suppression

NFPA 855 reflects the current best practice for preventing explosions and safely containing fires.

The 2023 edition mandates fire suppression for all ESS, with exceptions only at the discretion of AHJs. There are two options for explosion control: deflagration management using blast panels to meet the requirements of NFPA 68; or explosion prevention using exhaust ventilation to meet NFPA 69.

It is important not to combine deflagration management and fire suppression. If there is a propagating thermal runaway event, the fire suppression system could seemingly extinguish a fire but allow propagation to continue without flame, venting flammable gases into the enclosure to a point where their concentration exceeds the upper flammable limit. Such a situation would be stable, not allowing combustion until first responders open a door and allow oxygen to enter. This is what happened at the McMicken ESS in Surprise, Arizona in 2019, resulting in four firefighters being injured¹.

Since explosions represent a far greater risk to firefighters, preventing that risk takes precedence, which has led to industry best practice combining explosion prevention with fire containment, in which ESS fires are allowed to gradually extinguish in a controlled fashion while protecting adjacent enclosures and nearby equipment. This approach avoids the possibility of contaminated runoff, eliminates risks associated with stranded energy and reignition, and allows for the successful prevention of propagation of fires from the specifically affected units to the broader site. This explosion prevention and fire containment strategy also mitigates risks to adjacent properties. The Task Groups working on the 2026 edition of NFPA 855 are in consensus on the fire containment approach.

Fire Code Revision Cycles

Consistent with the fire codes, NFPA 855 is on a three-year revision cycle. NFPA 855 is a year ahead in its cycle, meaning that the 2023 edition will inform the 2024 editions of the model codes. While it's incumbent upon state and local jurisdictions to implement the latest versions of NFPA codes and standards, **the energy storage industry seeks to meet and exceed the standards established in the most up to date versions of NFPA 855.**

NFPA 855 serves as a valuable resource for the latest best practices in ESS safety for the industry and government partners alike.

¹ [Arizona ESS Explosion Investigation and Line of Duty Injury Reports Now Available](#)