

# Fire protection standard atlas for energy storage containers

What are the fire and building codes for energy storage systems?

However, many designers and installers, especially those new to energy storage systems, are unfamiliar with the fire and building codes pertaining to battery installations. Another code-making body is the National Fire Protection Association (NFPA). Some states adopt the NFPA 1 Fire Code rather than the IFC.

Is fire suppression equipment included in an ESS?

suppression equipment may or may not be provided as an integral part of an ESS, or it may be optional. Depending on the case, the ESS shall comply with all applicable performance requirements in the standard with and/or without the fire detection and fire suppression equipment in place and operational.

Where can I find information on energy storage failures?

For up-to-date public data on energy storage failures, see the EPRI BESS Failure Event Database.<sup>2</sup> The Energy Storage Integration Council (ESIC) Energy Storage Reference Fire Hazard Mitigation Analysis (ESIC Reference HMA),<sup>3</sup> illustrates the complexity of achieving safe storage systems.

Can deflagration be installed in a containerized system?

Actors: BESS developers, safety experts, thermal modeling experts Description: It is suspected that properly sized deflagration protection will be challenging to install in many containerized systems due to limited availability of wall and ceiling space.

What is battery energy storage fire prevention & mitigation?

In 2019, EPRI began the Battery Energy Storage Fire Prevention and Mitigation - Phase I research project, convened a group of experts, and conducted a series of energy storage site surveys and industry workshops to identify critical research and development (R&D) needs regarding battery safety.

How are BESS installations evaluated for fire protection and Hazard Mitigation?

In 2020 and 2021, eight BESS installations were evaluated for fire protection and hazard mitigation using the ESIC Reference HMA. Review specifications, design drawings, performance data, and operations and maintenance documentation provided by the site host participant. Document important safety-relevant features (and lack thereof).

Further, for the whole energy storage container, the heat balance of the fire can be expressed as Eq (7) and Eq (8):

$$(7) \dot{Q}_{i=1} N q_{i, conv} + \dot{Q}_{i=1} N q_{i, rad} = \dot{Q}_{tot} \quad (8) \dot{Q}_{tot} = m \dot{T} C ...$$

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