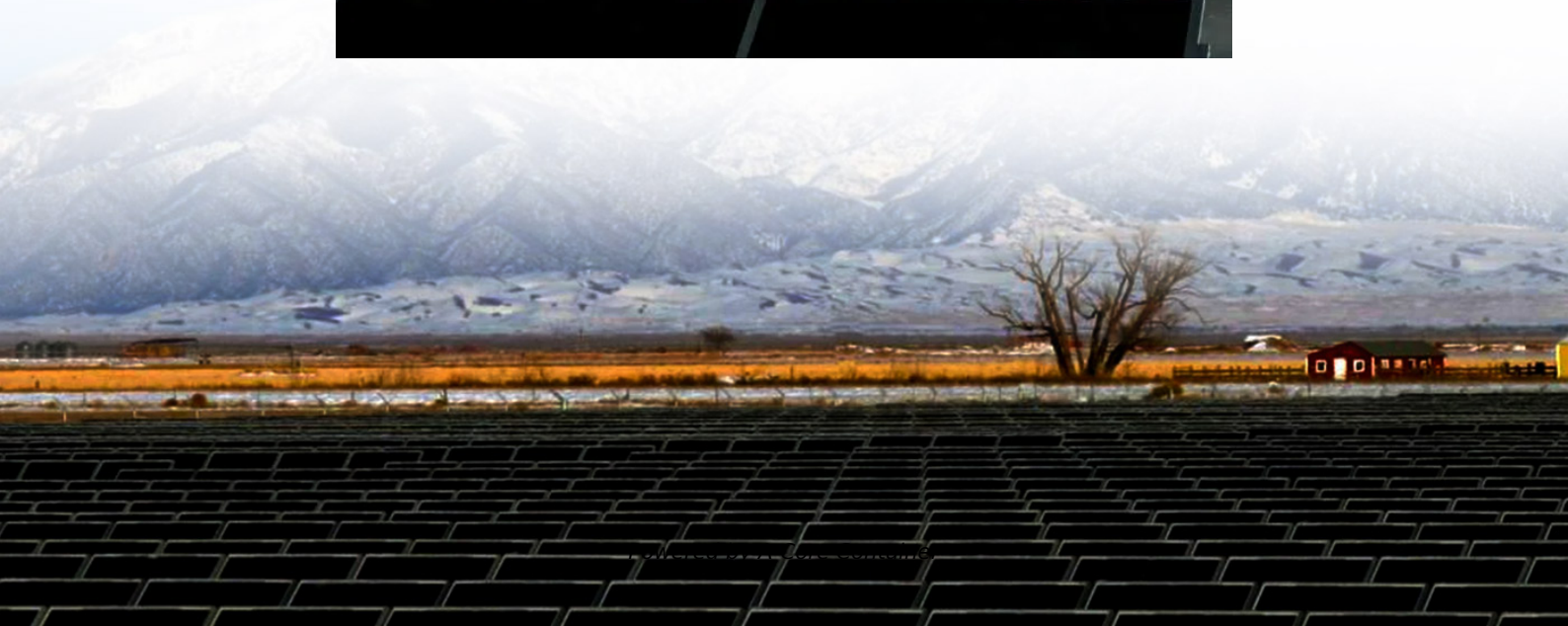


A-Core Container

Explosion-proof energy storage products



Overview

What are the different types of explosion protection systems?

Although Passive Protection (explosion venting) is the most common protection method, Active Explosion Protection Systems are available which incorporate detection, control and monitoring, and suppression to instantaneously quench the incipient explosion before it reaches a dangerous state.

Should deflagration venting be used as passive explosion protection?

In general, using deflagration venting as passive explosion protection in addition to an active system has multiple benefits due to the nature of the battery failure event, which involves a rapid release of flammable gases.

Can passive protection be used as a sole explosion protection scheme?

The two main challenges in using passive protection methodology are design constraints for the enclosure and lack of validation data to support calculation methodology. These challenges make it difficult to obtain a feasible design for deflagration venting of ESS enclosures as the sole explosion protection scheme for most configurations.

How does ESS design affect fire and explosion safety?

Several competing design objectives for ESS can detrimentally affect fire and explosion safety, including the hot aisle/cold aisle layout for cooling efficiency, protection against water and dust ingress into the enclosure, and the use of larger cells with increased energy density.

Why are explosion hazards a concern for ESS batteries?

For grid-scale and residential applications of ESS, explosion hazards are a significant concern due to the propensity of lithium-ion batteries to undergo thermal runaway, which causes a release of flammable gases composed of hydrogen, hydrocarbons (e.g. methane, ethylene, etc.), carbon monoxide, and

carbon dioxide.

What are the different types of explosion control options for ESS?

The two types of explosion control options for ESS, NFPA 68 deflagration venting and NFPA 69 exhaust ventilation, are based on a design basis determined from UL 9540A test data. This testing is meant to provide baseline data for the analysis and is generally extrapolated to a sufficiently conservative hazard scenario for the ESS installation.

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