Battery Energy Storage System (BESS) Fire Protection

with F-500 EA® Micelle Mist

BESS Hazards are Outpacing Codes and Standards

Battery Energy Storage Systems (BESS) are playing an increasingly critical role in our power grid as we transition toward a renewable future. Storing excess electricity from solar and wind sources and releasing it during peak demand, BESS provide stability, reliability, and efficiency.

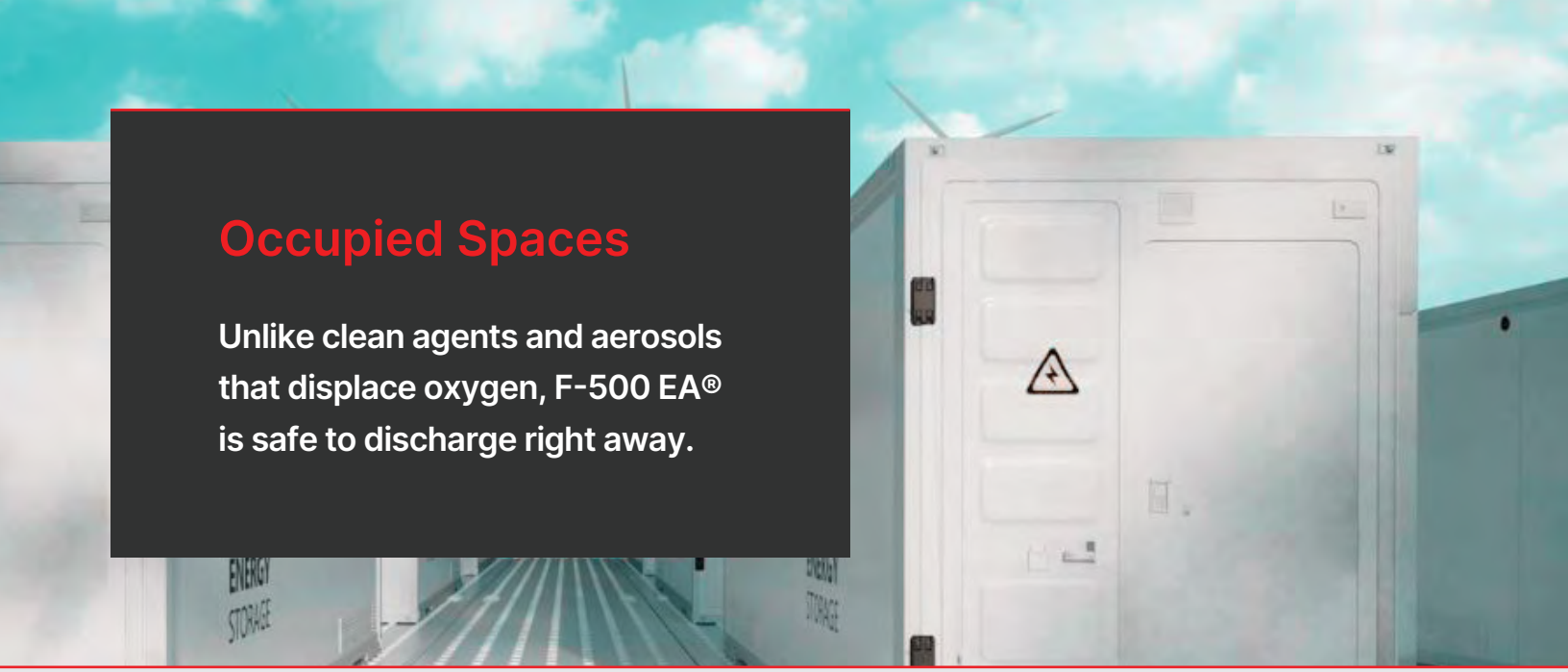
Creating Health and Safety Concerns for Industry Leaders, First Responders, and Rural Communities

However, their rapid adoption brings serious hazards to rural communities with limited resources and infrastructure. Lithium-ion batteries entering thermal runaway release dozens of explosive and toxic vapors, escalating torch-like flames while endangering lives and property.

NFPA 18A Annex 4.3

This standard recognizes close to two decades of proven lithium-ion battery fire testing utilizing Encapsulator Agents.

Carried out by some of the world's most crucial power players, results from these tests demonstrate F-500 EA®'s ability to consistently and effectively mitigate life-threatening BESS risks.



Occupied Spaces

Unlike clean agents and aerosols that displace oxygen, F-500 EA® is safe to discharge right away.

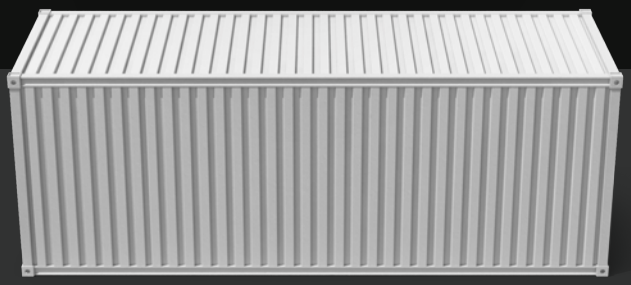
Comparing

F-500 EA® with Clean Agents

	Clean Agents	F-500 EA®
Application Method Single and Continuous Discharge	Single Discharge Only	✔
Agent Versatility Flammability, Explosivity, and Toxicity	Flammability Only	✔
Enclosure Requirement Contained and Open Spaces	Contained Spaces Only	✔
Environmental Impact Fluorine-free and Biodegradable	Varied	✔

F-500 EA® Micelle Mist

The Complete Solution Proven to Stop Thermal Runaway Propagation



100-350
Microns

Early Detection for BESS Fire Containment

F-500 EA® Micelle Mist Targets Flammability, Explosivity, and Toxicity

Encapsulator Agents change the composition of a plain water droplet with the introduction of spherical micelles.

This allows Encapsulator Agents like F-500 EA® to extinguish fires that can't be fought effectively with water mist alone. BESS enclosures are prone to explosions, highlighting the need for technology capable of not only extinguishing battery fires, but encapsulating hazardous vapors.

Conclusion

Water mist fire protection with F-500 EA® as a water additive can better suppress BESS fires.

Reviewing

NIOSH Testing with F-500 EA®

The NIOSH Pittsburgh Mining Research Division conducted a study evaluating the effectiveness of water mist with and without F-500 EA® on two lithium-ion battery packs.

12V with Water Mist

Average of 250°C → 75°C in 200 Seconds

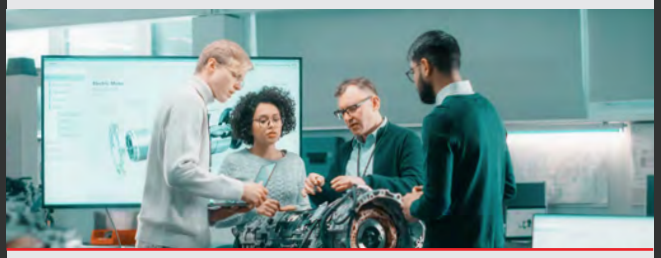
12V with F-500 EA®

Average of 250°C → 25°C in 200 Seconds

F-500 EA®
Testing Chronology

> View Full History

2008
Bosch
Official Reference Customer



2012
DEKRA
Tested and Recommended

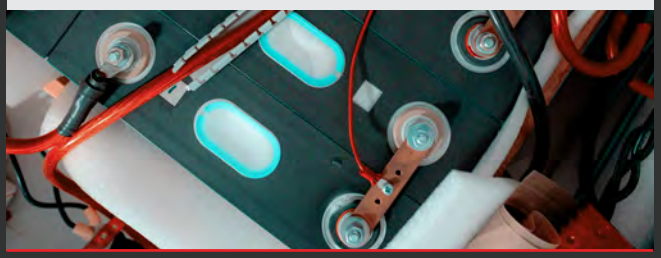
2012
Formula 1
Specified for Circuits

2017
KIWA
Tested for Johnson Controls

2015
General Motors
Specified for Battery Abuse Labs

2016
Tesla
Specified for Charging Stations

2024
Marine Science and Engineering
Passed UL 9540A Testing



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Applus+
Applus+ Approved & ETI Certified

Hazard Control Technologies, Inc.

Since 1997

We're revolutionizing fire suppression, vapor mitigation, spill control, and contamination response with our flagship Encapsulator Agent, F-500 EA®. Manufactured in the USA, we're trusted worldwide to address today's high hazards with a formula that's always been fluorine-free, biodegradable, and noncorrosive. It's clear to see why F-500 EA® is still encapsulating the world.

Learn more at www.hct-world.com or call +1 (770) 719-5112.

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ISO 9001