



Marine Hazard Protection with F-500 EA®



Exploring

Hazard Control for Marine Operations

With the increasing global transport of lithium-ion batteries and electric powered cargo, the potential for devastating marine incidents has risen significantly. Once ignited, battery fires are difficult to extinguish with conventional fire suppression systems, compromising vessel integrity and crew safety. Therefore, an advanced fire protection, detection, and containment system is critical to promptly mitigate maritime threats. Our complete on board Diamond Doser® Fire Suppression System powered by F-500 EA® is salt-water friendly and expertly engineered to safeguard valuable lives and cargo at sea.

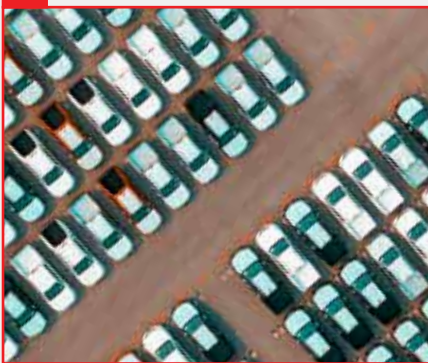


Typically, a ship's fire protection and detection systems are not designed to deal with lithium-ion battery fires.

Jensen Hughes

F-500 EA allows you to switch to fluorine-free fire suppression without sacrificing safety.

Ro-Ro Ships



Tanker Ships



Cargo Ships



Hazard Control Technologies, Inc.

150 WALTER WAY, FAYETTEVILLE, GEORGIA 30214 / +1 770 719 5112 / INFO@HCT-WORLD.COM / HCT-WORLD.COM

Comparing

F-500 EA[®] Performance with SFFF and Water

	SFFF	Water	F-500 EA [®]
Class A	✓	✓	✓
Class B (Flat Spill)	✓	✓	✓
Class B (Three-dimensional)			✓
Class C (Energized Environments)			✓
Class D			✓
Lithium-ion Batteries		✓	✓

Lithium-ion Batteries

A 3% solution of F-500 EA[®] provides complete battery fire protection targeting flammability, explosivity, and toxicity. When plain water is used, a lithium-ion battery's high energy density can intensify thermal runaway, allowing the fire to spread rapidly to multiple levels of a ship. Lithium-ion batteries off-gas dozens of vapors as they burn, increasing explosion risk and toxic smoke accumulation in vessels while threatening the lives of those on board.



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Mitigating

ICE, Hybrid, and Electric Vehicle Fires



F-500 EA® is backed by over 15 years of proven testing on lithium-ion battery flammability, explosivity, and toxicity, as referenced in NFPA 18A Annex 4.3.

[Learn More](#)

The ALBERO Project Studied Where EV Fires Began for Ro-Ro Ships

Parked EVs	32%
Charging EVs	24%
EV Accidents	16%

PCC Ships

A Pure Car Carrier (PCC) Ship can house thousands of new vehicles, with the largest transporting over 8,000 at a time. F-500 EA® can mitigate modern automotive hazards like combustible metals and lithium-ion batteries, preventing total losses.

Ro-Pax Ships

Newer Ro-Pax ships can accommodate 1,000 passengers and carry anywhere from 100-300 vehicles varying in age and maintenance status. F-500 EA® absorbs thermal energy 10x faster than plain water to prioritize passenger safety and preserve life.

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Mitigating

Flammable Liquids and Explosive Vapors



F-500 EA® is proven to be able to render liquid and vapor state hydrocarbon fuel nonflammable, as referenced in NFPA 18A Section 7.7.

[Learn More](#)



NFPA 18A Standard on Water Additives for Fire Control and Vapor Mitigation

Section 7.7

Encapsulator Agent
Qualification Test Protocol

Oil and Chemical Tankers

Very Large Crude Carriers (VLCCs) and Ultra Large Crude Carriers (ULCCs) are the largest in their class. They often carry at least 200,000-320,000 deadweight tons of crude oil and other hydrocarbon products. F-500 EA® can encapsulate polar and non-polar fuel hazards with ease.

LNG and LPG Carriers

Liquefied Natural Gas (LNG) and Liquefied Petroleum Gas (LPG) carriers typically transport a mix of methane, ethane, propane, and butane at low temperatures. F-500 EA® is capable of encapsulating flammable vapors, proactively minimizing explosion risk.

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Mitigating

Multi-class Shipping Container Fires



F-500 EA® is a versatile Encapsulator Agent that can effectively extinguish Class A, B, C, D, and lithium-ion battery fire hazards.

[Learn More](#)

In Terms of Weight,
Nearly 70% of the USA's
International Trade is
Transported by Sea

Bureau of Transportation Statistics

A network of 926 ports, with 208 handling at least 250,000 tons a year.

Ports and Ship Yards

Between densely stacked shipping containers, material handling equipment, heavy machinery, passengers, and crews, adequate fire protection becomes critical before cargo ever leaves. F-500 EA® can be deployed as a 1%-3% solution by various mobile equipment and fixed systems.

Offshore Vessels

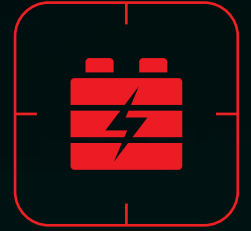
At sea, advanced fire protection is even more crucial as crews have access to minimal resources. A 1%-3% solution of F-500 EA® can be created using salt water to perform immediate life saving firefighting operations and prevent abandonment.

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Reviewing

F-500 EA® Compliance and Accreditations



F-500 Encapsulator Agent

UL Listed NFPA 18

NFPA 18A Section 7.7 Compliant

NFPA 18A Annex 4.3 Compliant

IMO Certified

EPA Listed

Firefighting Equipment and Sprinkler Systems

NEN NTA 8133 Compliant

Applus+ Approved

DEKRA Approved

FILK Certified



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