

Encapsulator Technology

Applications Guide



One agent. Many applications.

F-500 EA makes handling today's high hazard incidents safer, faster and easier than ever before.

While other agents may aide in extinguishing a specific class of fire, F-500 EA is a powerful multi-class preventative, protector and mitigating agent.

F-500 EA safely extinguishes Class A, B, C (energized environment), D, K and lithium-ion battery fires. Take the guess work out of emergencies with an agent that does it all.





Application: Firefighting

F-500 EA is keeping your industry personnel, assets and property healthier and safer while reducing damage.

Safety F-500 EA eliminates scalding steam and reduces smoke by 97%, improving visibility. Additionally, F-500 EA's rapid knockdown means up to 20x less time spent in IDLH environments.

Health F-500 EA is 100% fluorine free, noncorrosive and reduces cancer-causing toxins by over 98%, drastically reducing health risks and improving air quality.

Efficiency F-500 EA's rapid knockdown capabilities translate to less time, less water, less runoff and less stress on personnel.

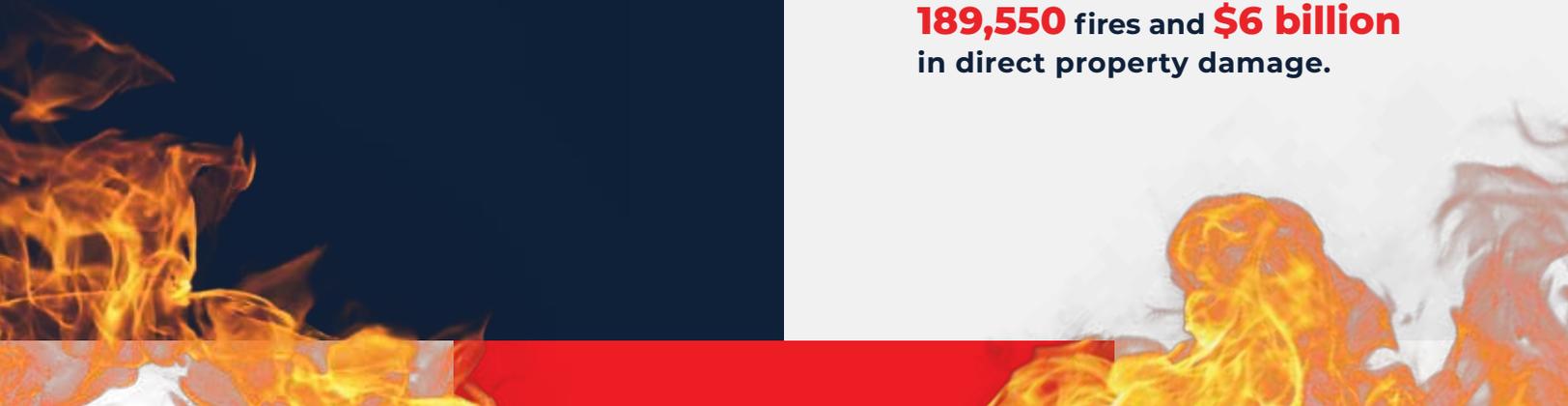
A **1%** solution of F-500 EA increases the extinguishing capacity of water up to **20x**.

F-500 EA works on **all four legs** of the fire tetrahedron at once, rapidly removing the heat, neutralizing the fuel from the oxygen on a chemical molecular level and interrupting the free radical chain reaction.

“During 2011-2015, there were an estimated **37,910** fires at industrial or manufacturing properties (including utility, defense, agriculture and mining) reported to U.S. fire departments each year, with annual losses of **\$1.2 billion** in direct property damage alone.”

NFPA

Over the course of 5 years, that becomes an estimated total of **189,550** fires and **\$6 billion** in direct property damage.





Application: Spill Control

F-500 EA rapidly encapsulates Class B fuel spills, tanking LELs and rendering flammable spills non-ignitable.

Safety F-500 EA provides complete fuel neutralization, compared to Foam, which offers a temporary blanket. F-500 EA is 100% fluorine free, while toxic PFAS/PFOA chemicals in foam continue to contaminate our soil, bodies of water and poison aquatic life.

Efficiency F-500 EA creates a safe scene within as little as 30 seconds, producing very little runoff, which translates to minimal, if any, cleanup and property damage. AFFF foam must be applied for 15 minutes, then re-applied, which amounts to hefty cleanup costs.



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“According to the U.S. Department of Energy, **1.3 million gal.** of petroleum are spilled into U.S. waters from vessels and pipelines in a typical year. A major oil spill could easily double that amount.”

LIVESCIENCE

F-500 EA solution can be mixed with salt water for spill control on **ships** and **oil platforms**.

The fuel, water and **F-500 EA** solution on a hard surface can be left to evaporate, depending on local regulations.

Applying **Foam** does nothing to alter the chemical molecular properties of the fuel, meaning the entire mixture may reignite and must be cleaned-up.

Applying absorbent to **Foam** simply creates a flammable granular that must be removed at a great expense and safety risk.





Application: Vapor Control

F-500 EA is utilized to quickly encapsulate flammable vapors, eliminating the risk of ignition.

Safety F-500 EA can quickly encapsulate any detected flammable vapors, containing a highly hazardous situation before an explosion ever occurs. This is crucial in protecting industrial personnel, assets and property.

Efficiency F-500 EA is a powerful preventative that can save your company millions in the long run. One spark can cripple operations and cost lives. Now, even the largest industrial hazards can be protected. F-500 EA eliminates flammability and prevents fatal and costly explosions.

“In 2007-2011, U.S. municipal fire departments responded to an estimated average of **51,600** fires per year involving ignition of flammable gas as the type of material first ignited.”

NFPA

F-500 EA is protecting hazardous areas in and around **refineries, chemical plants, pulp and paper plants, power plants** and many more at risk industrial environments.

In 2007-2011, U.S. flammable gas fires resulted in an estimated **168** civilian deaths, **1,029** civilian injuries and **\$644 million** in direct property damage per year.

NFPA

Over the course of 5 years, that becomes an estimated total of **840** civilian deaths, **5,145** civilian injuries and **\$3.2 billion** in direct property damage.



Application: **Combustible Dust**

F-500 EA encapsulates any and all finely ground material, quickly eliminating suspension and preventing dust fires.

Safety F-500 EA effectively prevents combustible dust explosions by encapsulating fine dust particles within its solution. This paired with our innovative Piercing Rod equipment is the perfect combination for mitigating deep seated silo fires from a safe distance.

Efficiency F-500 EA eliminates the suspension of finely ground particles, which can cause a sudden powerful and deadly explosion if left alone. This highly efficient housekeeping solution can quickly prevent crippling losses for your company.

“In 2018, three dust related incidents were recorded in the U.S. with losses above **15 million.**”

DUST SAFETY SCIENCE

F-500 EA is protecting companies with combustible dust hazards in **agriculture, plastic, rubber, pulp and paper, coal, metal processing** and many more at risk industries.

“The **#1** way to avoid a devastating combustible dust explosion is to implement a hazardous dust inspection, testing, housekeeping and control program.”

OSHA

“From 2018 global data, **89%** of dust hazard fatalities occurred due to explosions. From the injuries, **70%** occurred from explosions while **30%** were from fires.”

DUST SAFETY SCIENCE





Application: **Green Energy (ESS)**

F-500 EA is a trailblazer in green energy, energy storage system (ess) and lithium-ion battery hazard protection.

Safety F-500 EA provides deep, rapid cooling and lasting encapsulation of flammable electrolyte while reducing heat below the auto ignition temperature. This provides permanent burnback resistance against thermal runaway.

Health F-500 EA's encapsulates toxic HF gas emitted by burning lithium-ion batteries in high concentrations. Without F-500 EA, HF gas is well above the EPA approved exposure limit. F-500 EA's rapid knockdown translates to less exposure time, less runoff and less risk to personnel and assets.

“Testing shows, without extinguishment with F-500 EA, toxic HF gas levels released from burning lithium-ion batteries could reach **2,656 PPM**.

With F-500 EA, HF gas levels drop to **37.45 PPM** and under, well below NIOSH's 10 minute exposure limit of **95 PPM.**”

JOHNSON CONTROLS



“In February 2018, the U.S. Consumer Product Safety Commission's Status Report on High Energy Density Batteries Project reported over **25,000** overheating or fire incidents, involving more than **400** types of lithium battery-powered consumer products.”

OSHA

“F-500 EA can be recommended to apply on a lithium-ion battery fire.”

JOHNSON CONTROLS

Fighting today's fires.

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