



**Insurance Services Office (ISO)
FSRS Equivalency List
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APPLICATION BULLETIN

Reasons to Use F-500 Encapsulator Agent for Structural Fires

F-500 Encapsulator Agent is the most versatile and capable firefighting agent available. It can be used to extinguish all Class A materials, Class B polar and nonpolar fuels, Class D metals, three-dimensional fires, and is even recommended by third parties for specific Class C fires, such as lithium-ion battery car fires and 345 kV energized transformer fires. F-500 EA can even encapsulate fuel spills and render them nonflammable.

Firefighters often save F-500 EA for the tougher jobs, like industrial fires or highway fuel spills. The reason is it is believed plain water is cheaper to use. Actually, most fires are Class A and can be approached using 0.5 to 1% F-500 EA very effectively. The benefits of using F-500 EA over plain water add up to real savings.



Structural Fires - F-500 EA vs. Plain Water

- **Water is not free**
Firefighters use large quantities of water and could use an estimated one-sixth the amount of water by adding 0.5% F-500 EA.
- **Fewer Health-related Issues**
F-500 EA virtually eliminates steam, reducing Workman's Compensation claims from steam burns. Clemson University testing found F-500 EA eliminated 98.6% of toxins, including carcinogenic toxins, from smoke and eliminated 97% of the smoke, increasing visibility.
- **Many Fires Are Rural**
Firefighters must depend on the water carried on the pumper. A small reservoir of 350 gallons might last a few minutes. F-500 EA makes that few minutes much more effective. Consider the cost of calling in an additional pumper or a drafting operation.
- **Faster Knockdown**
Rapid extinguishment not only reduces property damage, but means less time on the job and less run-off. Overhaul time is reduced due to F-500 EA's effectiveness. Less time at the scene results in fewer accidents related to fatigue and means firefighters are available sooner for the next call.
- **Outstanding Burn Back Resistance**
F-500 EA penetrates and cools resulting in excellent burn back resistance, reducing rekindles.

The Cost of Using F-500 Encapsulator Agent

F-500 EA is comparably priced to foam, yet it is so effective, usually very little is required. Two videos show rapid extinguishment with F-500 EA. The amount of F-500 EA needed in these videos, was minimal. Fires vary, and more intense fires will require more F-500 EA. A fire in Wisconsin used 2,000 gallons of F-500 EA, yet it involved one million tires and was the largest fire in Wisconsin's history. The table shows typical fires where very little F-500 EA was used.

Video	Nozzle	Time to Extinguish	% F-500 EA	F-500 EA Used
House Fire	95 gpm	27 seconds	½%	23 ounces
Car Fire	20 gpm	10 seconds	1%	4.2 ounces

Remember . . .

F-500 EA is not a foam; it is an Encapsulator Agent

F-500 EA does not form a blanket of foam to smother a fire, instead F-500 EA;

- **Rapidly Cools the Fuel and Surrounding Structures**
- **Encapsulates Carbons and Hydrocarbons, Rendering Them Nonflammable**
- **Interrupts the Free Radical Chain Reaction, Greatly Reducing Smoke and Carcinogenic Toxins**

These extinguishing properties make F-500 EA far more versatile and capable than foams. NFPA does not recommend foams for three-dimensional fires.* Since F-500 EA doesn't form a blanket, it's perfect for three-dimensional fires. F-500 EA can be used on Class D metal fires and combustible dust fires without flare-ups and potential explosions. F-500 EA has been tested and recommended by Bosch and others for lithium-ion battery car fires and by ConEdison for direct application to energized transformer fires.**

* NFPA 11 Annex A.1.1. - "Foam is not suitable for three-dimensional flowing liquid fuel fires or for gas fires."

** Read SOGs before applying F-500 EA to an energized transformer fire.

The Challenge of Today's Car Fires

As technology progresses, firefighting becomes more and more challenging. Today's fires are hotter and more difficult to extinguish than ever before. Modern vehicles add to the challenges faced by firefighters. Lithium-ion batteries used in hybrid and electric cars present high-voltage feedback problems and just don't respond to foam or powders. To save fuel by making cars lighter, manufacturers are using more and more magnesium components. Burning magnesium can exceed 5,000°F. The fuels carried on modern vehicles can be Class B polar or nonpolar. Tires exude oil as they burn and have always presented problems. Finally, vehicles are a three-dimensional fire, not well suited to foams. With most car fires located far from hydrants, the only water available is on the truck. F-500 EA provides the fast knockdown needed when water is limited.

Lithium-ion Batteries in Hybrid and Electric Cars

Extensive independent testing by Bosch, Dekra, Daimler (Mercedes) and Deutsche ACCUotive in Germany concluded F-500 EA was the recommended agent for lithium-ion battery car fires. Penetration into the battery compartments was excellent and no other agent could extinguish the other vehicle components like F-500 EA. Less agent and water is required resulting in little run-off. Voltage feedback to the nozzle is negligible with F-500 EA.



Tire Fires

Tires have always presented a challenge for both water and foam. Tires exude oil as they burn, effectively becoming a three-dimensional, Class B fire. Foam can't form a blanket to smother the fire. Since F-500 EA both cools and encapsulates, it extinguishes tire fires in seconds. F-500 EA also interrupts the free radical chain reaction, changing the black smoke to white. This results in improved visibility and reduced toxins.



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