

Encapsulator Technology

Overview + Mechanics



Encapsulator Technology

Today's fires are burning hotter and faster than ever before. We are faced with new and highly hazardous materials every day. So, why are many municipalities and commercial industries fighting today's fires with yesterday's technology?

The Future Of Firefighting

Encapsulator Agents are a type of Water Additive, whose basic building blocks are Spherical Micelles. These Spherical Micelles are capable of encapsulating carbon molecules as well as polar and non-polar hydrocarbon vapor or liquid molecules.



One agent for all fires.

Unprecedented Versatility

Encapsulator Agents are extremely versatile agents, capable of extinguishing Class A, Class B (Non-Polar & Polar), Class C (Energized Environment, Transformers), Class D and Lithium-ion Battery fires.

Encapsulator Agents excel at both fire suppression and flammable spill control while remaining **100% fluorine free**, **noncorrosive**, **nontoxic** and **100% biodegradable**.



Fire Mechanics

Four things are required to create a fire: **heat, oxygen (O₂), fuel** and a **chemical chain reaction**. This is known as the fire tetrahedron. Eliminating any one of these legs can extinguish a fire. For example, foam separates the fuel from the oxygen. This effectively eliminates one leg: oxygen.

Encapsulator Agents work on all four legs at once, removing the heat, neutralizing the fuel by separating it from the oxygen on a chemical molecular level and interrupting the free radical chain reaction.

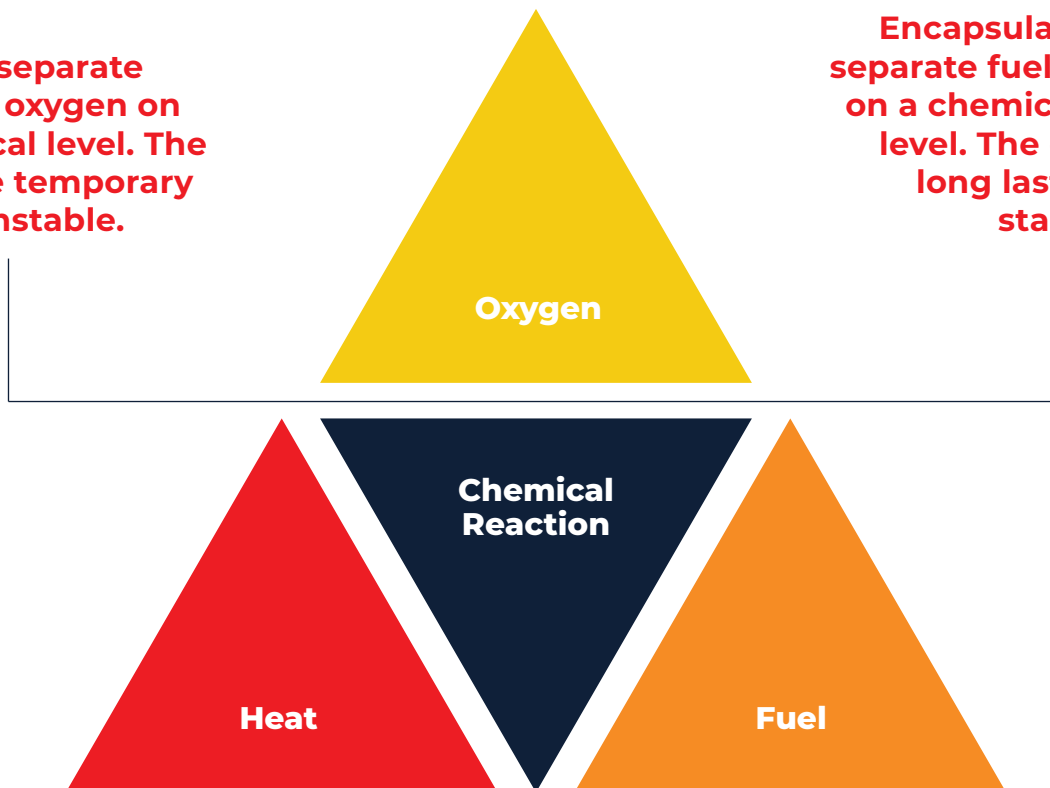
This results in a faster knockdown, superior burnback resistance, the elimination of steam, **reduction of soot and smoke up to 97%** and **reduction of cancer-causing toxins up to 98%**.



The Fire Tetrahedron

Foams separate fuel from oxygen on a mechanical level. The effects are temporary and unstable.

Encapsulator agents separate fuel from oxygen on a chemical molecular level. The effects are long lasting and stable.



Encapsulator Agents & The Fire Tetrahedron

Heat

- Rapid & Permanent Heat Reduction
- 1,200°F > 127°F (3 Seconds)
- Lasting Burn Back Resistance

Oxygen

- Toxin, Soot & Smoke Reduction (98.6%)
- Improves Visibility & Air Quality

Fuel

- Encapsulates Carbons
- Encapsulates Hydrocarbons
- Renders Material Nonflammable

Chemical Reaction

- High Molecular Weight
- Absorbs Free Radical Energy

Encapsulator Agent Mechanics

Our Encapsulator Agents start with a large amphipathic molecule, meaning it has a hydrophilic polar head and a hydrophobic non-polar tail that act independently. When mixed with water, these molecules form spherical micelles as the non-polar tails turn inward, avoiding water at all costs.

Encapsulator Agents immediately reduce the surface tension of water. This makes water droplets smaller, creating more surface area to **rapidly absorb heat and better penetrate the pores of solid fuels.**

Testing shows that a 1% solution of F-500 EA can reduce the amount of water needed to extinguish a fire by 60%.

The Encapsulator Molecule

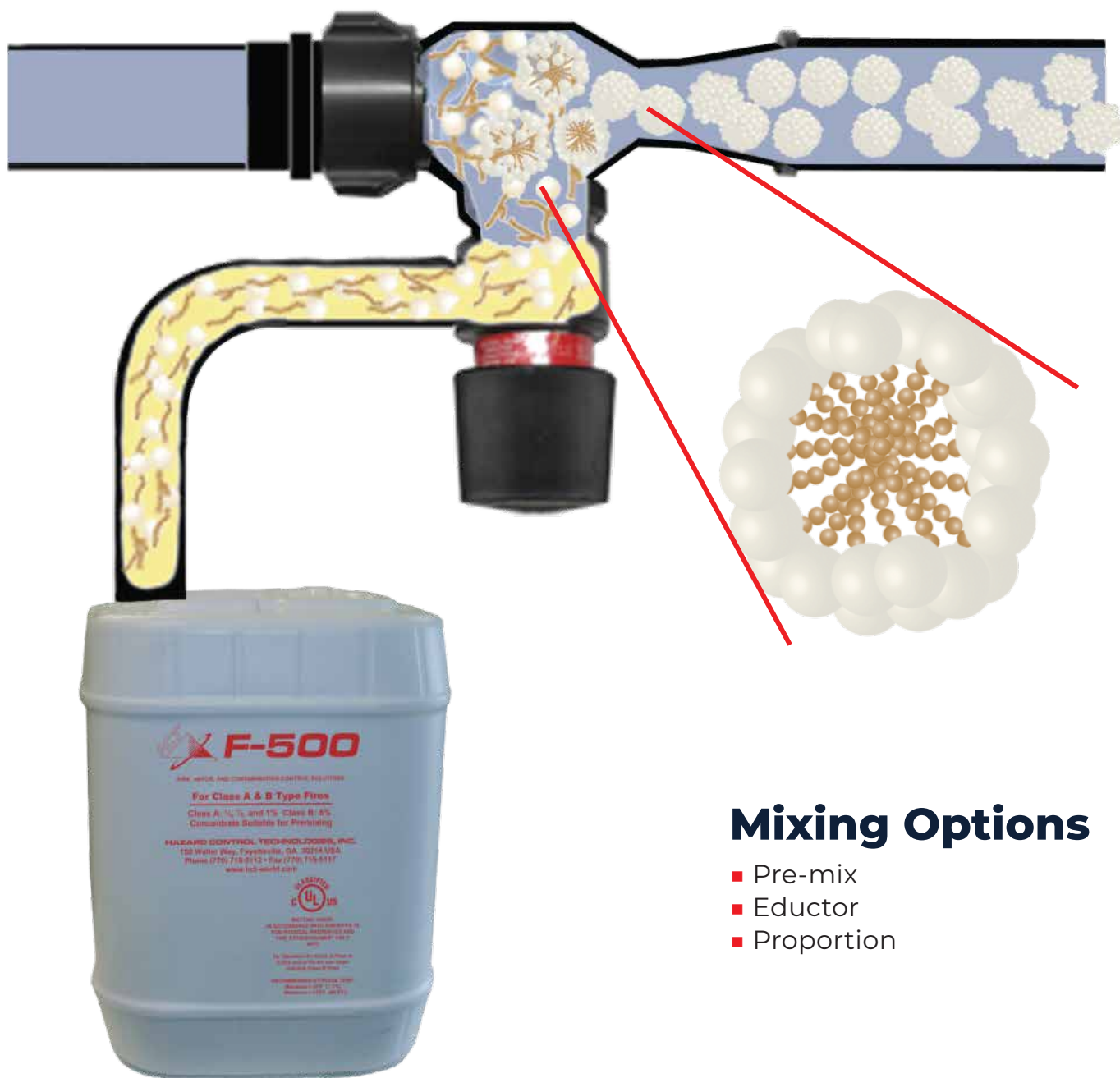
Hydrophilic Head



Hydrophobic Tail

Encapsulator Agent Solution

Spherical Micelles form automatically when lipid molecules are placed in an aqueous environment. Lipid molecules come together and arrange themselves in a spherical form known as the Spherical Micelle. A Spherical Micelle is a molecular structure with its actual size being measured in angstroms (1×10^{-10}).



Mixing Options


- Pre-mix
- Eductor
- Proportion

Encapsulator Agent Droplets

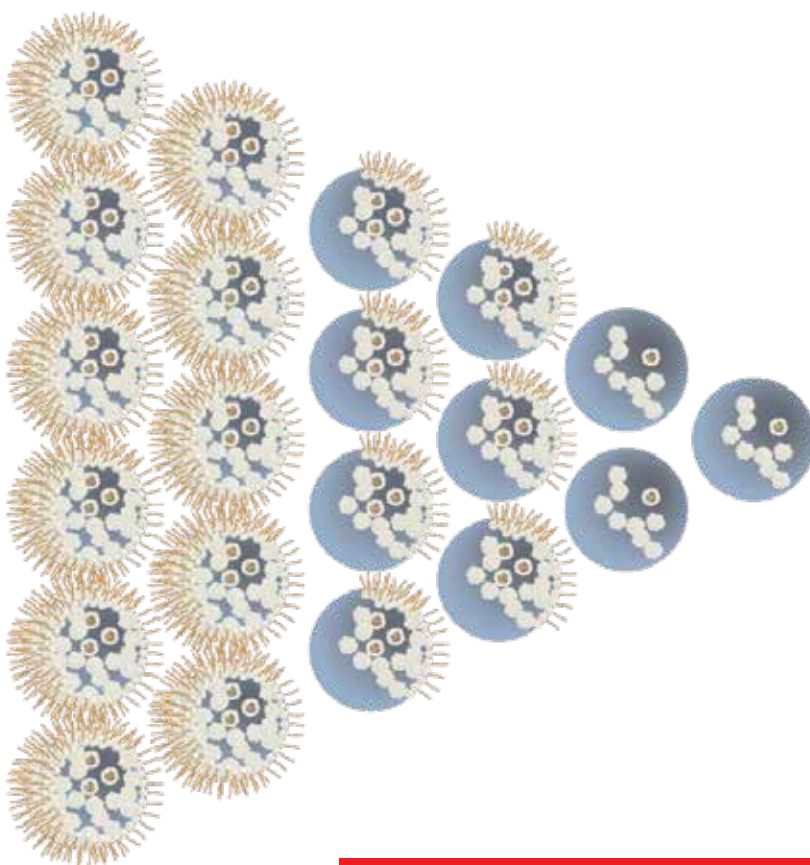
As spherical micelles leave the nozzle, the nonpolar tails nearest the surface turn outward, forming a protective “skin” around the outside of each droplet. This happens instantly, leaving a multitude of spherical micelles within the droplet.

This is important for several reasons. This changes the molecular weight of an Encapsulator Agent droplet. The boiling point of an Encapsulator Agent molecule is 248°F as opposed to 212°F for water. This means the Encapsulator Agent molecule can absorb more heat than a water molecule. This absorbed heat is then transferred from the outer tails into the core of each Spherical Micelle within the droplet.

A water molecule lacks this layer, meaning the outside of a plain water droplet converts to scalding steam and will not transfer heat.



Encapsulator Agents do not generate scalding steam. Instead, a significant portion of each droplet is utilized, resulting in a warm vapor mist.

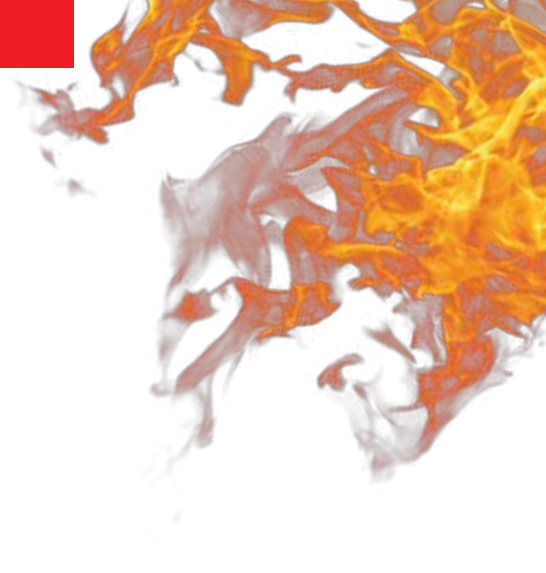


Instant Transition



Encapsulator Agent Benefits

Encapsulator Agents offer countless benefits for both fire suppression and spill control. Let's compare!



Benefit

Encapsulator Agent

Water

Permanent Encapsulation



Lasting Burn Back Resistance



Rapid Cooling (1,200°F > 127°F)



Rapid Knockdown (3 Seconds)



Smoke & Soot Reduction



Carcinogenic Toxin Reduction



No Scalding Steam



Minimized Runoff



Protect your personnel. Protect your assets.

Fighting today's fires.

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