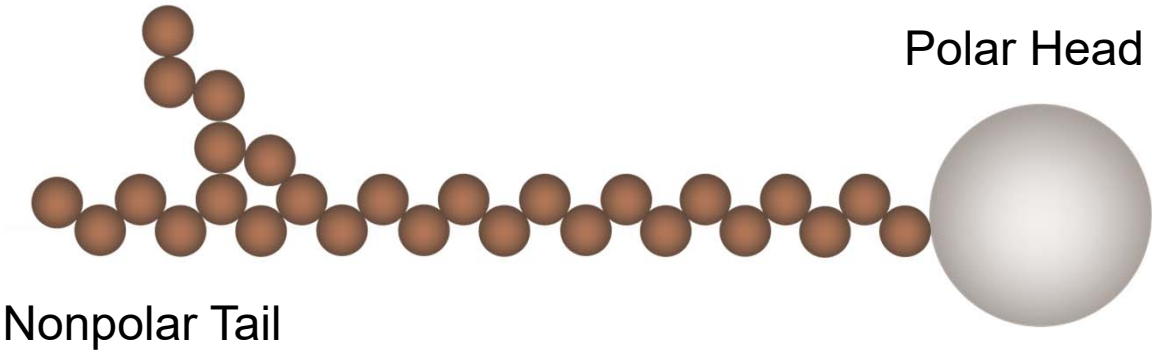
HAZARD CONTROL TECHNOLOGIES, INC.

ENCAPSULATOR AGENT INTRODUCTION

www.hct-world.com

F-500 Encapsulator Agent Molecule Characteristics

- Large molecule with a polar head and a nonpolar tail with sufficient distance between so each end acts independently
  - Polar Head (hydrophilic - “loves water”)
    - Soluble in water; dissolves in water
  - Nonpolar Tail (hydrophobic - “fears/hates water”)
    - Non soluble in water; does not dissolve in water.



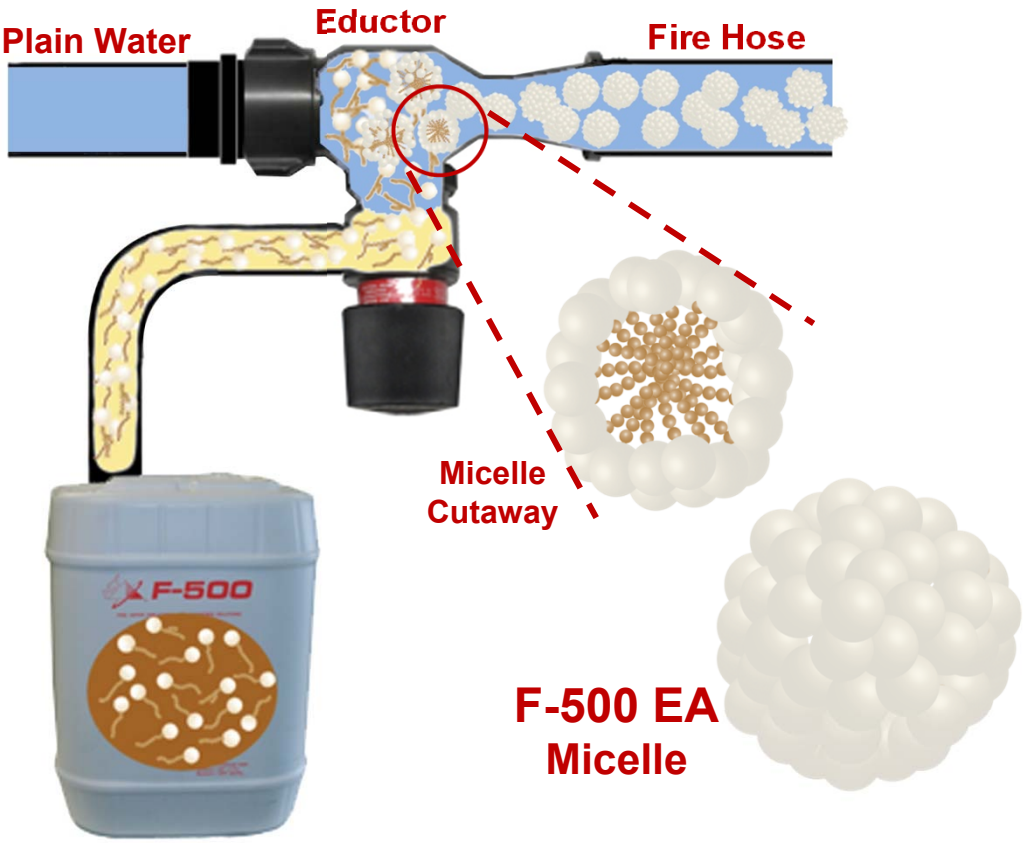
Plain Water

Fire Hose

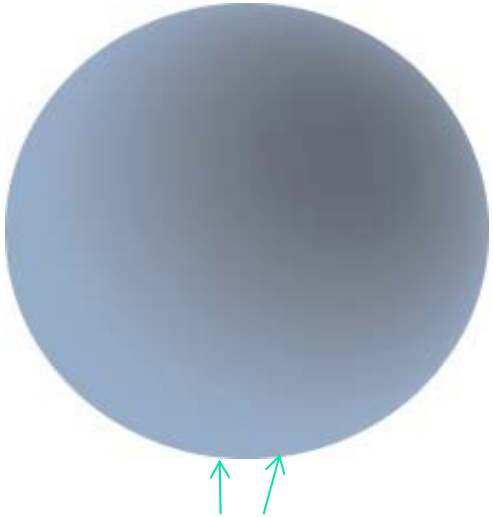
H_2O Molecules

F-500 EA Solution

In Solution – (e.g., batch mix, in the hose or pipes)
Nonpolar Tails - Align inward to form Micelles

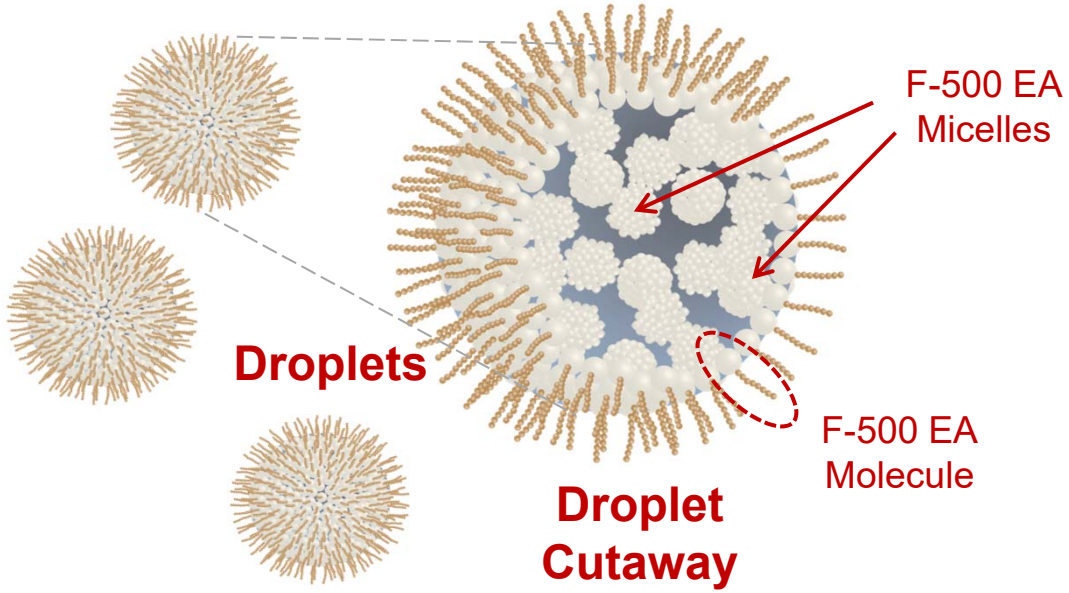


Water Droplet



F-500 EA Droplets

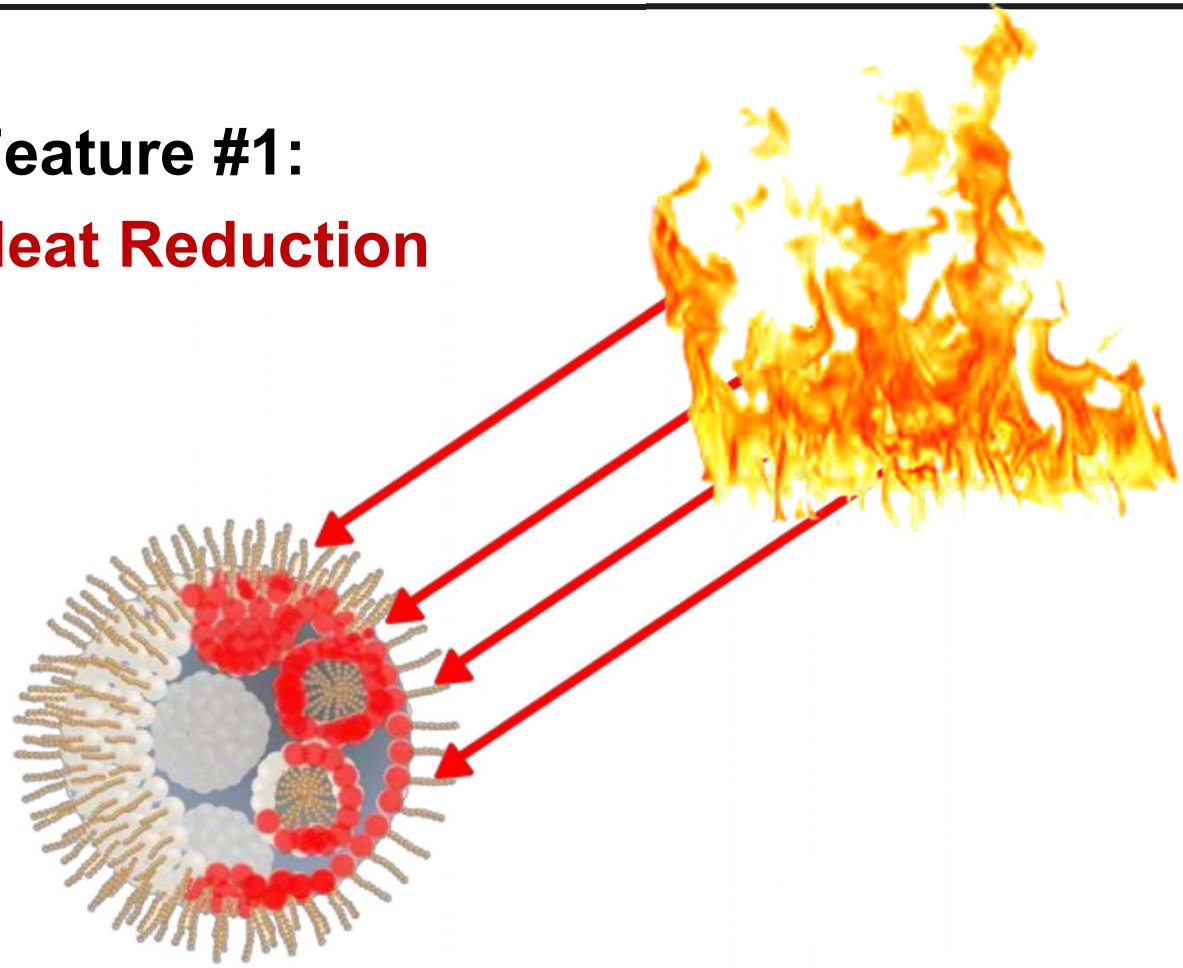
When a droplet is formed, nonpolar tails stick out of the water droplet, pulling the polar heads to the surface to form an F-500 EA skin on each droplet.



Droplet	Molecular Weight	Boiling Point	Heat Reduction Method	Efficiency
Water	18 g/mol	212^{0}F (100^{0}C)	Steam Conversion	Inefficient
F-500 EA	>1000 g/mol	248^{0}F (120^{0}C)	Thermal Conveyance	Highly Efficient

Unique Feature #1:

Rapid Heat Reduction



F-500 EA Droplet is creating a thermal circuit, where heat is driven into the internal portion of the droplet.

HAZARD CONTROL TECHNOLOGIES, INC.
FIRE, VAPOR, AND CONTAMINATION CONTROL SOLUTIONS

F-500 ENCAPSULATOR TECHNOLOGY

Plain Water Drops

Steam Conversion

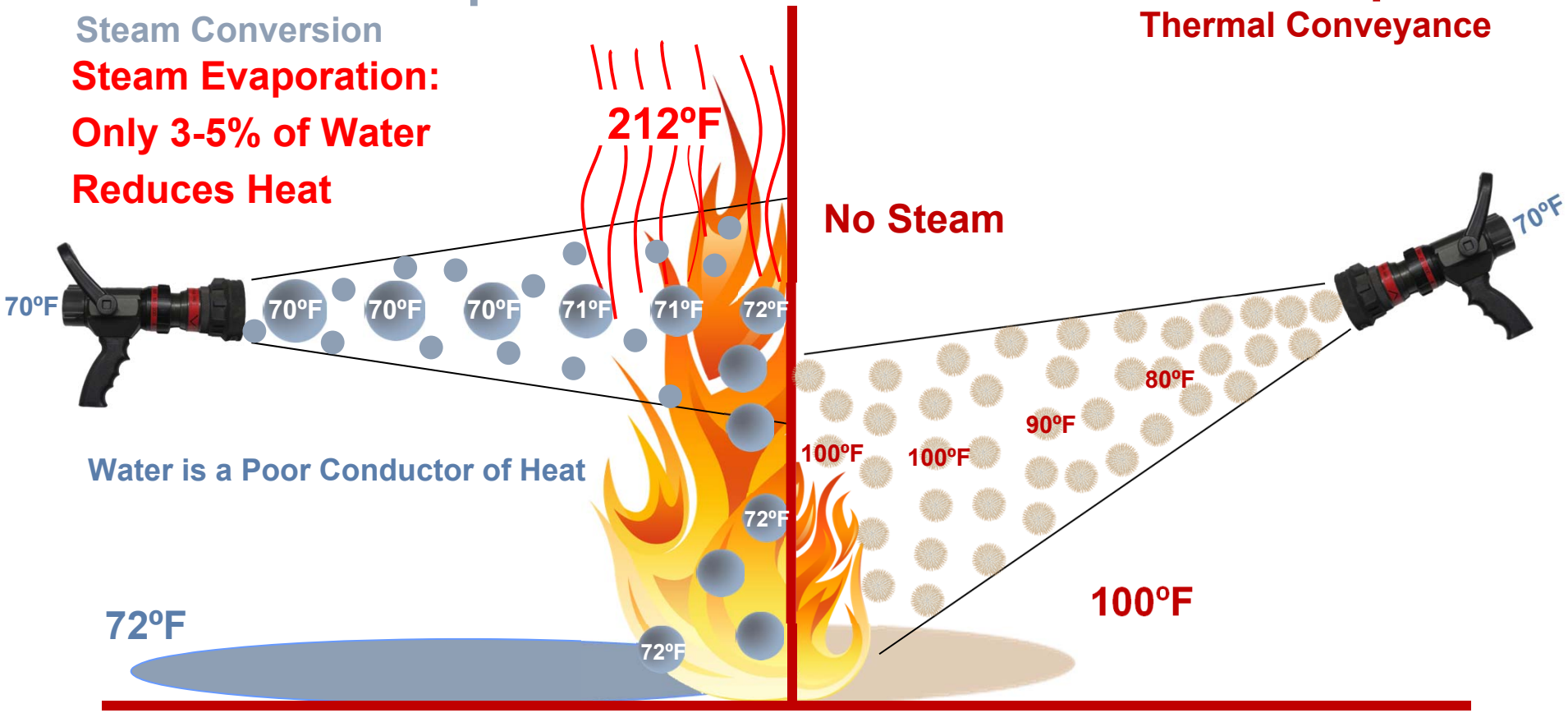
Steam Evaporation:

Only 3-5% of Water

Reduces Heat

F-500 EA Droplets

Thermal Conveyance

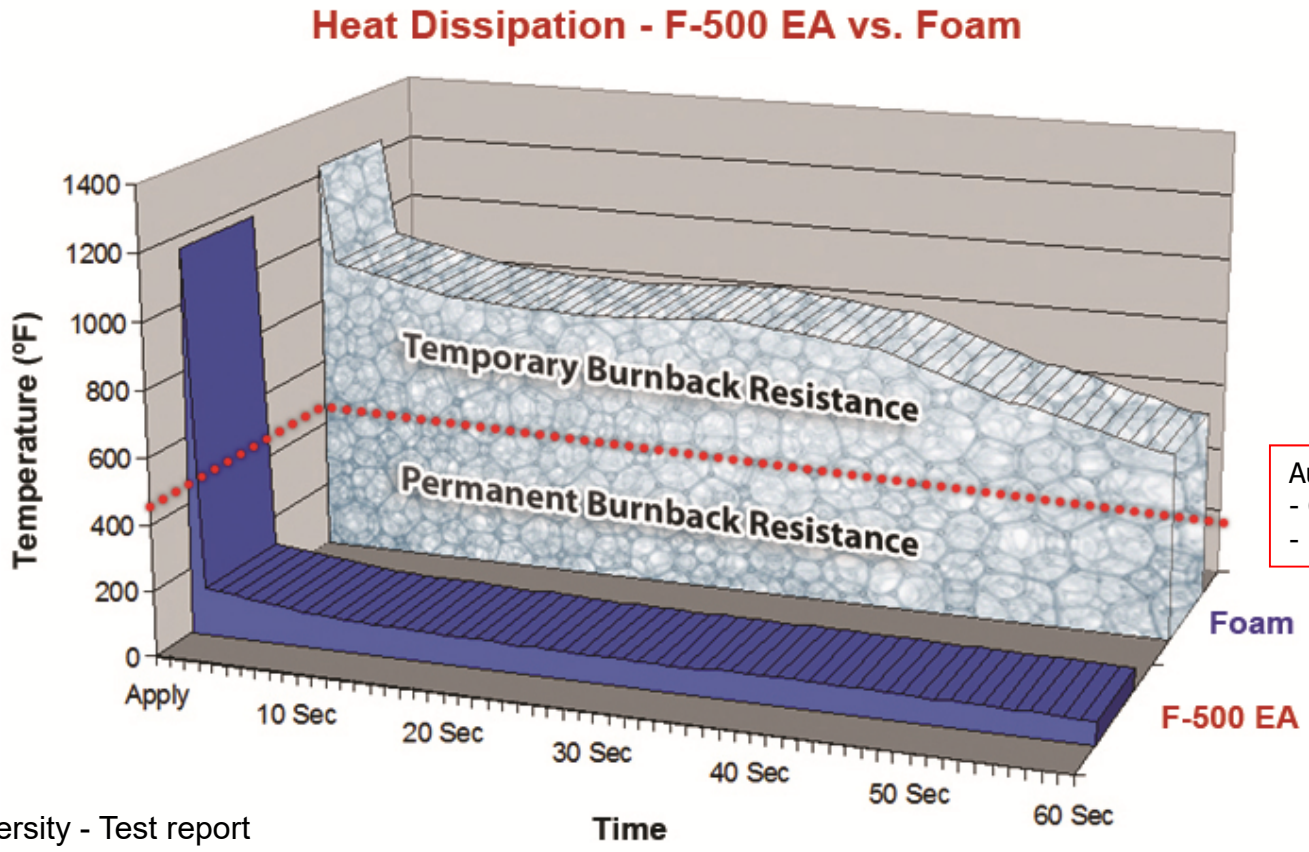


Water is a Poor Conductor of Heat

95-97% of Water Falls on the Ground

Wetting Agents Create Even More Steam Than Plain Water

Permanent vs. Temporary Burn Back Resistance



Auto Ignition Temperatures
- Gasoline: 495° F
- Ethanol: 695° F

Clemson University - Test report
Pendleton, SC – July, 1997

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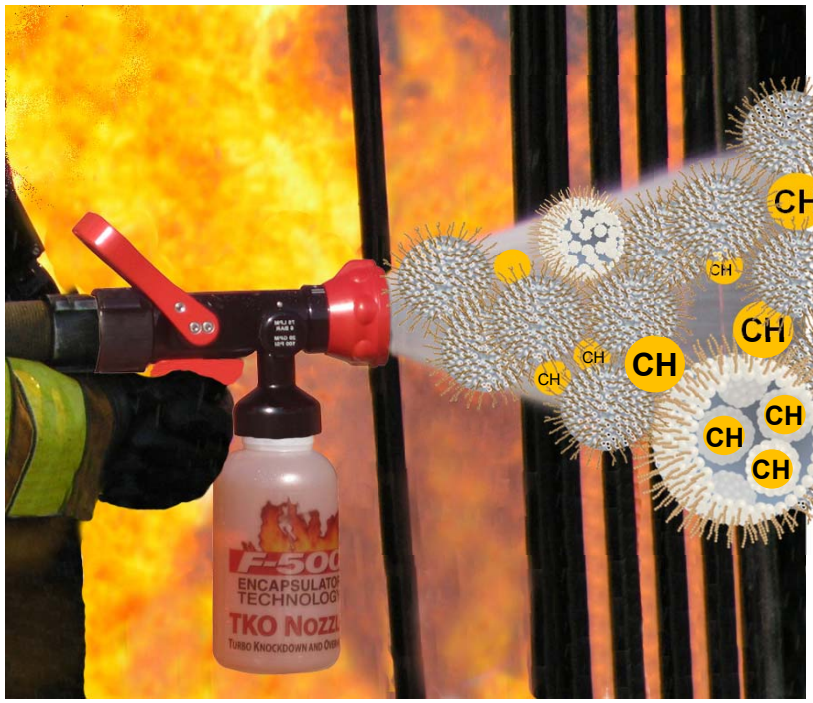
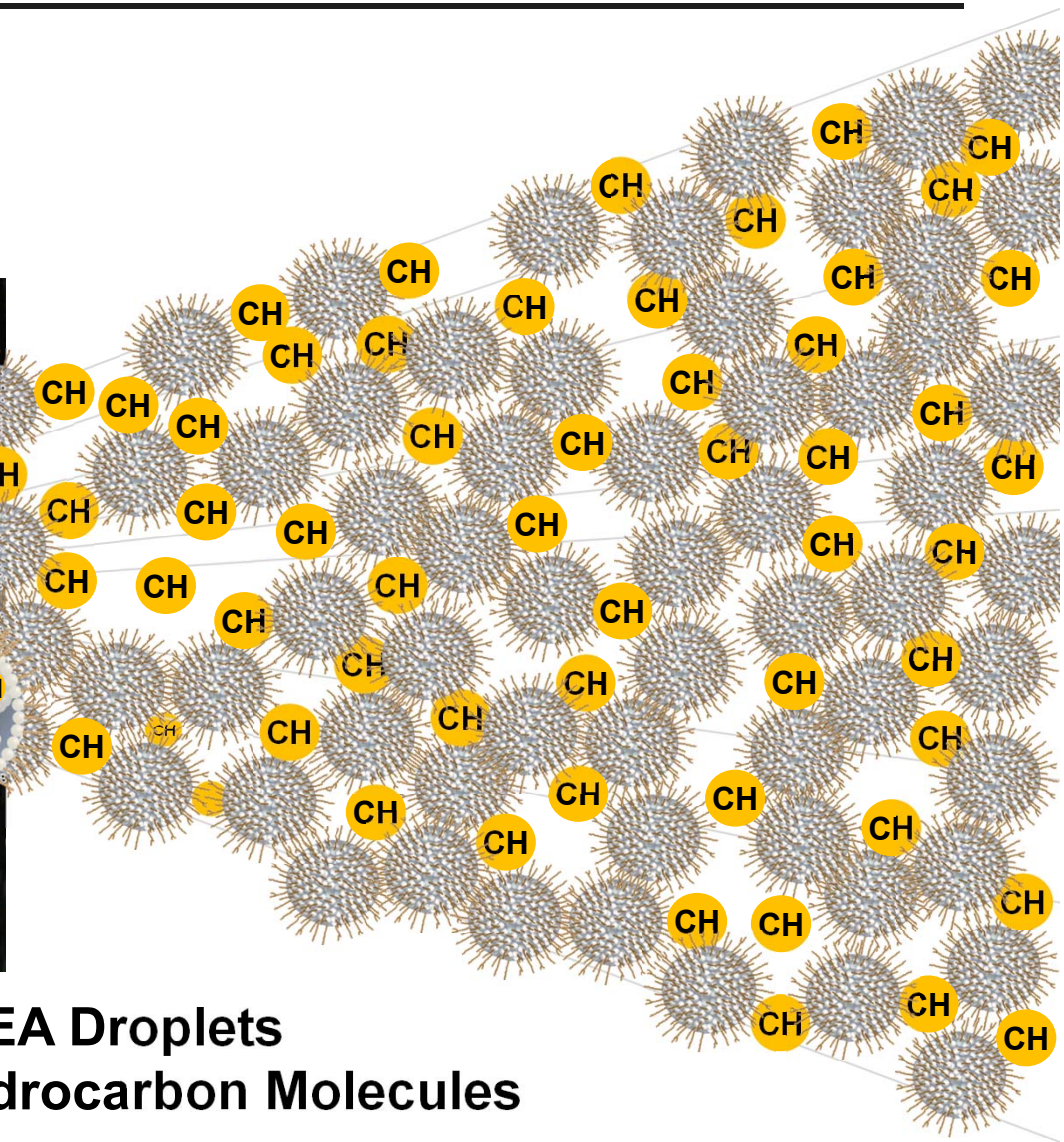
F-500 ENCAPSULATOR TECHNOLOGY

Unique Feature #2:

Encapsulation





F-500 EA Droplets
Encapsulate Hydrocarbon Molecules

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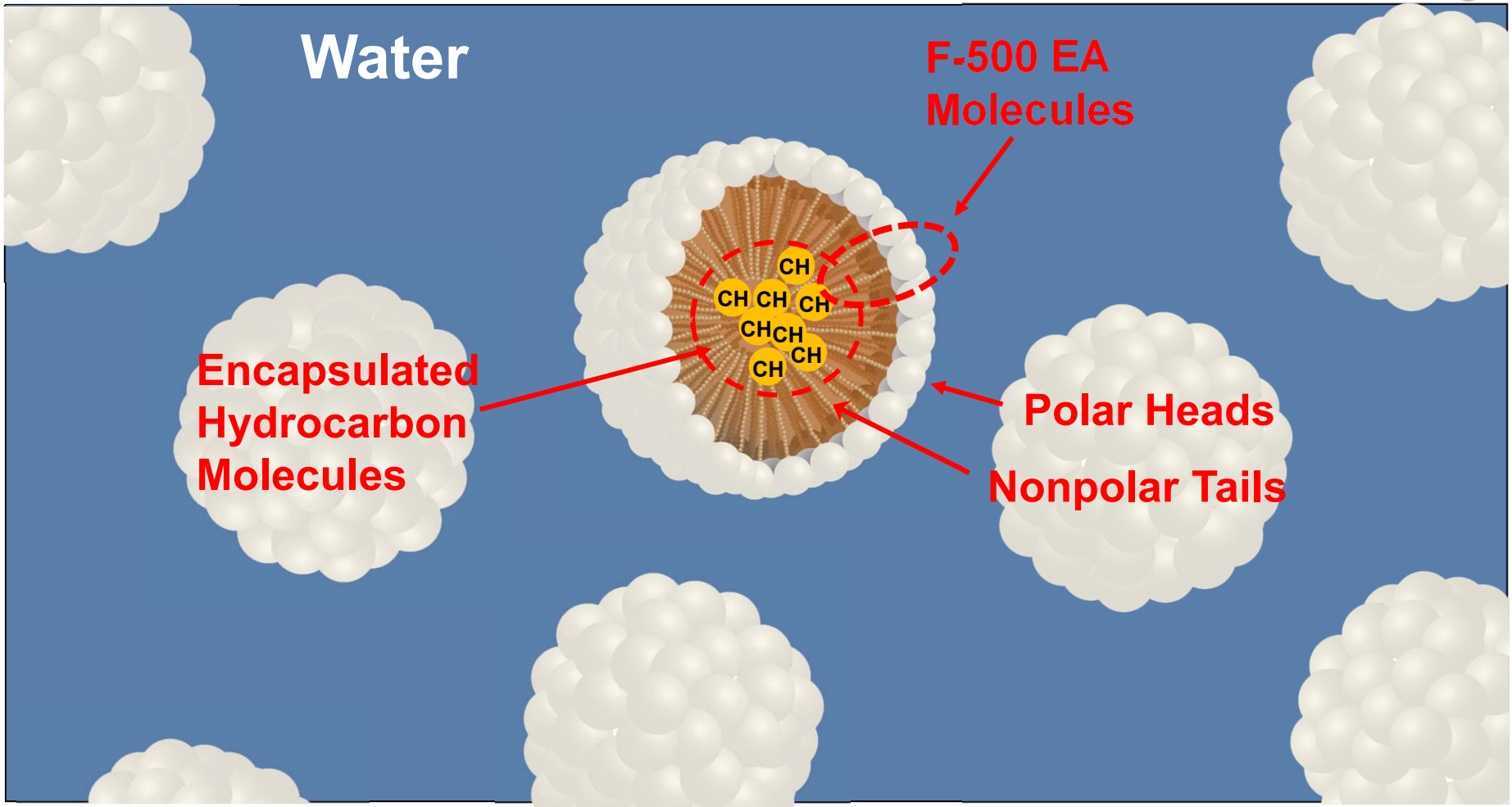
F-500 ENCAPSULATOR TECHNOLOGY

F-500 EA Micelle Cross Section



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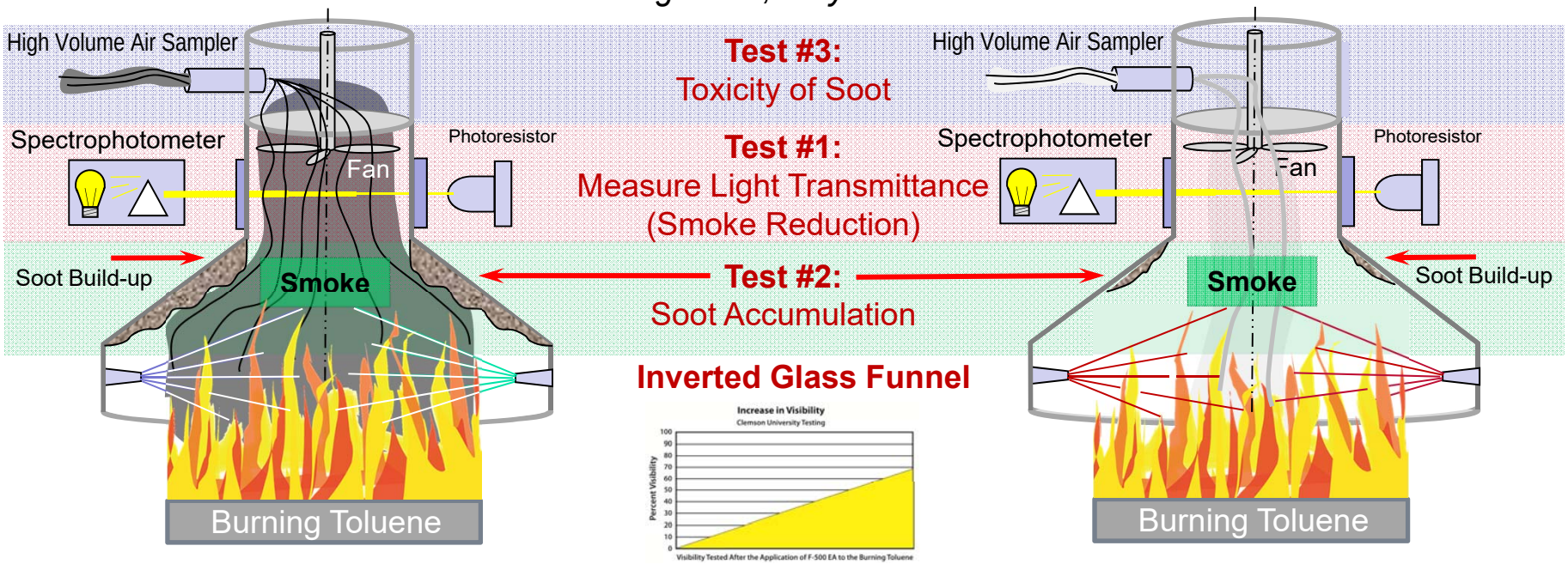
FIRE, VAPOR, AND CONTAMINATION CONTROL SOLUTIONS

F-500 ENCAPSULATOR TECHNOLOGY

Unique Feature #3: Interruption of Free Radicals*

** When free radicals combine or "come together", they form soot and smoke*



Water Spray
First Test Series
Water Sprayed
Through Smoke Plume

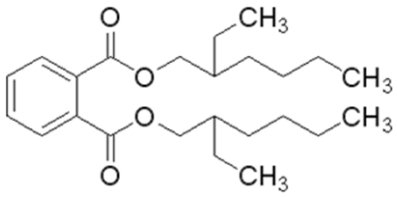
Plain Water vs. 3% F-500 EA	
1. Light Transmittance (Smoke Reduction)	68% Increase in Visibility
2. Soot Accumulation	97% Reduction in Soot
3. Soot Toxicity	98.6% Reduction in Toxicity

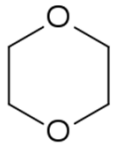
Clemson University Study – Pendelton, SC

F-500 EA Spray
Second Test Series
F-500 Encapsulator Agent @3%
Sprayed Through Smoke Plume

F-500 EA Reduces Carcinogenic Toxins in Smoke 98.6%

- Benzo(a)pyrene
- Terphenyls
- Fluorene derivatives
- Indene derivatives
- Bis(ethylhexyl)phthalate
- 1,4 Dioxane
- Cyclohexanols
- Several higher molecular weight polynuclear aromatic hydrocarbons





Clemson University Report – Pendelton, SC
FAI Material Testing Lab – Marietta, GA
Analytical Services – Norcross, GA

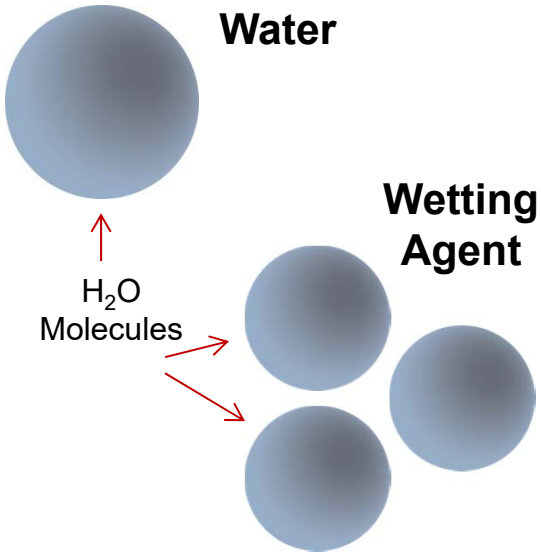
HAZARD CONTROL TECHNOLOGIES, INC.
FIRE, VAPOR, AND CONTAMINATION CONTROL SOLUTIONS

F-500 ENCAPSULATOR TECHNOLOGY

WETTING AGENT
NFPA 18

Surface Tension Reduction
- Spreads
- Penetrates

Heat Reduction
- Same mechanism as water
- Converts H_2O to Steam

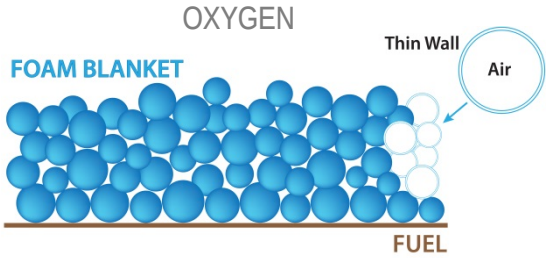


FOAM
NFPA 11

Surface Tension Reduction
- Aids in spreading the blanket

Blankets
- Separates fuel from oxygen to smother the fire

Heat Reduction
- Blanket insulates and traps the heat
- Counterproductive to heat reduction
- Requires maintenance of separation for extended period until heat slowly dissipates



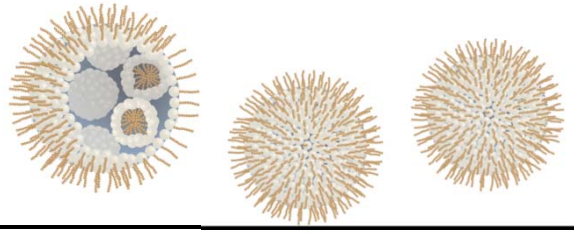
ENCAPSULATOR AGENT
NFPA 18A

Surface Tension Reduction
- Aids in Spreading MEA

Encapsulation
- Encapsulates fuel and vapor molecules and renders them nonflammable and nonignitable

Heat Reduction
- Changes the heat reduction mechanism of water droplet
- 10-20 times faster heat reduction than plain water, wetting agents and foam

Interruption of Free Radicals
- Empirically Proven
- High Molecular Density Theory



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FIRE, VAPOR, AND CONTAMINATION CONTROL SOLUTIONS

F-500 ENCAPSULATOR TECHNOLOGY

F-500 Encapsulator Agent
NFPA 18A - New 3rd Category of Agents

PINNACLE

F-500 ENCAPSULATOR TECHNOLOGY

Foam and/or F-500 Encapsulator Agent Applications

- Class A Fires, 2D
- Class B, 2D Fires (Gas, Diesel or Ethanol-blended Fuels)
- Class K or Class F Fires

F-500 Encapsulator Agent Applications - Expands Your Hazard Mitigation Capabilities

F-500 ENCAPSULATOR TECHNOLOGY

- Class A, 3D Fires
- Class B, 3D Fires (Transformers, Turbine Lube Oil Fires)
- Class B, Flowing/Spraying Fuel Fires (Distillation Columns, Flange Fires)
- Class C Fires (FDNY/ConEdison Testing - SOGs)
- Class D Fires (Magnesium, Titanium, Lithium Batteries)
- Flammable Liquid Spill Control

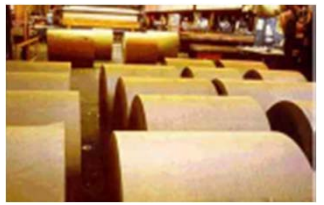
The only agent proven to extinguish lithium-ion batteries, without reignition, and recommended for transformer fires.

Municipal Fire Service Applications

- **Structural Firefighting**
  - House Fires
  - Commercial Buildings & Warehouses
- **Vehicle Fire Fighting**
  - Vehicle Fuels
    - Gasoline
    - Diesel
    - Ethanol-Blended Fuels (E85, E10)
  - Magnesium Components
  - Lithium-Ion Batteries
  - Rubber Tires / Plastics
  - Dumpster Fires
- **Hydrocarbon Spill Control**
  - Fuel Spills
  - Overturned Tank Trucks
  - Derailed Tank Cars
- **Wildland Fire Fighting**
- **Industrial Fire Fighting**
  - Steel, Foundries and Metal Fabricators
  - Oil & Gas Exploration (Refineries)
  - Industrial Warehouse
    - Flammable Liquid Rack Storage (3D Class B)
    - Paper & Plastics
    - Rubber Tire Storage
  - Silos & Bunkers (Combustible Dusts)
    - Coal, Bio-Mass, Grain, Saw Dust, Wood Chips
  - Transformers
- **Recycling Fires**
  - Landfills
  - Rubber Tires and Crumb Rubber
  - Metals (Class D & Combustible Metals)
  - Paper & Plastics
  - Batteries (All Types – Lithium ion)








Fire Suppression Agents By Category

WETTING AGENT

- Pyrocool
- Cold Fire
- Novacool
- FireAide 2000*

FOAM

- Pinnacle Class A
- Pinnacle Class B
  - AFFF
  - AR-AFFF
- Ansul
- Chemguard
- National Foam
- FireAide 2000*

ENCAPSULATOR AGENT

- F-500 Encapsulator Agent
- HydroLock
- EncapsuLock
- EnviroLock
- C-Sync
- CarbonKnight

*FireAde 2000 is actually a UL Listed AFFF foam but cross listed as a wetting agent to cause confusion in the market place.