

On-Line CAFS Orientation

*Montgomery County
Fire & Rescue Service*



Class B Foam Theory and Deployment



Class B Technology



Module Objectives

Understand Difference between Class A & B Foams

Understand how Class B Foams work

Understand how to make Class B Foam

Understand MCFRS Class B Foam options



Class A vs. Class B Foams

Both Classes of Foam make bubbles and hold water.

The difference lies in their degree of attraction to hydrocarbons.

Class A Foams want to mix with hydrocarbons - which is good when we want the foam to cling to a burning surface. This is not so good when trying to smother a flammable liquid fire as the foam will break apart and sink to the bottom of the flammable liquid.

Class B Foams do NOT want to mix with hydrocarbons and this is why they form a nice cohesive foam blanket on top of flammable liquids.



AFFF-ATC

Aqueous Film Forming Foam - Alcohol Type Concentrate

- Designed for use on Multiple Hazards
 - Normal Hydrocarbon Fires
 - Oil, Gasoline w/o MTBE or Ethanol, etc...
 - Polar Solvent Fires
 - Gasoline with MTBE or Ethanol**, Ethanol, Alcohols, etc...
- AFFF-ATCs have multiple use ratios (proportioning rates)



How does an AFFF-ATC work?



Normal Hydrocarbon Fires

- Forms an aqueous film that advances ahead of the bubble blanket to smother the fuel.
- The aqueous film is “oleo-phobic” or “oil-hating”.
- The aqueous film and the foam blanket work together to smother the flammable liquid.
- The weight of the foam blanket plus the aqueous film is greater than the vapor density of the flammable liquid.



How does an AFF-ATC Work?

Normal Hydrocarbon Fires

The film & blanket:

- prevent the liquid from being able to convert from a liquid to a gas, preventing ignition.
- prevent the oxidizing agent from coming in contact with the liquid.
- absorbs heat from the liquid pool.

All of these factors prevent ignition of the flammable liquid.



How does an AFFF-ATC work?



On a Polar Solvent Fire

- When mixed with the proper volume of water, forms a polymeric membrane (due to added polymers in solution)
- This membrane prevents polar solvent pick-up, and degradation of the foam blanket.
- The membrane does not allow the water in the aqueous film or foam bubble blanket to come in contact with the polar agent.

•AFFF-ATCs must be utilized at the proper proportioning rates for effective use!



Chubb National Universal Gold 1% x 3%

Most Probable Class B AFFF-ATC that will be used by MCFRS

- 1% proportioning ratio for normal hydrocarbon fires.
- 3% proportioning ratio for polar solvent fires.



MCFRS Class B Foam Proportioning Systems



Foam Proportioning Systems refers to the method in which foam concentrate is introduced into hose streams.

- MCFR Spec

- Feecon FoaMidget External Around-the-Pump System

- 95 GPM Elkhart In-line Eductor



FoaMidget Around-the-Pump

Features and Benefits

- Works over a wide range of flows and foam concentrate injection rates.
- Able to provide high (>500 GPM) Class B foam solution flow rates.

Considerations

- Must have **adequate** Class B foam supply
- Must have adequate water supply (total gallons)
- Most Likely Use - Dedicated Pumper for large scale Class B operation
- HAZMAT (6000-gallon fuel tanker - SB95 to OL495 ramp)



FoaMidget Around-the-Pump

Concerns during use

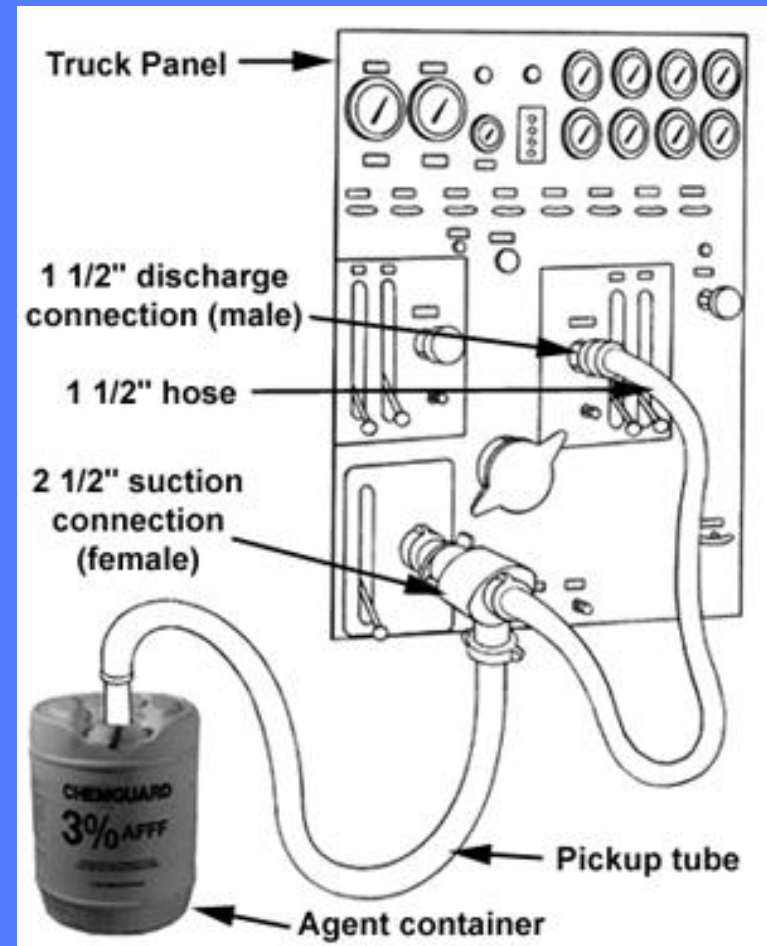
- No more than 10 psi suction-side (intake) pressure - so use tank water as you would with CAFS.
- Must make connections properly.
- Must keep pump-to-tank (Tank Fill) valve **closed** to avoid contamination of booster tank water.
- Must back-flush pump after use.



FoaMidget Operation



- Set indicator to proper setting for the discharge flow.
- Open suction valve.
- Insert pickup tube into agent container.
- Open discharge valve.
- When system shuts down, immediately remove pickup tube from container.



95 GPM In-line Eductor



Concerns During Use

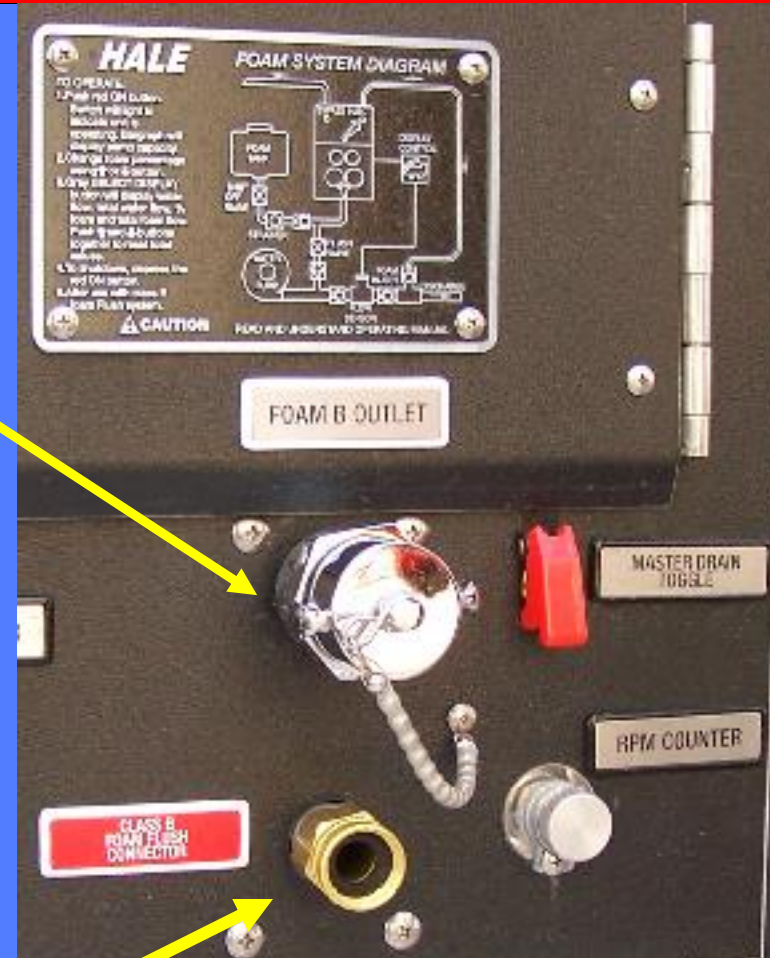
- Operator must maintain 200 PSI at the throat (inlet) of the eductor for the venturi to work properly.
- Cannot have: (due to back pressure issues)
 - Too much fire hose after the device
 - Improper Nozzle (Gallonage Mis-Match)
 - Back pressure due to elevation, partially opened nozzles, greater than 6-foot lift from foam concentrate source to eductor



95 GPM In-line Educator

Attach Educator to one of the 2.5" outlets on the pump panel. Thread end of Educator pick-up tube onto fitting on pump panel. This fitting connects with Class B Foam Concentrate Tank. Then open the Class B Foam valve on the pump panel to get the concentrate flowing. Charge 2.5" discharge and pump at 200 psi.

After Class B use, flush hose and all of educator with plain water. Also flush piping by attaching garden hose to fitting and flowing plain water. This will flush out everything from Class B valve down.



Nozzle Aspirated Foam System (NAFS)

Require the use of an **air-aspirating nozzle** to create bubbles.

- Different nozzles mix different volumes of air, creating different finished foam expansion rates. In general, the fatter the nozzle, the more air is entrained, and the higher the expansion ratio.

NAFS are considered a “high volume, low energy” system.

- High Volume - due to Expansion Rate
- Low Energy - Fire Stream reach decreases due to the fact that hydraulic energy is used to entrain air.



Crimson Engine Class B NAFS Capabilities



- What does this mean to me as a pump operator?
 - 25 gallons of National Gold 1x3%
 - 95 GPM In-line Eductor with dedicated Air-Aspirating Nozzle



- This Class B foam proportioning system can handle :
 - Normal Hydrocarbon - 950 Square Feet (Approx - 31' x 31') pool fire
 - Polar Solvent - 400 Square Feet (Approx 20' x 20') pool fire
 - 50 - 100 gal. Saddle Tank or smaller car fuel tank spill



Review Questions



- What is the proper proportioning rate for Chubb Universal Gold for use on an E85 pool fire? If you use 300 gallons of foam solution to put the above fire out, how many gallons of foam concentrate did you use?
- Explain how to use the 95 gpm In-line eductor:

Final Thoughts - Safety Check!

- Pump Operations
- Foam Compatibility
- Attack Hose Compatibility
- Proper Hose Handling Techniques
- Foam Type Utilization
- Proper Bleeding, Breakdown and Take Up Practices

...ON-GOING TACTICAL AND OPERATIONAL TRAINING!



On-Line Program Credits



- MCFRS
 - FF Dominic Colletti, Jr., *Sta. 6 C*
 - Capt. Alan Butsch, *Sta. 12 C*
 - D/C Steve Lohr, *Division of Operations*
- Hale Products, Inc.
 - Dominic Colletti, *Global Foam Products Manager*
 - Rick Tull, *Manager of Product Training*
- Kidde, Inc.



Credits



- Photos:
 - Hale Pumps, Kidde Inc., A. Butsch, D. Colletti Jr.



- Special Thanks:
 - FP M. Lumsden, 12 C; FP D. Schaefer, 12 B
 - Editorial Assistance
 - Capt.s Bartlett, Hinkle, Williamson - PSTA
 - Blackboard, Infrastructure Support
 - Jeff Feiertag IT, FP Barclay 04 A
 - Computer Support

