	Cincinnati Fire Department Fire Training Supplement DRILL BOOK	SECTION #3 Engine Co. Operations
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Section #: 3	Portable Foam Operations & Nozzles	**Topic #: 17**

FOAM OPERATIONS

The Fire Department foam operations start with basic foam operations at the company level. Company foam operations consist of portable foam eductors and portable foam containers for making limited quantities of class "B" foam. For larger operations the fire department is equipped with (2) foam trucks assigned to Engine 17 and Engine 32.

Every fire department Engine Company carries Ansulite 3x3 foam in portable containers, which can be used at 3% concentration to fight fires in polar or nonpolar materials or can be used to suppress vapors of other hazardous materials.

The Cincinnati Fire Department uses two types of foam products:

1. The use of Ansulite® 3x3 AFFF (Aqueous Film Forming Foam) foam concentrate will be to extinguish fires in both polar and non-polar substances. Aqueous Film Forming Foam is a water additive designed to decrease surface tension, reduce viscosity, have a fast spreading and leveling characteristic, and to act as a surface barrier to halt fuel vaporization and exclude air. AFFF floats on the surface of a flammable or combustible liquid, trapping the flammable vapors, thus preventing them from locating a source of ignition. If a fire is present, AFFF will rapidly extinguish the fire and deter flash back. AFFF is biodegradable; it will not harm the environment. It is non-toxic and basically, non-corrosive.

2. The use of Adair Cold Clean will be to emulsify non-polar substances.

<u>ANSULITE® 3 X 3 AFFF</u>:

- is applied at a 3% mixture.
- extinguishes fire in polar substances.
- extinguishes fire in non-polar substances.
- prevents formation of fumes, if applied with a medium expansion nozzle.
- good "wetting" agent, can be used on some deep seated Class "A" fires.
- should not be mixed with other types of foam concentrates.
- carried by all engine companies. Squad 52, Foam 32 and 17 and Boat 3.

ADAIR COLD CLEAN 500:

- is used to emulsify (dissolve) non-polar substances.
- dispersing percentage varies from 1% to 6%.(begin at 1% and work up as needed)
- has limited fire fighting capabilities.
- is carried by Foam 32 and 17 as well as Squad 52 and Fire Boat 3.

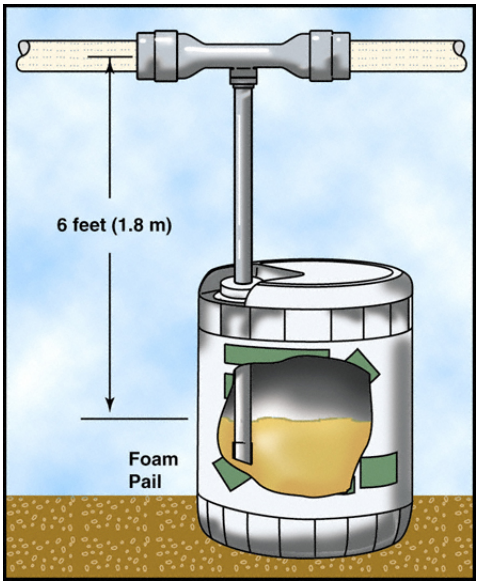
FOAM OPERATIONS AT THE COMPANY LEVEL:

All Engine companies, as well as Squad 52, Foam 32 and 17, and Fire Boat 3 carry Ansulite 3X3 AFFF in five (5) gallon containers. This foam may be used to rectify an emergency or for use in advance of a Foam Unit. Each Engine company will be outfitted with one 1-1/2" or 2-1/2" in line eductor and one TFT nozzle adapter for low expansion foam production. The T.F.T. nozzle is the nozzle of choice for company foam operations. Foam is drawn from the 5 gallon container by the eductor and mixed with water at a 3% mixture rate to create foam solution in the hose line. When this foam solution exits the nozzle it create finished foam.

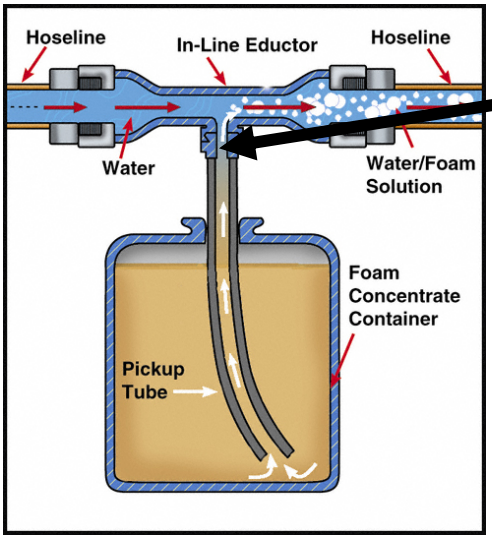
- the eductor must be set at 3%
- the engine pressure must be 200 psi. ± elevation if the eductor is at the pumper.
- if the eductor cannot be used at the pumper it must be supplied with 2-1/2" hose.
- when supplying the eductor with 2-1/2" hose, use the above formula, then estimate and add friction loss for the sections prior to the eductor, as described below.

THE FOAM EDUCTOR NEEDS 200psi AT THE INTAKE SIDE IN ORDER TO WORK PROPERLY

- for the 125 GPM eductor estimate 3 lbs. per section before the eductor.
- for the 200 GPM eductor estimate 5 Ibs. per section before the eductor.
- there can be no more than 4 sections of 1 -3/4" hose between the eductor and the nozzle.
- nozzle should be set to a straight stream.
- nozzle must be opened all the way, when dispersing foam.
- attach the foam adapter to the T.F.T. nozzle for low expansion foam.
- without the T.F.T. attachment, foam is delivered as low quality, short duration foam.
- eductors must be flushed with at least 5 gallons of clean water at the scene and cleaned with warm water at quarters.
- Vindicator nozzle will create good foam without any special tips or adapters. The Vindicator nozzle will not work on portable foam eductors due to the large difference in GPM produced by the Vindicator. It can be used on foam pumpers that will produce higher GPM flow.



Eductor is not designed to pick up more than 6 feet in height.



Check Valve in the pick-up end must be present in order to obtain the venturi effect and draw up product into the water stream

NOTES:

When using foam to suppress vapors or to extinguish a fire, there must be enough foam to cover the entire surface of the fuel and to completely extinguish the fire. If not enough foam is available, there is no sense in using foam at all. Half measures do not work with foam. Incomplete coverage allows fire to burn around the foam and destroy it. Foam may be used to push fire or to affect rescue, even if you do not have enough foam for complete extinguishment.

Do not direct water streams into foam blankets. Water can be used to protect fire fighters approaching a fire or to cover tanks and other exposures near the fire, but it will destroy the blanket if aimed directly into the foam.

TERMS USED IN FOAM FIRE FIGHTING

Eductors - used to draw foam concentrate from the container into a hose line, in order to form foam solution. There are 1-1/2"(125 GPM) and 2-1/2" (200 GPM) eductors. Each eductor should be used in conjunction with the proper size hose. 1-3/4" hose with the 1-1/2" eductor and 2-1/2" hose with the 2-1/2" eductor.

Foam Concentrate - Ansulite® 3x3 AFFF or Adair Cold Clean 500 carried in 5 gallon containers.

Foam Solution - foam concentrate mixed with water. (at 3%, 100 gallons of foam solution will contain 97 gallons of water and 3 gallons of foam concentrate)

Finished Foam - foam solution dispersed from a nozzle and mixed with air.

Low Expansion foam - finished foam will be increased by approximately lOx the amount of foam solution by it's mixture with entrained air. This is foam from the T.F.T. nozzle with aeration tip attached. One Hundred (100) gallons of foam solution when mixed with air will produce approximately 1000 gallons of finished foam.

Medium Expansion Foam - finished foam will be increased by approximately 50x the amount of foam solution by it's mixture with entrained air. One Hundred (100) gallons of foam solution, when mixed with air, will produce approximately 5000 gallons of finished foam. A special 125 GPM nozzle with a metal alloy, aeration tip is carried on Foam 17 and Foam 32. These are the only two units in the CFD that can produce medium expansion foam.

Polar Solvents - flammable liquids that have an attraction for water, much like a positive magnet pole attracts a negative magnet pole (will mix with water). Alcohols, acetone, lacquer thinner, ketone, esters and acids are polar solvents.

Non-Polar or Hydrocarbon Fuels - petroleum based and will float on water (remain separate from water). Crude oil, fuel oils, gasoline, benzene, naphtha, jet fuel and kerosene are hydrocarbon fuels.

Foam Operations with Foam 17 and Foam 32

See Training Bulletin on Foam 32 Operations (use the same bulletin for Foam 17)