MORE ABOUT FIRE FIGHTING FOAM

GENERAL OVERVIEW

Types of Foam
Fire fighting foams can be put into two very broad categories: Class A, and Class B. These categories correspond to the types of fuels that the foams are designed to be used on. This is very important! No matter what any salesman tells you Class A foam is not designed to put out class B fires. It looks white and bubbly, but they are chemically not compatible. Using Class A foam on flammable liquids (Class B) could extinguish the fire but lead to catastrophic results because of its inability to secure the explosive vapors. Class B fuels can be subdivided into two more subclasses: Hydrocarbons like gasoline, kerosene, and fuel oil will not mix with water; and polar solvents like alcohols, ketones, and ethers which will mix with water.

More on foam types.
Let's look at class B foams first. Class B foams can be divided into two general categories: synthetic based or protein based. Both types have advantages and disadvantages.
Synthetic foams are basically super soap with fire performance additives. They include high expansion foam, aqueous film forming foam (AFFF), and Alcohol Resistant aqueous film forming foam (AR-AFFF). In general synthetic foams flow more freely and provide quick knockdown with limited post fire security.
Protein foams use natural protein foamers instead of a synthetic soap, and similar fire performance components are added. Protein type foams include regular protein foam (P), fluoroprotein foam (FP), alcohol resistant fluoroprotein foam (AR-FP), film forming fluoroprotein (FFFP), and alcohol resistant film forming fluoroprotein (FFFP). In general, protein based foams spread slightly slower than synthetic, but produce a more heat resistant, longer lasting foam blanket.
Why so many types? Each foam is the "best choice" for certain applications, but no foam is best for every application. For example, if you want to fill up a large volume area like a basement or an airplane hanger, high expansion would be the best choice. If you want to put out a thin spill fire, caused by a jet crashing on the deck of an aircraft carrier, then AFFF may be the best choice. Take an overturned tanker in a municipal environment where the fuel may accumulate into a deeper pool, and FFFP may be your best choice. If you are a chemical company that uses ethanol as part of your production, an alcohol resistant, fluoroprotein may be your best choice. What if you are like one of the thousands of municipal fire departments across the country who don't know what emergency you will encounter next? In this case, you need a multi-purpose foam that allows you the flexibility to handle most any type of Class B incident. Your choice here may be an alcohol resistant FFFP or an alcohol resistant AFFF. If you live in area that uses oxygenated gasoline, especially those blended with MTBE, then alcohol resistant FFFP would probably be your best choice.

Why FFFP?
FFFP foam on blended gasoline is your best choice because gasoline blended with MTBE prevents AFFF from forming a film under the bubbles. This film is what allows AFFF to spread rapidly and make a "seal" on most hydrocarbon fuels. Without film formation, AFFF's are virtually useless on blended gasoline fires. FFFP's provide better blanket stability and heat resistance, allowing them to put out these types of fires, without film formation. In addition to their fire fighting capability, FFFP's have also been shown to be the friendliest to the environment.

We have 3% AFFF. Will it work on a polar solvent fire?
NO. AFFF's are completely useless on any Class B fire involving polar solvent fires. You will need an Alcohol Resistant foam like Buckeye Platinum AR-AFFF.

Prove It.
Go to the first-aid kit in the station and get some methyl alcohol, or go down to the Seven-Eleven or auto parts store and get some gas line anti-freeze. Make sure to look on the back of the can and get the type that uses alcohol and not petroleum distillates. (Petroleum distillates are hydrocarbons, not polar solvents.) Get a sports bottle or a bottle with a lid on it – like a Gatorade bottle. Use an eye dropper (the pharmacist will give you one if you ask) with milliliter (ml) measurements. Get some regular 3% AFFF concentrate and put 3 ml's in the sports bottle. Then use your measuring cup that has ml's on it and pour in 97 ml's of water.

Now put the alcohol or gas line anti-freeze in a pie plate. Your pie plate represents the spill that you will have tomorrow at 2 a.m. when the polar solvent tanker truck rolls over on the highway, or the local mega home supply store spills a pallet load of paint thinner under their gas powered fork truck.
Shake up the foam bottle to make it full of bubbles like the ones that would be coming out of the foam nozzle. Pour the bubbles onto the alcohol. (Watch your foam blanket "dissolve"). Now you know what will happen to your AFFF on polar solvent fuels.

What about nozzles?
For class B foam, you should always use a foam nozzle, especially with blended gasoline. You need to expand your foam for it to work at its best. It will work with a fog nozzle on regular hydrocarbons, but vapor suppression and post fire security are sacrificed when a standard fog nozzle is used. Remember, you want to make a thick "foam blanket," not dish washing liquid.

Class A Foam.
Class A foam is not new thinking. Go back to the first issues of Fire Engineering and you will see ads for Class A foam. The difference in Class A foam today (at least with the good ones) is that today's formulations provide better wetting of Class A fuels, foam longevity (stability) and superior heat resistance. Class A foam is very versatile. It can be dumped into your water tank to produce a premix. It can be proportioned using a standard venturi eductor. It can be metered with a Class A foam injection system. It can be used at 0.1% all the way to 3%. It can be applied through compressed air foam systems (CAFS), conventional fog nozzles, or low, medium, or high expansion foam nozzles. It can be used for direct attack, indirect attack, or to protect exposures. And, it can be used in wildland fires and for structural fire fighting.

So, when and how do you use it?
For direct attack in the wildland, use conventional nozzles or low expansion nozzles.
Set your mix from 0.1% to 0.3% For indirect attack in the wildland, use all types of nozzles and use a foam mixed as high as 1.0%. For structural protection in the interface, use medium expansion or CAFS. When working in steep terrain, use high expansion equipment and let the foam flow down over the terrain. For structural fire fighting, use conventional nozzles at a 0.1% to 0.3% proportioning rate.