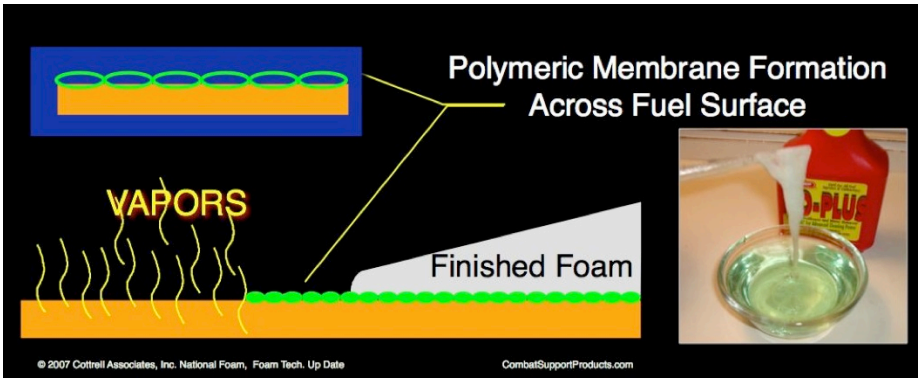
FDSOA 2009 Orlando
Smart Firefighting Foams For Ethanol

Alcohol resistant foams know what to do regardless of the fuel type they are applied to. On oil base fuels, diesel for example, foam solution forms a microscopic, flame smothering water film, which drains from a foamy froth, usually delivered via a spray or an aerating foam nozzle. On solvent fuels, ethanol for example, finished foam creates a floating, polymeric raft, separating foam destructive solvents from water in the foam blanket. With smart foams you're covered, be the fuel a simple hydrocarbon, a complex polar solvent or a compound of both, which is now or will soon be a fact of life when dealing with gasoline / ethanol blends.



Note: AR foams are UL tested using aerating nozzles with expansion of 5 to 10:1 Foam stream is not plunged into fuel. Finished (aerated) foam is allowed to run down a back-splash. Solvent fuels will not respond to non-aerated, plunging streams such as delivered from master stream nozzles" over the top" at fuel storage tank fires.

Concentrate Does Not Gel-Up

Thickness is an indication of how much alcohol resistant chemical (sugar/gum) is present. There is no storage condition or contaminant that will make regular class A or B foams turn to gel. In this regard, smart foam concentrates thin out as they move through system plumbing. The faster they move the thinner they become; much like thick latex paint in an airless spray gun. Fluids with these properties are known to be self-thinning, non-Newtonian or thixotropic. This is why published viscosities for AR foam concentrates tend to be misleading, since these otherwise high values tend indicate a fluid's viscosity at rest, or while moving very slowly. Foam systems having concentrate pumps creating positive suction do quite well with AR-AFFFs, regardless of published viscosity values. Use an eyedropper or turkey-baster to prove it. If the eyedropper lifts AR foam concentrate so will a foam eductor, or any onboard foam system having a concentrate supply-side which posses sufficient suction energy to draw AR-AFFF concentrate out of a foam tank. AR foams do not gravity feed very

well. Conversely, class A and regular AFFF concentrates tend to gravity feed quite well.

Note: Most AR-AFFFs are UL listed using foam eductors as a proportioning device.

Pumping And Transferring AR-AFFF
Pumping AR-AFFF foam concentrate into foam tanks should be done from the bottom-up. Avoid foam concentrate transfer pumps or on-board systems that recirculate concentrate back to the tank. Several trips through the foam pump can harm alcohol resistant polymers (sugar), creating a butter-like froth that will not dissipate over time, as does regular AFFF or class A concentrates. In all cases, churned AR-AFFF will surely be cause for lean proportioning and or its complete ruination.

Foam Concentrate Storage
The date on a UL listed foam container is its birth date, not its expiration date. Contrary to popular belief, class A and B foams do not have an industry-defined shelf life. It is not uncommon to find thirty-year old AR-AFFF perfectly suitable for use. Although it's environmental profile may not be very attractive by today's formulation standards. The key to foam concentrate storage life is to prevent its evaporation.

The most common cause for AR-AFFF to go bad is foam concentrate stored in unsealed, atmospheric storage tanks. Leaving containers open for more than a few months is likely to be the cause for concentrate's premature aging (drying out). Keep in mind that the alcohol resistant element of AR-AFFF is a sugar-like substance, which starts life as a dry powder. Simply put: store foam concentrate as if it were latex paint and avoid proportioning or transfer systems that employ concentrate recirculation.

Note: Freeze thaw cycles may ill-affect some AR-AFFF concentrates.

Mixing Unlike Class B Concentrates
It's not a good idea to mix different type foams, or brands, mainly because there is no telling what to expect in terms of firefighting performance or chemistry reactions should unlike concentrates be mixed in long term storage. If brand A and B's AR-AFFFs are mixed, there should be no system fatal downside because virtually all U.S. manufactured synthetic AR-AFFFs share the same chemistry origins. The same can be said for class A and regular AFFF. As long as the concentrate type and proportioning ratios (percentage) are the same, there should be no issues in terms of systems failure caused by adverse chemical reactions. In the case of mixing UL listed AR-AFFF, I would consider the final mixture's foamability, quarter-life and firefighting performance to be the lesser of the two quality, and of course, UL listings in terms of fuel types and application rates.

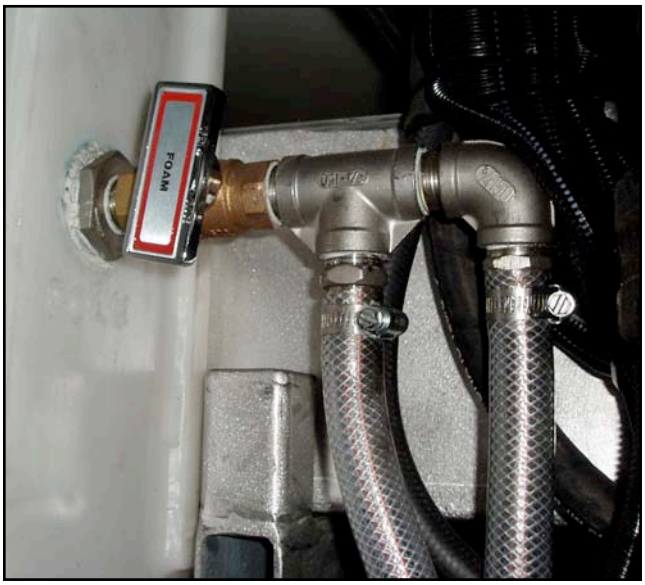
System Fatal Mixtures
NEVER mix regular AFFF or class A foam concentrates with AR-AFFF. Trace amounts of dispersing solvents contained in AFFF and strong alcohols used as wetters in class A foams will cause AR-AFFF concentrate to form pizza dough-like masses or lumps, which will foul system plumbing or plug a concentrate tank's outlet. Simply put, AR-AFFF concentrate is doing what is designed to do. On contact with a solvent, it polymerizes. It does so in your foam tank or system plumbing rather than on the fire. Trace amounts of either class A or AFFF concentrate will trigger this polymerization process.

The Fix
AR-AFFF in a class A tank can be sieved

(filtered), saving the class A concentrate. A cup of class A foam in your AR-AFFF tank is sure to be an expensive 'WHOOPS' as there is no saving contaminated AR-AFFF.

Foam Storage Related System Failures

UL listed foam concentrates have a maximum storage limit of 120 degrees F (49 C), and is clearly printed on all UL package labels, yet system installers routinely route non-flushable concentrate supply plumbing through the hottest place on the rig. When apparatus systems proportion lean, or not at all, one can often trace it back to contaminated or dehydrated foam concentrate, which can take the form of a past-like goo or a plaque deposit found in concentrate supply plumbing, strainers, metering and check valves.



To prevent this condition, install a flush line that starts at the foam tank's outlet. If that's not an option, cycle the system, making foam for ten seconds every two months or so. If your B system sees no exercise, don't bet your life on its reliability. When the A system fails, everybody goes home. If the B system fails, going home may not be an option.

For more on this and other firefighting foam related subjects, visit our web site www.combatsupportproducts.com or YouTube postings by ARAFFF136

Since 1988, Jim Cottrell has been National Foam and TFT's Eastern regional factory agent. He chairs the IFSTA Foam Technical Committee and is a member of the Underwriters Laboratories, Foam Standards Panel. Jim is an accomplished investigator, speaker and a nationally recognized instructor /lecturer. Jim's Combat Support Products division manufacturers specialty firefighting trailers and skids.