



Foam Lines

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Help! Our New Fluorine Free Foam Has Gelled

Like old time Alcohol Resistant, Aqueous Film Forming Foam concentrates (AR-AFFFs), new fluorine free versions (AR-FFF) also present like goos and gels; this is where the physical similarities end.

When old time AR-AFFFs saw water contamination it likely went unnoticed, because such contamination tends to thin the concentrate proportionately to water volume. If contaminated with class A foam or regular AFFF their solvents creates a pizza dough-like material in the tank which could float or sink and likely be system fatal within minutes. Same with new fluorine free (FFF) versions. However, unlike old time AR-AFFFs they tend to expand (increase viscosity) within minutes or hours after seeing water contamination

Water contaminated AR-AFFF will suffer performance deficiencies and may be missed upon tank inspection. Fluorine free versions will also suffer performance

deficiencies and be obvious upon inspection, as viscosity can easily double with as little as 5 to 10% water contamination. For example: A 30 gallon foam cell with a gallon rinse water left behind will cause what's pictured on the right.

Other things alcohol resistant fluorine free formulations dislike:

- a. Direct sunlight. May causes minor concentrate separation leaving a water-like skim on top of the concentrate and is why it is recommended to store in sealed, translucent concentrate totes, indoors away from direct sun light. National Foam's new AR-FFF are now shipping in opaque totes.
- b. Evaporation will cause viscosity changes. Keep tanks sealed and topped off with clean, working pressure vacuum vents, an NFPA 1901 requirement.



AR-FFF co-mingled with AFFF or Class A concentrate will often present with a system fatal polymeric mass like this.

Transitioning to new AR-FFFs. - Empty and flush foam tank(s). Do so in cooperation with environmental regulations which may vary by jurisdiction. Discarded concentrate and rinse water will need to be captured, clearly labeled and dispose of in accordance with environmental authority having jurisdiction.

Flushing AR-AFFF tanks will likely require rinse water circulation, perhaps twice for a half hour or so. Use a submersible sump pump discharging back to tank top insuring top to bottom circulation. This will insure all concentrate gel is dissolved; it will coat tank walls and floor until dissolved. Use an inspection light to insure all rinse dregs are dissolved and drained. Insure ALL rinse water is drained and tank is dry before introducing new fluorine free foam. I use a small fan set on tank floor. Finally, refill tank. Avoid pouring from top as agitation will cause a frothy mess. Fill from bottom up with a concentrate pump. Test new foam's proportioning accuracy. [See attached PDF for more flush detail.](#)



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Combat Support Products, Inc. Tech & Training Division

<http://www.cottrellassociates.com/combatsupportproducts/training-library.html>

Flushing procedure for foam trailer tanks and apparatus foam tanks, proportioning devices and related plumbing.

The following is the recommended procedure for the cleaning of existing foam tank(s) and related plumbing when changing to fluorine free foam. This procedure is recommended for all Class A or Class B foam change-outs.

- Application rates and/or viscosities for alcohol resistant fluorine free concentrates have changed from AFFF predecessors. Prior to starting any tank and/or system cleaning, thoroughly review the system design to ensure tank sizes and proportioning devices are still appropriately sized for the hazard. Because of potential application rate changes, some systems may require modifications to the foam concentrate tank and/or proportioning devices prior to the introduction of a different foam concentrate. Should the viscosity of the foam concentrate be different than the foam concentrate being replaced, proportioning device(s) may need to be changed or modified. Contact technical support representatives for additional guidance.

• Environmental regulatory authorities and/or the Authority Having Jurisdiction (AHJ) may require more stringent cleaning procedures. Consult such authorities prior to foam concentrate change-out concerning cleaning and disposal of old foam concentrate and rinse water.

Note: A case may be made by environmental authorities to replace the foam tank and plumbing since flushing may not achieve desired level of PFAS contaminants.

The Following Simple Flush Procedure will prevent system fatal cross contamination of foam types and or brands.

1. Isolate the foam tank from the firefighting system by turning off foam tank discharge valve insuring a closed circuit. See manufacturer's manuals related to the tank and system plumbing to be flushed.
2. Transfer the foam concentrate to be replaced from the tank to suitable storage containers. Use the TPK23 transfer pump kit that came with your CSP foam trailer if need be. If not in your inventory, contact us for a loaner.

Properly label temporary foam concentrate storage containers and dispose of the foam in accordance with regulatory authority requirements for chemical labelling and disposal.

3. Fill empty foam concentrate tank with fresh water and circulate with a transfer pump or apparatus system pump for thirty minutes. If with transfer pump, circulate using down-tubes (stingers) thus avoiding frothing. Empty the tank via system plumbing and or tank drain. Do it a second time if in doubt.

Note that some systems have extensive foam concentrate pipe runs between the foam tank and proportioning devices ie., ratio controllers. Such systems may require partial to full-firefighting system discharge to flush foam concentrate from all concentrate pipework. Follow applicable system instructions in those cases.

4. Where tote or trailer tanks are to have concentrate change recirculate as above. Flush all concentrate tank plumbing from front to back capturing waste discharge as necessary.
5. On apparatus, run rinse water through system proportioners and related plumbing, insuring all foam residue is replaced with rinse water. Cycle all valves while rinse water is passing through. Capture and destroy rinse water as required.
6. Typically, a discharge of foam solution may result in foaming or bubbling of the rinse water solution. If a sanitary rinse is desired, repeat flush steps above until no evidence of foaming or frothing is occurring in the rinse water.

8. Once the tank interior is cleaned, emptied and approved for use, refill the tank with the new foam concentrate taking care to fill the tank from bottom up using a down tube (stinger).
9. Once the tank is full, place the system back in service using the guidelines outlined in the manufacturer's operation and maintenance manual.
10. Verify all components of the system match the foam concentrate approved for use (i.e. proportioner orifice size, discharge devices, etc.). 1%- 3%-6%
11. Ensure appropriate labelling is added to the newly-filled tank and dated to identify its contents. Update safety data sheets (SDS) on foam trailers, tenders, engines and marine units.

Special Notes:



- Some tanks may be more difficult to thoroughly rinse including, but not limited to, those containing AR-AFFF and protein-based foam concentrates. Remove screen from fill tower if applicable and use a light to inspect the tank. This will facilitate the visual inspection of tanks containing a viscous foam concentrate (generally AR-AFFF products) or a foam concentrate with the potential for sedimentation (most protein-based products).

- Once the new concentrate is in service, testing of your system may be required to determine the equipment is performing as designed. Please consult your appropriate regulatory authority regarding such tests. Fluorine free test and training surrogates are available. Contact Combat Support Products for guidance. info@combatsupportproducts.com

- Foam tanks should always limit free air exchange between the foam concentrate within the foam tank and the outside atmosphere to minimize and prevent evaporation and condensation during changing weather conditions as well as to help prevent contamination. A new pressure vacuum vent (PVV) should be installed on cleaned apparatus tanks and totes. **Do Not Use Mineral Sealer Oil Fluorine Free Foams...**

EXPOSURE CONTROL / PERSONAL PROTECTION

Follow Safety Data Sheet (SDS) instructions for safe handling of both existing foam concentrate and replacement concentrate.

Be sure tank is empty and dry before filling with new concentrate