Foam Transition Fact Sheet

Overview

Transitioning from AFFF to F3 is not a straightforward process. It involves careful planning, technical evaluation, regulatory compliance, and coordination among multiple stakeholders, including ARFF leadership, environmental teams, operations staff, regulators, and vendors. Because of the complexity and evolving regulatory landscape, airports should work with informed and trusted advisors who understand the technical, operational, and environmental considerations of foam transition planning.

Why are we switching to Fluorine-Free Foam?

Part 139 airports were historically mandated by the Federal Aviation Administration (FAA) to use Aqueous Film Forming Foam (AFFF) for Aircraft Rescue and Fire Fighting (ARFF) emergency response activities. AFFF contains per-and poly-fluoroalkyl substances (PFAS) which are persistent in the environment, meaning they don't break down easily and can accumulate in the bodies of humans and animals and have been linked to harmful health effects. The FAA is now allowing the use of fluorine-free foam (F3) without intentionally added PFAS. While there is no federal mandate to switch, several states are promulgating regulations related to the use of AFFF.

Who should be included in planning for the transition?

It's important that each airport consider all stakeholders who should be involved in the planning process. Consider engaging your ARFF, Environmental, Legal, Risk Management, and Operations Departments. Identify the goals and objectives most important to your airport's operations.

What are the key components that need to be included in a transition?

- ARFF Fleet Evaluation
- Selection of Replacement F3
- Firefighter Training
- Decontamination of ARFF Vehicles
- Verification Sampling
- Proportioner Testing
- Waste Management

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ARFF Fleet Evaluation:

Consider the replacement schedule of your ARFF fleet. Equipment that will be retired may be handled differently than vehicles remaining in service. Prior to beginning your transition, ensure that ARFF Vehicles are in good working order including proper proportioner operation. In accordance with Part 139 CertAlert 24-011, an output-based discharge test shall be performed following completion of F3 transition. Mechanical issues identified in the middle of the transition could result in significant delays, increased costs, and issues maintaining Index.

Selection of Replacement F3:

On January 6, 2023, the DoD published MIL-PRF-32725 (MILSPEC F3) for F3 foams that don't require the use of fluorinated surfactants. Foams that meet the requirements of the MILSPEC F3 have been added to DoD's Qualified Product List (QPL). The FAA considers the foams on the QPL as acceptable for satisfying the regulatory requirements of Part 139.

F3 products must be stored in their original manufacturer provided containers and cannot be mixed with other F3 concentrate. Maintain AFFF reserves until the transition is complete. Departments will need to procure a new pump for F3 that has not been in contact with AFFF.

14 CFR 139.317 prescribes the minimum quantities of extinguishment agents to be maintained per Index category. The calculations for the quantity of F3 is the same as for AFFF; however, unlike AFFF, F3 surfactants do not form a film layer, and a mechanical foam blanket must be created and maintained. That means more foam solution is needed to achieve the same vapor suppression and burn-back resistance. A best practice quantity to account for this need is two times the concentrate tank volume on the vehicle. Additional foam will be needed for proportioner testing and training if conducted on site.

Firefighter Training:

It is essential that ARFF firefighters are prepared to use F3 effectively and safely. While both foams are highly effective, F3s require adjustments in techniques to account for differences in spreading and knockdown behavior compared to AFFF. While F3 does not contain PFAS, it contains organic surfactants and additives that are toxic to aquatic life and can create oxygen demand in waterways. Training with F3 should only be performed where it can be contained and managed properly.

Decontamination of ARFF Vehicles:

Most ARFF Vehicles have held AFFF in their on-board tanks for many years. Over time, the chemical properties of PFAS will cause them to self-assemble as sturdy crystalline structures on the surfaces of the tank. If these assemblies are not removed via a cleaning process, the glycols in replacement foam will dissolve residual remaining PFAS off of tank surfaces, contaminating the new foam.

Water is a poor solvent; therefore, rinsing with water will be insufficient in removing PFAS. Research performed by DoD indicates that a combination of heat, a solvent, and attrition is required to achieve desorption of PFAS from AFFF-impacted tanks.

Verification Sampling:

Because of the presence of PFAS assemblies accumulating on the tank surfaces, assessing the effectiveness of a decontamination method should be conducted using surface swab samples to measure PFAS adhered to surfaces before and after cleaning. Measurement of PFAS in aqueous samples during rinsing operations is not recommended as it provides no indication of residual PFAS that could result in contamination of F3 over time (e.g., rebound effect).

Proportioner Testing:

On December 31, 2024, FAA issued Part 139 CertAlert 24-011: Required Output Based Testing After Completion of Fluorine Free (F3) Transition. The CertAlert is to inform airport operators of the requirement in accordance with 139.319(g)(1) to conduct an output-based foam test on each index vehicle once Part 139 airport ARFF index vehicles have completely transitioned from AFFF to F3. Due to the higher viscosities of F3 compared to AFFF, flow rates using replacement F3 may be out of tolerances and may require modifications to proportioners to bring them into compliance. Testing should be performed in accordance with relevant FAA regulations and vehicle manufacturer recommendations.

F3 discharged as part of proportioner testing should be contained and appropriately managed.

Waste Management:

The foam transition process will generate three primary waste streams: (1) AFFF drained from the ARFF vehicles as well as any reserve AFFF, (2) rinsate from the cleaning process, (3) F3 discharged during output-based proportioner testing. EPA has not yet classified PFAS as a hazardous waste; however, regulations and guidance for proper PFAS disposal are constantly evolving. There are several options for disposal/destruction of waste with wide-ranging costs.

In April 2024, EPA released Version 2 of the Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances (EPA, 2024).The document presents currently available information on the destruction and disposal of PFAS and PFAS-containing materials. It focuses on the current state of science and associated uncertainties for three large-scale capacity technologies that can destroy PFAS or control PFAS release into the environment.

Want to Learn More? Contact us!

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