Federal Aviation Administration

National Part 139 CertAlert

AdvisoryCautionary **Non-Directive**Advisory**Cautionary**Non-Directive**Advisory**Cautionary**Non-Directive**

Date: **10/26/2026** **26-05**

To: **All Title 14 CFR Part 139 Airport Operators and Aircraft Rescue and Firefighting (ARFF) Departments**

Subject: **Use of Surrogate Liquid in Lieu of an F3 Foam in an Output-Based ARFF Apparatus Test (14 CFR 139.319, Aircraft Rescue and Firefighting: Operational Requirements)**

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1. Purpose.

This CertAlert informs 14 CFR Part 139 certificate holders of the approved use of surrogate liquids for output-based proportioner testing of Aircraft Rescue Firefighting (ARFF) vehicles. It provides a standardized and environmentally responsible alternative to discharging fluorinated-free foam (F3) concentrates during testing.

2. Background.

Under 14 CFR § 139.319(g)(1) (Vehicle Readiness), all ARFF vehicles must be tested to ensure proper foam proportioning accuracy. To streamline this process and eliminate the environmental release of F3 foam concentrates during initial in-service commissioning and transition phases, the FAA evaluated surrogate liquids that replicate the flow characteristics of F3 concentrates.

The FAA's technical evaluation concluded that surrogate liquids, when prepared and used in strict compliance with manufacturer specifications, serve as a suitable substitute for foam concentrate. This allows airport operators to rigorously test the plumbing, proportioning rates, and mechanical systems of ARFF vehicles without the operational costs and environmental impact of discharging actual F3 foam solutions. Surrogate liquid may be used after maintenance on an F3-transitioned vehicle for recalibration purposes as necessary.

3. Recommendations.

- **Key Operational Guidance.**
  To maximize test accuracy and verify system readiness, the FAA strongly recommends conducting output-based tests by discharging surrogate liquid directly from the vehicle's

onboard foam tank, rather than educting (mixing a liquid foam concentrate into a pressurized water stream at a precise ratio) from an external container.

- **Discharge from Onboard Tank.**
  Discharging from the vehicle's onboard tank is the superior method because it verifies the physical and operational integrity of the entire foam delivery path, including the foam tank valve and its associated actuation components. If a valve is seized or sluggish, this test immediately exposes failure, allowing for prompt maintenance. Always ensure an adequate quantity of surrogate liquid is loaded into the vehicle's foam tank before initiating tests.

- **Eduction from External Container.**
  While educting surrogate fluid from an external container is acceptable, it introduces several variables, such as extra external plumbing and different hydraulic head pressures, that are not present during emergency operations.

  These factors typically restrict flow and reduce the tested proportioning rate. Consequently, while educting is a permitted testing methodology, operators must ensure that all test results still fall strictly within the manufacturer's acceptable proportioning range despite these system variables.

- **Critical Technical Variables.**
  Viscosity Matching: Viscosity is the single most critical variable when using surrogate solutions. If the viscosity of the surrogate does not precisely match the F3 foam concentrate's profile, the proportioning system may register a false reading. This is of utmost concern for mechanical proportioning systems, but electronic proportioners must also be monitored to ensure proper flow meter readings and correct proportioning valve actuation.

  Temperature Sensitivity: Fluid viscosity varies directly with temperature. To achieve valid testing, the surrogate liquid and the corresponding F3 concentrate must be at the same temperature and as close as possible to the expected operational use temperature. Viscosity should be verified immediately before output-based testing. If the surrogate's viscosity is adjusted or modified, any conductivity 'bench standards' must be formulated using that specific modified surrogate solution to ensure calibration integrity.

- **Cleanup After Testing with Surrogates.**
  The surrogate is easy to dilute with water, so a simple water rinse of the tank and piping is sufficient.

- **Record Keeping.**
  Airport operators electing to use surrogate liquids for vehicle proportioner testing must maintain records of each test for FAA review and future operational reference.

- **Additional Testing Recommendation.**
  The FAA highly recommends performing a standard input-based proportioner test as soon as possible following a successful output-based surrogate test. This establishes an accurate baseline reference point that simplifies and validates all future surrogate-based testing procedures.



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