# PROJECT FACT SHEET

## PROJECT – EVALUATION OF CHEMICAL AND PHYSICAL CHARACTARISTICS OF FLUORINE-FREE FOAMS FOR FAA

**Objective**

Currently no fluorine-free fire-fighting agents are able to meet the stringent criteria outlined in MIL-PRF-24385F (MIL-SPEC). The Federal Aviation Administration (FAA) has a vested interest in finding effective, fluorine-free agents and methods to extinguish class B hydrocarbon fires. The DoD is working aggressively to address the national per- and polyfluoroalkyl substances (PFAS) issue in a cohesive, consistent manner while coordinating and communicating with external stakeholders. Since both the FAA and the DoD share an Aircraft Rescue and Fire Fighting (ARFF) mission, we are working together to research commercial-off-the-shelf fluorine-free foams (FFF) for potential Aqueous Film Forming Foam (AFFF) replacements. The objective of this project is to test the physical and chemical parameters of FFF against the MIL-SPEC to determine specific properties of foam formulations provide indication as to how the product will behave in fire-fighting scenario. For example, the spreading coefficient, a function of surface tension, is a good indicator of how the foam will spread on a fuel pool.

**Technology Description**

As the FAA identifies promising FFF candidates for replacing AFFF, the Air Force Civil Engineer Center (AFCEC) will measure chemical and biological oxygen demand (COD), and biological oxygen demand (BOD) at AFCEC/CX Tyndall AFB labs. Additionally, assessments of toxicity will be conducted via lethal concentration ($LC_{50}$) and inhibition concentration ($IC_{25}$), the total fluorine and perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) content, and by analysis of the combustion products of the foam. Refractive index, pH, viscosity, spreading coefficient, and stability will also be measured, as well as the stratification and precipitation of the foams before and after aging. These results will be used to help select potential candidates for the FAA to test as AFFF replacements in Class A fire extinguishment scenarios.

**Benefits**

Identifying a viable FFF replacement for AFFF is extremely urgent. Both the DoD and the FAA are mandated by the US Government to find a replacement that does not sacrifice performance. Further, the replacement must be more environmentally friendly than the original AFFF.

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