



NON FLOURINATED FOAM

Justification for the transition away from firefighting foam containing PFAS in the UAE, and the ME Regional aviation sector.



Since 3M and the US Navy developed the first AFFFs back in the 1960s, firefighting foams containing fluorochemicals have been the predominate firefighting foams used on commercial and military aerodromes globally.

Film forming foams such as AFFF and FFFP were (and still are) widely used for the ARFF mission in many countries

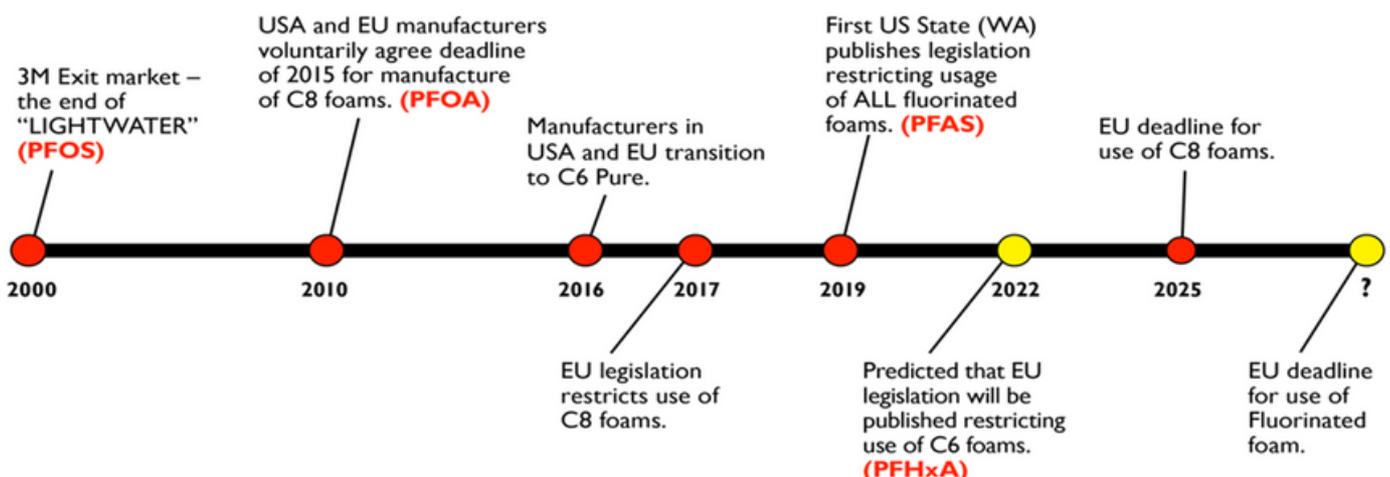
These high-performance products met the fire performance requirements of the appropriate international bodies of ICAO and the US CAA, were generally easy to handle, had good shelf life, and were available from a large number of manufacturers around the world.

In 2000, 3M announced (with 60 days' notice) they were exiting the firefighting foam market!

The reasoning was fundamentally due to the negative environmental impact of using their firefighting foam agents! A chemical compound known as Perfluoro Octane Sulfonate (PFOS) used by 3M in their firefighting foams was identified as a substance of very high concern due to its Persistence, its capacity to Bioaccumulate and its Toxicity.

Perfluoro Octane Sulfonate (PFOS) was identified in 2009 under the Stockholm Convention as a Persistent Organic Pollutant (POP).

Whilst 3M were the only foam manufacturer that used PFOS, environmental legislators such as the US EPA turned their attention to another chemical called PFOA, which could be found in the fluorinated foams manufactured by all other foam manufacturers. The figure below illustrates the timeline relating to the evaluation and subsequent legislative measures taken to restrict and eventually prohibit the use of PFAS in firefighting foams.



IMPORTANT OBSERVATIONS

04



Transitioning away from the use of PFAS containing foam agents such as AFFF and FFFP is environmentally responsible and sustainable.



Legislation and top organisations around the world are restricting the production, export and use of all PFAS containing products, including firefighting foam. The UAE is already establishing and implementing regulations to phase out the use of AFFF with PFAS and encourage the use of non-fluorinated foam and alternative solutions.



The same legislation issues will eventually lead to supply shortages as the foam manufacturers determine whether producing and selling PFAS containing foams is part of their business strategy.

QUESTIONS

05



Should the transition to fluorine free foams be made now?

The UAE is a signatory to the Stockholm Convention on Persistent Organic Pollutants (POPs.) As a party to the Convention, the UAE is obligated to implement the measures called for under the Convention, which include taking steps to eliminate or reduce the production and use of POPs, and to manage and dispose of POPs and POPs-contaminated waste in an environmentally sound manner.

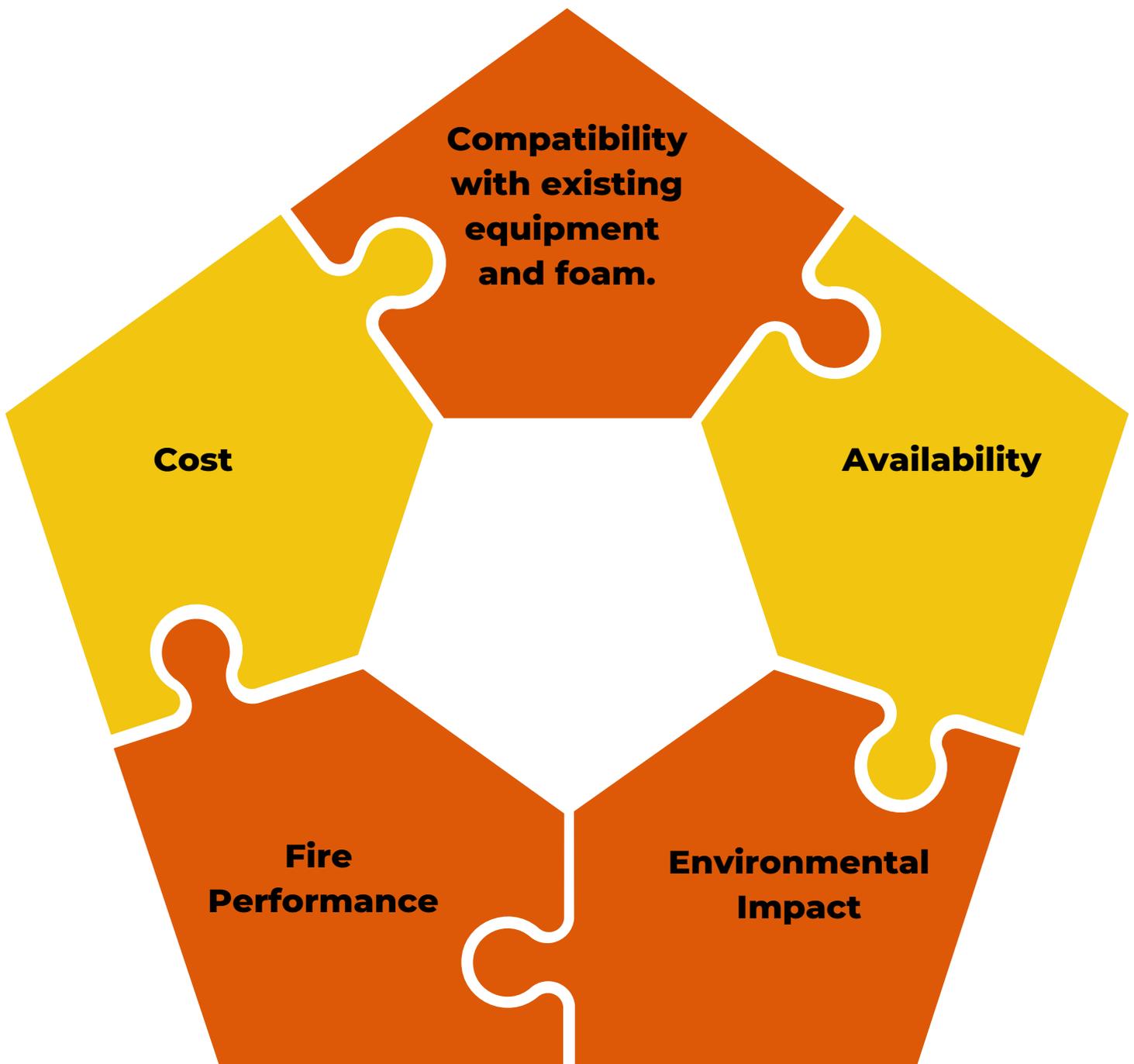


What does this mean for your organisation?

The first question that must be addressed is whether any of your existing AFFF or FFFP is older than 2016. This foam will contain PFOA and should NOT be used. (Foams supplied after 2016 should use shorter chain PFASs which are currently not part of the SC9/12.



When looking at the transition to fluorine free foams, the following needs to be considered:





Environmental Impact

As the driving force behind the transition is environmental responsibility, the fluorine free foam agent must be able to prove that the concentrate has “no intentionally added PFAS compounds”. Credible foam manufacturers will provide analysis data to support this claim or indicate GREENSCREEN certification for their foam agent.

Third party testing and certification is available to prove “environmental impact”



Fire Performance

Outside of the US the vast majority of commercial aerodromes are operating under International Civil Aviation Organisation standards and specifically Doc 9137-AN/898 Airport Services Manual Part 1 Rescue & Firefighting, Chapter 8. Within this document a fire performance test protocol is provided and performance of Level A, Level B and Level C are defined. Aerodromes are classified according to the largest aircraft that would land at that aerodrome and the number of ARFF vehicles and minimum quantities of agent are defined based on the ICAO Level chosen. The vast majority of aerodromes size their Rescue and Firefighting response according to Level B performance.

Fluorine Free Foams with a Level B performance have been available for more than 10 years and deployed in airports in Europe, Australia and, of course, Dubai for almost the same length of time.

The latest generation of fluorine free foam agents are demonstrating extinguishing times as fast as C6 AFFF's.

- Fluorine Free Foam agents that meet the same testing and approval standards for the AFFF's and FFFPs used for the past 30 years, are available on aerodromes outside the USA.
- US FAA currently requires Mil Spec AFFF's for ARFF mission on commercial airports in the USA (Awaiting the new Mil Spec for PFAS Free Foams (PFF) through the DOD).

Compatibility

It is NOT possible to mix a fluorine free foam concentrate and an AFFF (or FFFP) Managing the transition requires a complete change out or if phased, then vehicle by vehicle or system by system. The phased approach requires more ongoing management of inventory and testing.

Most fluorine free foams commercially available with ICAO Level B are pseudoplastic and have much higher viscosity and different flow characteristics than an AFFF or FFFP. Accordingly, not ALL proportioning systems will work efficiently with the viscose fluorine free foams, and this WILL need to be checked with the vehicle manufacturer. If new vehicles are being specified, then most vehicle manufacturers have tested their various proportioning systems and can offer and supply the correct systems for the foam.

Since 2020, several foam manufacturers have developed low viscosity foams targeted for the ARFF mission. These products are offered with ICAO Level B or better and have physical characteristics similar to AFFF or FFFP and can therefore be considered as a drop in replacement.

Fluorine Free Foam concentrate should NOT be mixed with AFFF or FFFP concentrate.

Testing shows that finished (expanded) fluorine free foam and finished (expanded) AFFF or FFFP can be used simultaneously on a fire with no noticeable detrimental effect

Necessary to confirm with the vehicle manufacturer that the proportioning system can operate with the fluorine free foam.

Low viscosity ICAO Level B foam agents now offered by several leading foam manufacturers



Cost

The negative involved with transitioning to fluorine free foam is, of course, the cost involved. This goes beyond the cost of the replacement foam, which litre for litre is more expensive than the AFFF or FFFP that it is replacing. As indicated, there may be costs associated with modifications to the vehicle so that it runs the fluorine free foam, but this is negligible and not a major cost associated with the transition. The largest cost associated with a transition is the disposal of the PFAS containing foam, and the cleaning / decontamination of the equipment. Depending on the age of the foam, it may be possible to offer it (either as a sale or a donation) to a developing nation, however disposal of a PFOA containing foam, or a PFAs containing foam, generally involves high temperature incineration.

A major cost associated with the transition to fluorine free foam is the disposal of the PFAS containing foam and the cleaning / decontamination of the vehicle / equipment.

Availability

Today, all the major foam manufacturers produce and market ICAO Level B fluorine free foam agents and, as noted, some also offer the option of a low viscose version as well.

Benefits

Environmental safety: non-fluorinated foams do not contain PFAS, which are harmful to the environment. They do not persist in the environment, meaning they degrade over time, and do not bioaccumulate in animals and humans.

Human health safety: As non-fluorinated foams do not contain PFAS, exposure to these foams is less likely to lead to health problems.

Compatibility: Non-fluorinated foams are suitable for a wide range of situations and are compatible with other fire suppression agents, such as water and dry chemical powders.

Performance: In numerous cases, Non-fluorinated foams have comparable or even better performance to AFFF in extinguishing capacity on liquid fuel fires.

Compliance: as regulations are becoming more strict about the use of PFAS, switching to non-fluorinated foams helps organizations to comply with the laws and regulations.

CONCLUSION

- The transition to fluorine free foams is an environmentally responsible and sustainable decision. (LHR and SYD have already made the switch)
- Although legislation has not been announced in the UAE with regard to the use of PFAS containing firefighting foams, the UAE are continually implementing regulations and conducting risk assessments to comply with their participation in the Stockholm convention including establishing regulations to phase out the use of AFFF with PFAS for alternative solutions. Global legislation will certainly impact the availability (and cost) of PFAS containing foams in the future.
- Fluorine free foams with ICAO Level B or better fire performance are available from the major foam manufacturers with certification through independent third-party testing bodies.
- Vehicle manufacturers are aware of the proportioning requirements for the fluorine free foams, but several manufacturers are now offering low viscosity ICAO foams to suit older proportioning systems.
- Fluorine free foams have been in use in airports in Europe, Asia Pacific in the UAE for over 10 years
- There are costs associated with transitioning, but by not transitioning now, these costs are only being deferred and will increase in the future.
- Benefits include future compatibility, performance and compliance.



THANK YOU



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Masdar City. UAE



9715 688-6448



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