

Subject: Premix foam solutions – Lifecycle Q&A

Issue Date: 05/08/2021

What is the difference between a foam concentrate and a foam solution?

- A **foam concentrate** has been specially manufactured in a dehydrated form to take up less volume in drums, pails, and tanks. A **foam concentrate** needs to be diluted (hydrated) and mixed with water before use through a discharge device.
- Once the **foam concentrate** is mixed with water, either through a proportioner or through pre-measured portions mixed in a container, it becomes a **foam solution**.
- The method of pre-measured portions of water and **foam concentrate** mixed in a container, is called a **Premix**.
- In most cases, **pre-mixed foam solutions** are discharged from a pressure tanks or vessels using an inert gas such as nitrogen.

How long can a premix remain in service?

- Chubb's pre-engineered foam spray systems all require annual replacement of the premix foam solution to ensure performance is maintained and that known biodegradation effects are controlled.
- Foam manufacturers recommend sampling and testing of foam solutions if they are to remain in service for more than 12 months.
- If a foam fire system manufacturer/supplier states that premixes can remain in service for longer than 12 months, we encourage equipment owners to seek evidence of tests to a recognized standard and confirmation from the foam concentrate manufacturer.

Why test?

- It is impossible to tell if foam concentrate, solution or premix is of operational quality by smelling it, looking at it in its drum, or touching the finished foam blanket.
- Water source selection used for creating the premix can create interactions with the chemical/organic elements of a formulation, and that could destabilize the foam solution.
- A large proportion of the compounds in firefighting foam are degradable organics such as glycol ether solvents and hydrocarbon surfactants which result in high overall biodegradability
- Biodegradation of foam concentrates occur in basic principle on their ability to oxidize and consume the organics. The opening and sealing of pressure tanks or vessels allow the concentrate to be introduced with oxygen and further promote foam biodegradation.

What tests should be carried out on premix's older than 12 months?

- In Australia, AS1940-1993 Clause 9.8.15 requires that samples of foam concentrate be checked at a frequency of not less than annually against the manufacturer's specifications, in accordance with NFPA11.
- The tests that are required include physical properties, foam properties, fuel tolerance, burn back resistance, film formation (where applicable) and alcohol resistance (where applicable)
- The tests require the tanks or vessels to be opened and a sample drawn (typically around 1ltr) from the vessel.

Testing vs. replacement of premix

- To maintain the foam fire systems original specification and performance, any samples drawn from pressure tanks or vessels would need to be replaced. This cannot be done easily with a premix as the replacement solution would need to be mixed at the correct ratio (concentrate to water).
- Pressure tanks or vessels need to be opened to extract a sample which introduces a risk of contamination.
- Testing is an additional cost with no guarantee that the sample will pass, meaning that the premix will need to be replaced at an unscheduled service routine.
- An agreement must be reached on the test parameters, and an original sample would need to be drawn to compare subsequent test samples over time.
- The **replacement of the premix** at the manufacturers recommend interval is most **practical and commercially viable option** to ensure that the foam system continues to perform as originally intended.
- There is an additional advantage for foam systems in that a discharge test can be performed when the premix is due for replacement. This provides an opportunity to evaluate the systems nozzle coverage against the original test result.

What else can be done to ensure a premix remains stable and performs as intended?

- Minimizing the amount of contaminants (microorganisms) assists in foam stability and demotes foam solution degradation. Only clean drinkable water (chloride ion content <150ppm) should be used when pre-mixing foam.