Fire Fighting Foams & Equipment

Fomtec Technical Advices
FTA No. 10

Storage, Handling and Maintenance of Foam

Shelf Life

Fomtec offers a wide range of superior quality foam concentrates that are specially formulated and manufactured to ensure exceptional storage stability as well as firefighting performance.

Two main factors affects the shelf life of a foam concentrate negatively, namely temperature and sunlight. The maximum storage temperature is printed on the product label. Storage vessels should be kept in ventilated and enclosed areas, with stable temperature conditions and no radiant heat from sunlight. Based on Fomtec experience and laboratory testing our recommended storage temperature for foam is between 15°C to 20°C to enable long shelf life of the product. Direct sunlight will result in excessive heat build-up in the storage containers. Sunlight is consisting of UV-radiation that may damage the ingredients in the foam liquid. Altogether, it will be negative for the shelf life of the foam. The general recommendation is to always store indoors. Foam concentrates are biodegradable chemicals, and will over time degrade, heat and UV-irradiation will accelerate these processes.

Shipping Containers

The foam concentrates and premixes from Fomtec is supplied in the following packages:

- 25 litres or 5 gallon blue plastic cans
- 200 litres or 55 US gallon blue plastic drums
- 1000 litres or 265 gallon IBCs

The main purpose of these is to serve as transportation packaging. However, the products may be stored in its original shipping containers. Since the purpose of the packaging is for transportation and not for final storage the packaging should be regularly inspected to verify their condition. In case of leakage, the foam should be decanted into another clean drum, sealed and tested to ensure it is still in satisfactory condition.

To store the products in its original container in a safe way and avoiding breakage we recommend the following storage conditions regarding maximum stacking height:

- 25 litres or 5 gallon cans can be stored two cans in height on a pallet. Two pallets can be stored in height (2+2 cans in height) when the bottom pallet is full of cans.
- 200 litres and 55 US gallon drums can be stored three or four on a pallet depending on pallet size. Two pallets can be stored in height when the bottom pallet is filled with drums.

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- 1000 litre and 265 gallon IBCs can be stored two in height.

Note that the products shall not be stored in direct sunlight to avoid UV-irradiation and temperature build up.

Transfer to Storage Tanks

Foam concentrates are frequently transferred to bulk storage tanks for long-term storage in systems. This kind of storage tanks should normally be kept full, with space allowed for expansion with adequate vacuum/venting arrangements. Recommendations for suitable storage tanks materials are given in FTA 20.

Always study the product MSDS before handling. Always use safety glasses and suitable gloves when handling the concentrate. Spilled product shall be handled according to local regulations. Always refer to the SDS for advice how to handle spillages.

Transfer of the foam product from an original packaging container into a storage tank or alike shall be done with a clean suitable pump fitted with non-collapsible hoses. The transfer shall be done is in such a way that minimal foaming takes place and that no air is drawn into the product during the pumping process. It is advised to fill from the bottom or at least keep the hose beneath the surface to avoid foaming. Use a positive displacement pump (gear, lobe, or membrane) for pumping of pseudo-plastic foam concentrate.

Control and traceability

In order to have good control and traceability of the product in the storage tanks it is highly recommended that the tanks are properly marked with the following:

- Product name with batch number
- Manufacturer of foam product
- Filling date
- Filling volume
- Keep record for each tank when it is topped up with above data and how much was left and how much was filled in

Evaporation

If foam concentrate can evaporate freely, the water and solvent in the concentrate will evaporate. FFFP ARC and AFFF-AR foam concentrates may form a skinny layer of polymer that occur on the surface of the concentrate which could clog up valves and proportioning orifices.

To minimise evaporation losses, the foam tank should be sealed, and a pressure vacuum vent installed to break the seal when the system is activated.

Evaporation will also be reduced by keeping the foam concentrate tank full. However, an ullage of 5-10% of the tank volume (e.g. expansion dome) should be maintained to allow for differences in thermal expansion coefficients between the tank materials of construction and the foam concentrate.

If it is not possible to seal the tank, air ventilation may be provided by breathers fitted with cowls. Alternatively, using an inert system with nitrogen gas covering the surface of the liquid at slightly above atmospheric pressure will reduce evaporation and ensure that leaks are nitrogen less rather than oxygen gain. A layer of hollow plastic spheres, either polypropylene or polyethylene, may be floated on the surface of the concentrate to reduce evaporation. On high viscous ARC foam a layer of mineral oil on top of the concentrate cans prevent evaporation or skin formation. It is of utmost importance to avoid the mineral oil to be mixed into the foam concentrate, hence, this cannot be used in stirred tanks.

Cleaning of Foam Tank Systems

Storage tanks, pipework, and pumps that have been filled with foam liquids should be flushed with clean water and drained after use. The need for flushing storage tanks falls into two areas:

- **Changing foam concentrate**: When changing foam concentrate stored in an existing tank, or after commissioning: The foam system should be emptied of any foam concentrate previously contained in it (or water used for hydrostatic tests), cleaned, and dried prior to refilling with the final charge of foam concentrate. Particular care should be taken when changing foam types.

- **In normal usage of system**: This presumes the system has been designed to avoid "dead-legs" in the system and drainage/flushing points are included to facilitate preventative maintenance. Judicious use of high pressure water regularly will enable pipework to be flushed and drained to dry so preventing any drying out of foam concentrate which could lead to the deposition of any solid material. Drain and flush until foaming diminishes. Avoid ullages greater than 10%.

Procedure for cleaning

Drain down system - open all valves. Fill foam tank with water and allow to drain. Repeat. Backflush through outlet using sufficient water as calculated to completely fill and overflow the tank twice. Allow to drain. Purge out all water, check to see foaming has ceased. Use a transparent bottle filled to half level and shaken repeatedly will assist in judging the amount of foaming. If not continue to cycle through process until foaming has diminished. Make sure to reset valves correctly.

Fill slowly with foam concentrate to minimise frothing and formation of air pockets. Charge foam line to furthest designated valve so that foam concentrate is present in all pipes where it is required. Drain foam concentrate from any pipes where drying out could occur and rinse through with pressure hose reel or similar.

When using natural protein-based foam concentrates or AFFF-AR in locations where drained areas may be heated (pipework, recently operated pumps), flushing should be carried out immediately after use to prevent drying-out of foam concentrate which could result in the deposition of solid material.

Bunding
In some instances, there may be a need for bulk foam concentrate stocks to be bunded or diked to comply with local environmental regulations. This will depend on the circumstances of a site, and the relevant enforcing authority should be consulted.

Annual foam testing

To ensure satisfactory performance of foam concentrates they should be sampled to a qualified laboratory at least annually as recommended in NFPA 11 (2005). Section 11.6 states that "*samples of concentrate shall be sent to the manufacturer or qualified authority for quality condition testing*".

It is generally recommended in all international standards to do annual inspection of foam concentrates starting three years after installation. The inspection shall be made on foam concentrates and their tanks or storage containers for evidence of excessive sludging or deterioration. This is accomplished by testing the foam concentrate regarding several physical parameters that indicate the foam concentrates condition. The Fomtec Foam Testing Service is a qualified laboratory and will perform such tests on any foam concentrates or foam premix solutions as required. More details on foam testing can be found at www.fomtec.com.

Summary

Keep foam concentrates in proper storage facility avoiding direct sunlight and temperature fluctuations. When transfer foam liquids into tank systems, make sure they are property cleaned to avoid contamination.

Recommendation

Keep track of the content in your tanks, record when it is filled up, with what and how much. This ensures traceability and possibility to evaluate defects when needed. Test the foam concentrates annually to assess the condition and make sure it will perform.

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