

PRODUCT SHELF LIFE

Perimeter Solutions foam concentrates are specially formulated to ensure exceptional storage stability as well as firefighting performance. The recommended storage temperature range for SOLBERG® VERSAGARD™ AS-100 and AS-100 FP 3x3 AR-SFFF foam concentrates is between 32°F - 122°F (0°C to 50°C), preferably in the original containers. The SOLBERG VERSAGARD AR-SFFF is compatible with multiple construction materials found in firefighting equipment. When stored in original containers, or in tanks designed for foam storage with manufacturer-recommended equipment and within the specified temperature range, a shelf-life of at least 10 years is expected. The shelf life of any foam concentrate is maximized by proper storage conditions and maintenance. Factors affecting shelf life are wide temperature fluctuation, evaporation, dilution, and contamination by foreign materials.

STORAGE RECOMMENDATIONS

All foam concentrates should preferably be stored in their original containers. All concentrates should be stored at the recommended temperatures as stated on the appropriate data sheets. It is desirable that the foam concentrate is not exposed to direct sunlight to reduce the extremes of temperature to which

the product is exposed. The containers should be regularly inspected to verify their condition. In the unlikely event of leakage, the foam should be decanted into another clean drum, sealed, and tested to ensure it is still in satisfactory condition. Foam concentrates in storage should not be mixed with other foam concentrates without checking compatibility.

Foam concentrates are suitable for transferring into bulk storage tanks for long-term storage. When stored in storage tanks, it is important that the tank is constructed correctly and maintained in good condition. Storage Tanks should be of stainless steel, epoxy tanks (glass-reinforced plastic/fiberglass with epoxy resin), or HDPE, preferably. The use of iron or copper alloy materials should be avoided, where possible. For fixed systems foam storage, then glass composites, carbon steel are preferred – usually where a nitrogen blanketing system or vacuum pressure vent/expansion dome is used - and aluminium would also be acceptable. Tanks and/or storage containers should be made from opaque, UV protective materials to reduce ultraviolet exposure that can impact shelf life. Ensure the tank is clean and dry prior to filling. The storage tank design should be that of a sealed tank to prevent free air flow through the tank and minimize air contact with the concentrate. Consideration should be given to

the use of a pressure vacuum vent to allow entry of air during operation, but not when standing idle, as well as to include an expansion dome to minimize the surface area exposed to air. These steps help to maximize the concentrate storage life and protect your investment.

To maximize the usage/storage life of fluorine-free foams and reduce impact on fire performance, Perimeter Solutions additionally recommends the use of mineral oil to create a seal on top of the foam concentrate in fixed atmospheric tanks.

- The appropriate grade mineral oil (Specific Gravity > 0.84) should be applied gently to the foam concentrate surface at a depth of 1/8 up to 1/2 inch (4 mm to 13 mm) across the full surface.
- The use of mineral oil in movable tanks (such as fire trucks or portable foam tanks/tankers) should be avoided.

If Intermediate Bulk Containers (IBC)/Totes are used for permanent storage, consideration should be given to the use of mineral oil on the concentrate surface and/or installing pressure/vacuum vent valves to minimize mass transfer of vapor in and out. This should be done after transport to the final location.

FOAM STORAGE GUIDELINES FOR SOLBERG VERSAGARD FLUORINE-FREE FOAM CONCENTRATE

The storage requirements for the SOLBERG VERSAGARD foam concentrates are in line with the majority of AFFF and AR-AFFF storage requirements. Please note, based on foam standards from 3rd party approval bodies like Underwriters Laboratory and Factory Mutual, the UL and FM approved SOLBERG fluorine-free foam concentrates have been confirmed stable with no loss of performance between 35°F to 120°F (1.6°C to 49°C). These typical 3rd party approval product stability tests last from 30 days to 90 days at temperatures ranging from 122°F to 140°F (50 to 60°C). For European Standard (EN1568) certification requirement, the SOLBERG fluorine-free foam concentrates passed the temperature conditioning tests at -30°C and +60°C, completing stability tests at +60°C after 4 cycles of freeze/thaw for 24 hours at -30°C and thaw. However, storage in these extreme variances would not be recommended.

SUMMARY OF STORAGE GUIDANCE FOR SOLBERG VERSAGARD 3x3 AR-SFFF FOAM CONCENTRATES:

- Should be stored between 0°C to +50°C as per Technical Data Sheet.
- The foam should preferably be stored in the original containers

- Foam concentrates are suitable for transferring into enclosed bulk bulk storage tanks for long-term storage, but these should normally be kept full, with space allowed for expansion and vacuum/venting, and to reduce evaporation.
- These bulk storage tanks should be stainless steel, epoxy tanks (glass-reinforced plastic/fibreglass with epoxy resin), HDPE, or Polyethylene. Additionally, for fixed systems - glass composites, carbon steel are preferable (usually with a nitrogen blanketing system or vacuum pressure vent), and aluminium would also be acceptable.
- Appropriate grade mineral oil (Specific Gravity >0.84) applied gently at a depth of 1/8 up to 1/2 inch (4 mm to 13 mm) across the foam surface is acceptable when stored in fixed tanks.
- Do not mix with other foam concentrates without consultation with Perimeter Solutions.
- A shelf-life of at least ten years can be expected if stored properly according to these recommendations.
- Per NFPA 11 foam concentrates should be tested annually to confirm that physical/chemical properties are within specification.
- When taking samples for testing, it's important to avoid collecting any mineral oil with the foam concentrate if this has been used in storage.

INSPECTION OF FOAM CONCENTRATES AND SYSTEMS

Perimeter Solutions recommends that foam concentrates, or premix solutions, should be tested annually as set out in National Fire Protection Association (NFPA 11) and EN-13565-2 standards. A sample of the foam concentrate should be sent to the manufacturer or a qualified third-party lab to confirm the physical properties and foam quality meet the specifications of the foam as originally supplied in line with the requirements of NFPA 11 and EN-13565-2.

According to recommendations contained in NFPA 11 "Standard for Low-, Medium- and High-Expansion Foam", periodic inspections of all Foam Systems shall be thoroughly conducted, and systems checked for correct operation, at least annually. The goal of this inspection and testing shall be to ensure that the system is in full operating condition and that it remains in that condition until the next inspection.

