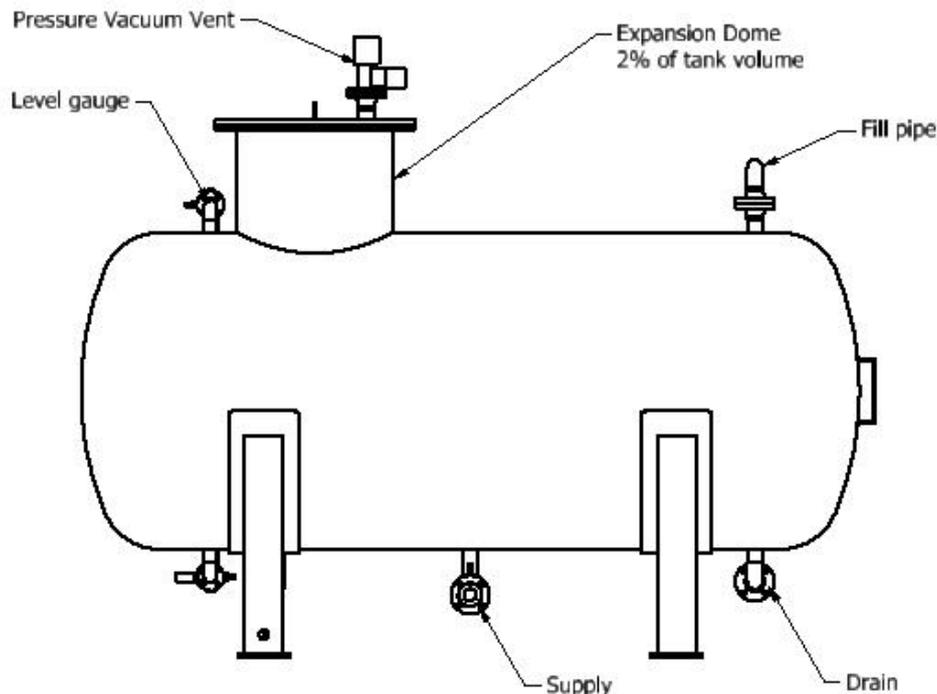


When storing foam concentrates, it is important that the tank is constructed correctly and that the tank is then maintained in good condition. The following rules are normal for any type of fire fighting foam **BUT** in the case of Alcohol Type AFFF's and protein foams they are essential, both because of the extremely sensitive nature of the products and their high value.

Good design of the storage tank prevents free air flow through the tank and minimises air contact with the concentrate. Further, it is desirable that the tank not be exposed to direct sunlight in order to reduce the extremes of temperature to which the product is exposed.

The following diagram illustrates the proper tank design. The design features a sealed tank with a pressure vacuum vent to allow entry of air during operation but not when standing idle and it features an expansion dome of 2% of the tank capacity that is half filled with the concentrate to minimise the surface area exposed to air. These rules guarantee maximum concentrate storage life and protect your investment.



If Alcohol type foam concentrates (ARAFF and ARFFFP) are stored in tanks that do not have an expansion dome and pressure vacuum vent their storage life can be reduced to as little as one year.

The materials of construction are very important for long storage life.

Synthetic foam concentrates

ARAFF, AFFF, Fluorine Free, High Expansion, Class-A foams.

316 Stainless steel tanks are very reliable for this application provided the concentrate has a low chloride level. Since 3M stopped manufacturing AFFF's there are not likely to be many synthetic foam concentrates with high chloride levels but you should verify this with the manufacturer. In ocean environments external corrosion of stainless steel tanks may be a more serious issue.

Glass reinforced polyester tanks are very reliable provided chemical resistant resins (isophthalic) are used and the gel coat must be isophthalic.

High density polyethylene tanks are not recommended. While they are low cost there are actually very few tanks made of true high density polyethylene and there is a large risk that the resin is not sufficiently chemical resistant for long term storage of fire-fighting foams. We have seen more failures than successes. In general they do not have an expansion dome and can only be used for ARAFFF if sealer oil is applied to the top of the foam concentrate. Since sealer oil requires careful application and periodic maintenance it is likely that the long term savings from using these tanks are probably not realised by many customers as either the tanks fail or the foam concentrate life is significantly shortened. High density polyethylene tanks are not recommended for outdoor use.

Orion does not recommend the use of sealer oil except as a means of mitigating the effects of a prior poor tank design.

Protein foam concentrates

For protein based foams, stainless steel tanks are not recommended as some protein foam concentrates contain higher chloride levels than sea water and all have quite significant levels of chlorides. Many manufacturers of protein foam concentrates recommend 316 stainless steel for the construction of foam tanks. This might work reasonably well in cool climates but in hotter environments the action of chlorides is accelerated. It is also necessary to carefully passivate all welds to maximise the tank life but this process increases the owner's risk as it is hard to verify that the passivation was carried out correctly.

Glass reinforced polyester tanks are very reliable provided chemical resistant resins (isophthalic) are used and the gel coat must be isophthalic. GRP tanks are an all-purpose option for foam tank construction.

Steel tanks with an appropriate corrosion allowance have a long and successful history. It is essential that an expansion dome and pressure vacuum vent be used in the tank design to avoid deterioration of the foam concentrate. Without a pressure vacuum vent corrosion at the liquid/air interface may be quite high and result in premature tank failure. Orion can also offer foam tanks with a rubber liner.

High density polyethylene tanks are an unknown quantity for storage of protein based foams. Orion has no experience with using this material for tanks. Without an expansion dome the life of the concentrate will be reduced. Sealer oil cannot be used. High density polyethylene tanks are not recommended for outdoor use.

WARNING: Sealer oil cannot be used with protein based foam concentrates. Sealer oil will irreversibly contaminate the foam concentrate and the concentrate will need to be replaced.

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Bladder tanks

When properly maintained, bladder tanks are probably the best storage tanks for preserving foam concentrates.

When used correctly bladder tanks contain no air so foam concentrate storage life is prolonged (since oxygen is the cause of most foam concentrate deterioration). The concentrate does not come in contact with the tank so internal tank corrosion is eliminated also. A good quality bladder will last for about the life of the foam concentrate.

With the addition of protection from direct sunlight bladder tanks provide excellent storage for foam concentrates.

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