Fire Fighting Foams & Equipment

# Fomtec Technical Advices
# FTA No. 20

# Material Compatibility

## General

In general foam concentrates and premixes will not cause and any corrosion problems. For some of our products this has been tested with authorized test institutes. However, since the liquids are containing water and other ingredients that are electrically conductive, they can give rise to electrical currents when used in systems with unsuitable metallic material combinations, i.e. combining two metals that can form a galvanic element.

Fittings in foam concentrate pumps and valves may be made from brass, bronze, and stainless steel. Dissimilar metals in contact with one another (e.g. a stainless-steel tank and a brass valve) may lead to electrolytic action. This will cause galvanic corrosion of the metals since the foam product is conductive. Dissimilar metals should either be avoided or a non-conducting gasketing material should be used in the joint. The safe route is to use the same type of metal throughout the system.

The use of zinc, galvanised materials, and aluminium in storage tanks, pipework, and machinery handling foam concentrates should be avoided. In the event that foam is being replenished into an existing system where zinc or galvanised materials were used in original construction, it is advised that some means are provided by which the system can be flushed through with water and drained after use.

Below is given general recommendations for selecting materials for foam extinction systems.

## Storage Tanks

It is recommended that storage tanks are fabricated or lined with the following materials for the different foam types.

- **Mild Steel (uncoated)**: This material is **not recommended** for synthetic detergent based foam concentrates. Ferrous metal ions can poison the foam concentrate leading to reduced firefighting performance. It **is recommended** for natural protein based foam concentrates, although there might be some initial etching of the material but it will not impact tank or performance. The protein foam concentrate quickly inhibit the etching process by forming a protective layer on the surface of the mild steel.

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- **Stainless Steel**: The stainless steel grades SS316L, SS316, SS304 and Duplex 2205 are recommended. Tanks with welded construction should have all joints treated to ensure consistent properties closed to welds. There might be slight pitting on the tank surface but this will have no effect on tank nor on foam liquid.

- **Glass Reinforced Epoxy:** This is basically fibreglass impregnated with epoxy resins and moulded to tanks. This is a very tough and resilient material suitable for all kind of foam types. It is not recommended in systems involving pressure displacement, unless the tank has been tested and approved the pressure used. Since the material is not conducting it can be combined with many different material that are electrical conductors.

- **High Density Polyethylene (HDPE)**: A plastic material inert to many different liquids, including foam concentrates. HDPE is a tough and durable material that can withstand minor impacts without cracking or failing. Since the material is not conducting it can be combined with many different material that are electrical conductors.

- **Polypropylene (PP)**: A plastic material closely related to HDPE with more or less common features. Also PP is not conducting and can be combined with many different material that are electrical conductors.

## Gaskets, Seals and Bladders

Gasket, seals and bladders may be manufactured from all commonly used elastomers, such as: Ethylene propylene diene monomer (EPDM), Ethylene propylene rubber (EPR), Butyl rubber (e.g. Bucar, Polysarbutyl, MD551, Buna N, Nitrophyl etc.), Fluoroelastomer (e.g. Viton), Nitrile rubber (Butadiene acrylonitrile copolymer), FKM, FFKM, Polytetrafluoroethylene (PTFE).

Foam liquids are comprising of surfactants and solvents that can partly be dissolved into the elastomeric material used as gaskets, seals or bladders and causing increased danger for failure. It is advised to check the compatibility of the elastomers systems with the foam liquids used in foam systems to avoid failure. Fomtec has tested some of their products with different elastomeric materials used in foam systems and can be available on request.

## Pipework

The choice of pipework materials depends on the anticipated contact time with the foam concentrate. For continuous contact the same materials of construction apply as for storage tanks (see above). PVC, copper, brass, and bronze pipes are also acceptable for continuous contact.

Inlet pipework should be located at the base of the tank to avoid excessive foaming during filling. Outlet pipework should be located above the base of the tank to prevent clogging in the event of any minor sediment that might have formed or other foreign materials in the tank.

Pipework systems should be designed to prevent water and other liquids accidentally entering the tank and foam concentrate accidentally escaping from the tank.

Foam concentrates are suitable for decanting into small containers. Agitation and air intrusion should be kept to a minimum if foam concentrate pumps are used.

## Recommendation

It is advised to select materials for tanks, pipework, fittings etc. that are suitable for contact with foam liquids in order to avoid failures. The foam liquid manufactures have information to recommend compatible materials.

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