

## Fomtec Technical Advices

### FTA No. 40

## Waste Handling and Disposal

### General

Foam concentrates and premixes made thereof contains a mixture of surfactants, solvents, metal salts (e.g. sodium chloride and alike) and in film forming foam types (aka AFFF:s) also fluorinated surfactants and fluorinated polymers are present. Some of these components can have a long term effect on aquatic organisms such as fish, daphnia, algae etc.

The latest developments of foams are based on pure C6 fluorinated surfactants that have a low toxicity and are no bioaccumulation. However, they are persistent in the environment. This means that they are resistant to degradation through normal pathways like chemical, biological and photolytic processes. Hence, they are potential environmental pollutants in the long perspective.

On the other hand, fluorine free foams generally contains substantially more surfactant than AFFF-types and are therefore more toxic to aquatic organisms. But they do not bioaccumulate nor contain any persistent compounds.

Most countries regulates the permission to discharge any kind of substance that eventually ends up into ground water, rivers, creeks etc. This means that all kind of foam types should not be discharged onto soil, waste land, rain water drains, lakes and so on unless local authorities have given their permission. Always check with the local authorities if it is possible to discharge foam before doing it. The big exception is when foam is used in emergency situations for protection of life and property.

Foam discharged in huge quantities into a waste water treatment plant may cause huge problems. The main issue initially is the frothing that may cause operational disturbances in the plant. Secondary, the surfactants and other compounds in the foam may interfere with the different steps in the plant and disturb the delicate balance in the chemical and biological cleaning stages. Waste water treatment plants can easier handle foam discharges if they are well diluted. In any case, it is advised to notify the treatment plant in case of a discharge.

### Waste Types from Foam

Waste from foam discharges can be of two kind, foam concentrate or a premix made from the foam concentrate. In the former case the concentrate is loaded with active components. In the latter case, a premix is heavily diluted with water and, hence, the active components are diluted a lot. When discussing handling of waste it is important to know what kind of waste it is. It is important to emphasise that the safety datasheet is concerning the foam concentrate and not the premix.

Premixes are mainly prepared as 1%, 3% or 6% of foam concentrate (strength depending on product) diluted with 99%, 97% or 94% water respectively. Hence, the safety datasheet cannot be used as is to assess the handling of a premix waste. The composition and the corresponding risk phrases and recommendations must be recalculated and assessed accordingly. Generally, the active components in a premix are so diluted that the safety datasheet will not have any label at all and no components are obliged to be presented in the composition list. As an example, a foam concentrate designed to be used at 3% in premixes contains 5% of a substance – when diluted in the right proportion the premix will only contain 0,15% of this substance – a dilution factor of 33.

## **Controlled Conditions**

Controlled conditions include foam training, commissioning of systems, cleaning and maintenance and alike. The recommendation is to do the training on suitable and for the purpose built facilities that allows the foam discharge to be collected for later destruction. When doing maintenance, cleaning and commissioning the waste foam discharge should be collected for later destruction.

## **Uncontrolled Conditions**

Uncontrolled conditions include emergency fire fighting where a fire is needed to be taken out wherever it occur. In such events, temporary containments may be needed in order to collect the run-off water. By using roads and parking space for cars or other hard and impenetrable surfaces could be arranged to work as temporary containment by the use of suitable containment measures, like sand bags or soil to form a temporary bund. It should be avoided to direct the run-off water directly into natural (like rivers or lakes) or artificial water system (like drainage). It is advised to block drains and sewages to reduce large quantities of foam to reach waste water treatment plants and local recipients. If runoff accidentally leaks to the surrounding, local authorities should be notified.

## **Reduction of Collected Run-Off Water**

Collected discharge water could mean huge volumes and to send this to destruction by incineration could be quite costly. In order to reduce cost the discharge can be reduced by evaporation by simply letting the discharge stand in an open container to allow water to evaporate. The ultimate way is to evaporate the discharge to a more or less solid state and this is sent for incineration.

In the case where the foam solution is contaminated with hydrocarbon fuel (water insoluble fuel) the liquid may stand for a few days. This will allow the fuel to separate from the water and can be skimmed off for separate disposal. In some cases the fuel may be possible to re-use for training purposes or alike.

## Recommendation

It is advisable to use specially designed training foams for practising. Fomtec has developed a couple of environmentally benign training foams called Fomtec Trainer E-lite. These training foams consists of especially selected surfactants that originates from natural resources and are hence readily 100% biodegradable. They are also solvent free in order to minimize environmental impact.

For commissioning systems, Fomtec has developed especially tailor made foam mimic liquids called Fomtec EnviroSenze. The are test liquids free from surfactants and hence, they do not foam but they contain other important ingredients so that the flow behaviour is as close as possible to the real foam concentrates. These products are available in different viscosities, from about 2-3 mPas to 5 000 mPas that makes them fit more or less the range of foam concentrate on the market today. The induction ratio can be determined by conductivity measurement with a high precision.

Contact local authorities to get recommendation on handling and disposal of foam waste. As a base for the discussion should be safety datasheet for the product. Determine the type of waste (concentrate or premix) and discuss the case accordingly.

## References

- Fire Fighting Foam Coalition – Environmental Issues Fact Sheet ([www.fffc.org](http://www.fffc.org))
- NFPA 11 Annex F – Foam Environmental Issues
- Environment Agency in UK, PPG18 – Managing Fire Water and Major Spillages