



BULLETIN #1001-1

TECHNICAL BULLETIN

Proportioning — an Important Parameter in Foam Firefighting

Foam Concentrates

Today there are several foam concentrates on the market, in a wide range of use concentrations. Often, concentrates have several use concentrations. For example, common Alcohol Resistant (AR) type foams have to be used at 3% on non-water-miscible flammable liquids and at 6% on polar liquids or water miscible liquids. Newer AR foams can be used at 3% on all flammable liquids, but there are trends toward 1x3 foams.

Pseudoplastic Foam Concentrates

They look viscous, but they are not. First of all, the viscosity of a pseudoplastic liquid can't be confused with that of high viscosity liquids. The CEN EN 1568 standard places a maximum value on Newtonian viscosity and, to comply with this standard, a foam should be "proportionable."

For pseudoplastic liquids, this is more difficult, since it depends on the speed

at which the liquid is moving. One thing must be considered: Pseudoplastic liquids need a yield to start moving. One can describe this as the energy needed to start moving the foam agent.

Most AR foam concentrates do contain polysaccharides. These molecules, in combination with other foam ingredients, are the key to performance on water-miscible liquids. Polysaccharides can be described as long, entangled molecules. When they are at rest, they behave viscously — all molecules are clustered. Once pressure is introduced and they start moving, the molecules will stretch. Viscosity diminishes in direct relation to velocity.

The best way to get an idea of the apparent viscosity (the viscosity related to the velocity) is by measuring the shear rate of the concentrate. This measurement is part of the EN 1568 standard. Relying on these measurements, a product complying with EN 1568 would be suitable to use with appropriate equipment.

Foam Standards

To ensure that your foam concentrate is used effectively, proportioning must be correct. The European standard, EN 1568, requires foam to be tested only at the 100% exact concentration (as does UL 162). The only standard (to our knowledge), which requires foam to be tested at a concentration other than nominal, is US Mil Spec F24365. (This requires a foam concentrate to be fire tested at 0.5 and 5 times its nominal concentration.)

Correct Proportioning

Foam concentrate performs best when it is proportioned 100% correctly, so TEST your equipment. Correct proportioning depends on the state of your equipment, the maintenance and compatibility of the different hardware parts, and the (yield) viscosity of the foam concentrate. Some concentrates that don't look viscous could be more viscous than a pseudoplastic liquid. Newtonian viscosity doesn't change with speed or shear.



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A Simple Test to Check Your Equipment

Fill a 5-gallon (20-litre) pail with water. Proportion it as though it were your foam concentrate. Time the consumption and calculate your system's accuracy. If you diverge more than -10% or +30% from the set concentration, it is time to adjust your equipment. Possible causes are backpressure of the nozzle or incorrect combination of hardware pieces. Realize that the line length and hose diameters are contributing to this backpressure. Also, make sure that the flow of foam concentrate into the proportioner is tested on maximum distance and diameter.

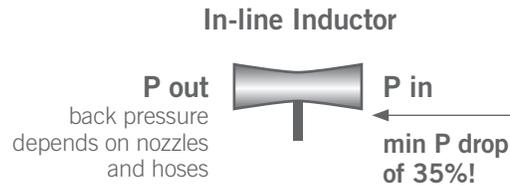
Once you are sure of your system's performance, you can repeat the test with foam concentrate.

RE-HEALING™ Foam Concentrates

Structure – Composition

These new products don't contain fluorochemicals, so in addition to their specific ingredients, they need polysaccharides for added foam

DYNAMICS OF SET-UP



stability. They have physical properties similar to the pseudo-plastic AR-AFFF foams. These new foams proportion without difficulty with properly fitted and maintained equipment.

They are currently undergoing testing by our partners, customers and distributors.

Practice

Several tests in Australia, the UK and the Nordic regions indicate no specific problems. These foams proportion as well as, or better than, the AFFF-AR polysaccharide-based products.

These new foams contain no protein-based material or other ingredients influencing viscosity in a negative way.

Conclusion

- Proportioning is an important parameter in foam firefighting.
- Properly tested and maintained equipment is a key requirement for accurate proportioning.
- Training is a requisite for responsible firefighting skills.