

## **Class A foam Specification**

The Fire Department requests purchase of Class A foam concentrate. The following items shall be included in the purchase specification to vendors:

### **Chemical Specification**

1. Shall be 0.1% to 1.0% concentrate
2. Shall not contain any U.S. EPA listed hazardous materials such as glycol ether
3. No flash or fire when tested via a closed cup method
4. Surface tension maximum: 28 dynes/cm of 0.6% water solution at 70 degrees Fahrenheit
5. Specific gravity: Maximum 1.03
6. Freeze and thaw: shall have no effect
7. Biodegradable
8. Foam concentrate water content less than 50%

### **Regulations**

1. Shall meet NFPA 1150
2. Shall currently be on USDA Forest Service Qualified Products List (QPL) including approval for use in fixed tank helicopters
3. Shall be UL listed as a wetting agent at 0.25% use rate

NO EXCEPTIONS

### ***Note to Purchasing:***

Vendors must include the following documents with their bid solicitation to validate product compliance with the above specification:

- U.S. Forest Service Qualified Products List
- Underwriters Laboratory (UL) Wetting Agent Listing
- Material Safety Data Sheet (MSDS)
- Outside laboratory test results showing water content percentage

If necessary, justification for the above specification can be obtained from the Fire Department.

## Class A Foam Specification Justification

The Fire Department has set a performance standard based on available industry and governmental information. This standard will provide the Fire Department, its employee's and the citizenry the best Class A foam product available relative to personal and environmental safety, firefighting performance, and firefighting equipment longevity. Informational sources were selected on the basis of independent third party testing.

## Environmental, Health Safety and Corrosion

The U.S. Forest Service produces a specification for foam concentrates. While these specifications do not focus on performance, they do include requirements and limits for environmental, health, safety, and corrosion. Federal users (U.S. Forest Service, Bureau of Land Management, U.S. Fish & Wildlife, Bureau of Indian Affairs, etc.) are **prohibited** from using any products that have not been approved for use by the U.S. Forest Service in Missoula, MT. They conduct these tests to protect the environment, their employees, the public, and their equipment. This approval list is called the QPL or Qualified Products List.

The items and areas that the U.S. Forest Service tests to formulate the Qualified Products list include:

- Fish toxicity
- Oral, and dermal (skin and eyes) toxicity
- Biodegradability
- Corrosion to aluminum, mild steel, brass, and magnesium
- Storage stability for the concentrate

It is important to note that some products on the QPL are not UL listed as wetting agents. The companies have either not UL tested the product or have failed the test. ***To allow products without the UL wetting agent listing, would qualify products that do not perform.*** For example, at one time Fire Choke was on the QPL. It contains about 85% water, has a significantly higher viscosity than other foams (which will result in proportioning difficulties), does not put out a Class B fire, and even at a 1% use rate produces about ½ the amount of foam with essentially no water retention (25% drain time is too fast to measure) compared to other approved Class A foam products.

## Performance

While there is no standardized performance criteria currently available to the fire service, Underwriters Laboratories Inc. (UL), has quantitative, and qualitative test protocols (NFPA 18) that qualify a Class A Foam concentrate as a **wetting agent**. The wetting agent test determines the ability of a product to extinguish

both A and B fires. The lower the concentration percentage by volume, the more effective the product is at extinguishing these fires. Listed wetting agents must be used at the concentration at which they are tested and listed. Tests on other listed wetting agents may have been conducted at considerably higher use concentrations, check when comparing products.

Our specification calls for the Class A foam concentrate to be listed by UL as a wetting agent at 0.25%. This will allow the Fire Department to fight more fire with less product. While the wetting agent criteria is the main attracter to the UL rating, other important factors they also test for include the following:

- Solubility
- Surface tension
- Separation temperature
- Separation during storage
- Performance after freezing
- Ph
- Viscosity
- Nozzle discharge
- Compatibility with fire hose
- Container and product compatibility and durability

## No EPA Listed Hazardous Materials

To explain this standard requires cursory knowledge of Class A foam concentrate and its functional components.

Currently approved concentrates are low viscosity, water soluble liquids ranging in color from clear through yellow to tan. They are slightly heavier than water and tend to be mildly alkaline rather than acidic. Class A foam concentrates usually contain several different functional components:

- **Surfactant or wetting agent.** This is the active part of the concentrate.
- **Stabilizers.** To increase the life of the bubble. Less than 5%
- **Corrosive inhibitors.** Some are inherently low in corrosivity

These components are then dissolved in a hydrocarbon **solvent** such as a alcohol or glycol. The odor and the flammability of the concentrate is generally a function of the type of solvent employed. (Note: One commonly used Class A foam concentrate has a closed cup flash point of 104 degrees F.) The properties of the solvent and the amount present can have a pronounced impact on the temperature at which the concentrate begins to thicken.

It is these solvents that create the hazardous material issue. While some concentrates use other Glycols that are not listed as a hazardous material, 2

concentrates in particular do contain Glycol Ether which is listed by the EPA as a hazardous material. It is the position of the Fire Department that we will not accept concentrates containing EPA listed hazardous materials.

## **Water Content**

Water is used in combination with the solvent (referred to in the previous section) to allow the foam concentrate to flow and be proportioned into the firefighting water stream. The Fire Department requires a concentrate that has less than 50% water content.

It is common in lesser quality foams to have water content as high as 85%. It has become common practice in the industry to water down foam concentrates to provide larger profits since the products are sold by the gallon.

This requirement will assure the Fire Department that we are producing foam solution with the highest efficiency and cost effectiveness. By using less concentrate per gallon of water, our apparatus will be able to produce more finished foam with the least amount of concentrate, allowing more firefighting per fill-up. Less water also means greater freeze protection of the concentrate solution.

All vendors shall provide an independent lab analysis showing concentrate water content. Only products with less than 50% water content will be acceptable.

## **Recommendation**

We request that the specification be maintained as written. It is the Fire Department's desire to set the standard with which all vendors are invited to comply with. Our research information is available should the need arise. These standards will maintain the Fire Department's lead in technology and service to its citizenry.