

Insight: Special Extinguishing Systems Foam

Recognizing the Risk

“Don’t throw water onto a grease fire” is something that you may have heard while growing up. This is to prevent burning grease from splattering onto surrounding surfaces and spreading the fire. Grease fires and fires involving other liquids with a flash point (called Class B fires) are best controlled with a fire extinguishing method other than water alone. In industrial applications, specialized fire suppression agents, including foam concentrates, are the preferred method for most Class B fire hazards.

Examples of a Class B fire is one involving flammable liquids, flammable gases, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, or alcohols. For example, propane, natural gas, gasoline, and kerosene fires are types of Class B fires. These can be found in a wide variety of occupancies ranging from heavy industry to warehousing and even retail. Some of the largest foam systems in the world are found at warehousing facilities. Foam is also carried and used by most public fire departments and brigades officials. For example, in the picture to the right, firefighters are applying a foam blanket over a mock overflowing tank fire.

Controlling the Hazard

The primary benefit from a foam fire extinguishing solution is the ability to quickly put out a fire and not just control it. Foam systems may also provide a lower CAPEX option than water-only fire protection solutions.

1. Foam-water sprinkler systems are designed to extinguish a burning liquid fire (Class B) while water-only sprinkler systems can usually only control and contain the flames (versus putting the fire out).
2. Foam systems can contain fire damage to a smaller area and reduce fire duration. This translates into less damage from heat, smoke, and water as well as less business interruption after the fire occurs.
3. The capability of foam in fire extinguishment can lead to design benefits in terms of less required emergency drainage capacity, and smaller required retention basins.
4. There are some cases where using a foam-water sprinkler system can also reduce the overall volume of fire protection water required by as much as 50% compared to water-only sprinkler systems, implying potential cost savings on fire pumps, tanks, and water supply piping.



Foam Concentrate Tank Supplying Multiple Foam-Water Sprinkler Risers

Foams Containing PFAS

Aqueous Film Forming Foam (AFFF), an industry standard for combatting liquid fuel fires for almost 50 years, is a water-based solution that contains a fluorinated, film forming surfactant (per- and poly- fluoroalkyl substances (PFAS)) to seal the fuel surface during suppression/extinguishment. Because of concerns over safety to humans and the environment, the use of AFFF and other fluorinated foams to extinguish Class B fires continues to be greatly restricted across the globe

from Australia to the U.S. According to a recent publication by the National Fire Protection Agency, the regulations may ultimately impact the distribution and use of AFFF. Many of the commercially available fluorine-free foams have been tested to, and or listed/approved to, the legacy foam test protocols. These include but are not limited to; Underwriters Laboratories (UL), Factory Mutual (FM), European Standards (abbreviated EN), and International Civil Aviation Organization (ICAO) standards.

Inspection, Testing and Maintenance (ITM) for Foam Extinguishing Systems

While there are valuable benefits to using foam extinguishing systems and foam-water sprinkler systems, they are more complex than water-based systems and require additional ITM compared to water-only systems to ensure system reliability and effectiveness. These additional ITM activities can be found in *NFPA 25 Standard for the Inspection, Testing, and Maintenance of Water-based Fire Protection Systems* and *NFPA 11 Standard for Low-, Medium-, and High-Expansion Foam*.

Design Standards, Certifications, Listings and Approvals

There are no one-size fits all foam extinguishing systems. Each system needs to be selected and designed for the specific hazards that are present. The design and installation should follow NFPA 11 Standard for Low-, Medium-, and High-Expansion Foam, the requirements of the Approval / Listing, and the manufacturer's recommendations.

References & Resources

NFPA Fire Protection Research Foundation, Firefighting Foams: Fire Service Roadmap, May 2022

NFPA 11, Standard for Low-, Medium-, and High-Expansion Foam

NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-based Fire Protection Systems

NFPA 30, Flammable and Combustible Liquids Code

*While NFPA documents are the global standard used by AIG, international equivalents may be acceptable.

For more information, contact your local AIG Risk Engineer.

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