



tyco

*Fire & Integrated
Solutions*



Foam Systems Explained

Protecting the process and storage of flammable liquids

a vital part of your world



What we do and how we're committed to doing it for you

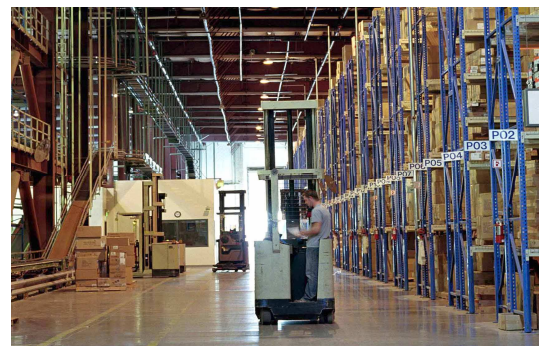
Tyco fire & Integrated Solutions are recognised as the leading provider of quality engineered, cost effective foam fire protection solutions. We pride ourselves on our ability to meet and exceed our client's expectations and requirements with a foam systems 'total solutions' product range that is second to none.



For over 120 years, our dedicated design engineers and project management teams have worked exclusively in "preferred supplier partnerships" in over 17 different market sectors to all international design standards including LPC, BS EN, NFPA, FM Global and many others.

Working in partnership with our sister company Ansul, based in the USA, Tyco Fire & Integrated Solutions provide a wide range of Low, Medium and High Expansion Foam packages that are constantly developed to include "best practice" design, project management and installation. Our expertise in design and engineering

solutions enables us to advise and develop the most cost effective systems to provide high quality, reliable protection and after sales customer service and support.





The effectiveness of foam

Fire fighting foam is made of three ingredients. These are a foam concentrate, water and air. When these three ingredients are mixed, it creates a foam solution that is a stable mass of small, air filled bubbles with a lower density than oil, gasoline or water.

This unique combination makes the foam solution very fluid and enables it to readily flow over liquid surfaces to blanket fuel surfaces. It can quickly suppress flammable vapours, cool burning fuels, and hot surfaces.

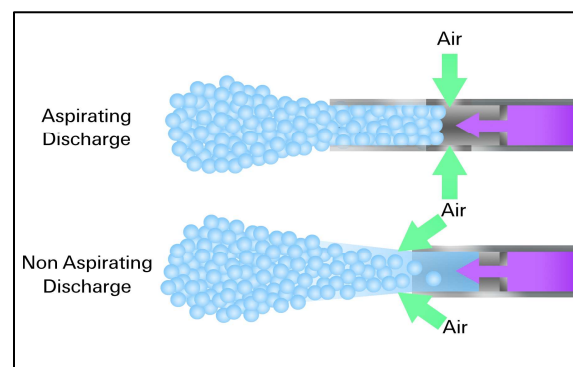
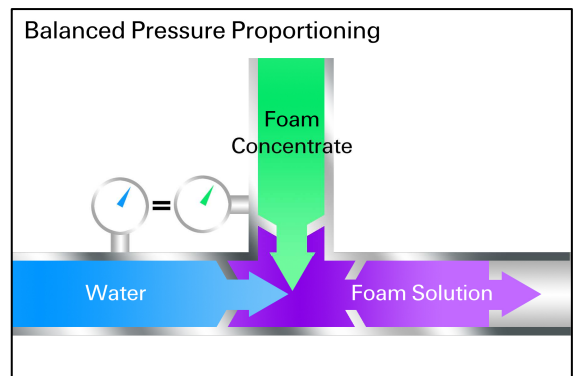
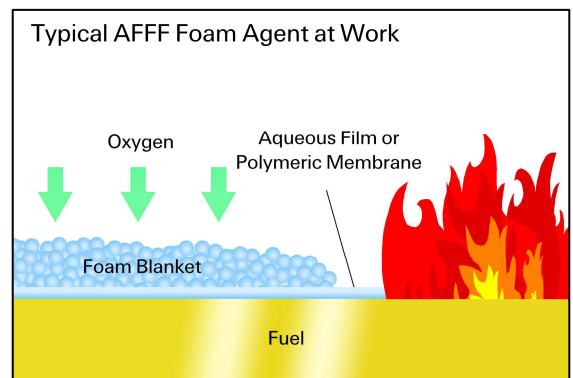
How does foam work

Fire fighting foam agents suppress fire by separating the liquid fuel from the air (oxygen) it needs to burn. Balanced pressure proportioning is the most common method used for foam system applications.

The foam concentrate pressure is balanced with the water pressure at the proportioner inlet allowing the exact amount of foam concentrate to be metered into the water stream.

With an aspirating discharge device, foam solution passes through an orifice, past air inlets, and into a mixing and expansion area to produce expanded foam.

In non-aspirating devices, the foam solution doesn't mix with air until it first passes beyond the orifice and discharge area.



Matching the foam to the hazard

Each type of foam concentrate has various features and benefits, applications and limitations. The right choice means bringing together considerations of the hazard, the fuels involved, proportioning and discharge devices used, codes and standards, maintainability and associated costs.

Class 'A' Foam Agents

Formulated using fluorine-free surfactants, Class 'A' foams reduce the water surface tension to form a clinging blanket that suppresses combustible vapours while cooling the fuel. Applied on the ground or through the air, this foam immediately wets, cools, and insulates a fire. It is especially effective in fighting fires in coal mines, power generation (coal bunkers), tyre and rubber factories, timber mills, paper warehouses, structures and forest fires.

Class 'B' Foam Agents

These types of foam agent are employed to fight Class 'B' fires involving petroleum based products and combustible liquids such as LNG and rubber.

Protein Foams

At 3% concentrate, these foams produce stable mechanical foam with good expansion properties and 'burnback' resistance characteristics. They are ideal for the protection of flammable and combustible liquids where they are processed, transported and stored.

Fluoroprotein Foams

Compared with protein foams, Fluoroprotein foams provide better control and extinguishment, greater fluidity, and superior resistance to fuel contamination. They are used for hydrocarbon vapour suppression and have been widely recognised as being very effective agents for sub-surface injection into hydrocarbon fuel storage tanks.

Film-Forming-Foam (AFFF - FFFP)

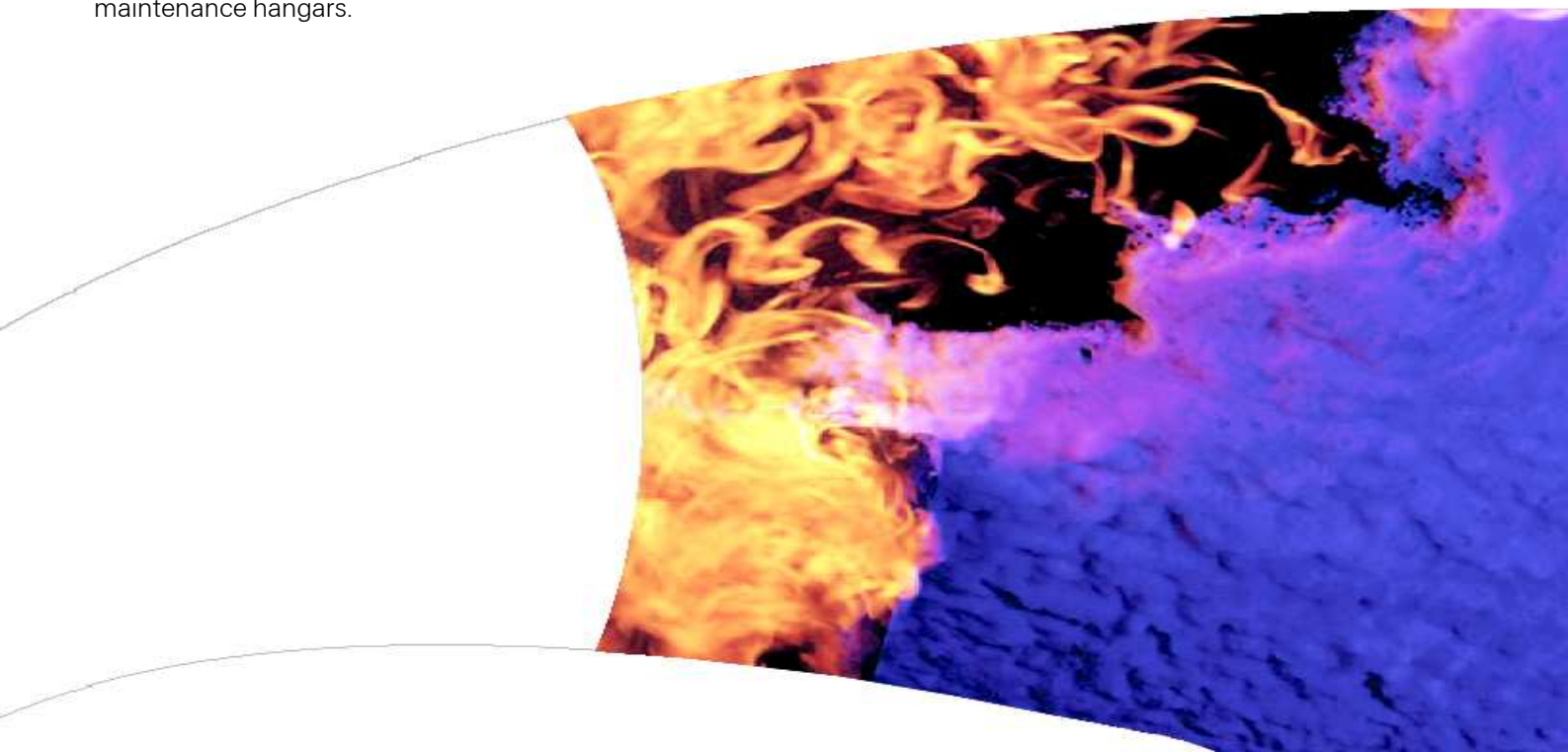
This versatile foam can be applied through a wide variety of delivery systems making it ideal for rapid fire 'Knockdown' in areas such as airports, refineries, manufacturing plants and other operations involving the processing, handling or transportation of flammable liquids.

Alcohol Resistant

A polymeric membrane is added to this foam to prevent the fuels from absorbing water from the foam and impairing its efficiency. This added polymer makes the foam extremely effective on fires involving polar solvents, such as ethanol, as well as hydrocarbon fuels like gasoline.

Synthetic Foam

This detergent based foam is a High Expansion Foam Concentrate used with air aspirating generators for applying foam to large areas in total flooding and three-dimensional applications such as warehouses, ship cargo holds and aircraft maintenance hangars.





Selecting the right foam system design

Selecting the right foam system is rather like buying a car. You need to know how the system will perform, what the running costs will be, how expensive the replacement parts are and how frequently they must be replaced. With these facts in mind, we incorporate products into our design that are made exclusively by our sister company Ansul, which is recognised as the world leader in the manufacture of innovative foam products and equipment.

Proportioning Equipment

This equipment introduces the foam concentrate into a flowing stream of water to produce a foam solution. There are many methods of proportioning, but fixed systems typically use balanced pressure proportioning equipment.



Bladder Tank Systems

These systems use a Fire Authority approved bladder to store foam concentrate.

System water pressure squeezes the bladder, providing foam concentrate at the same pressure to the proportioner. No external power source is required and little maintenance is needed

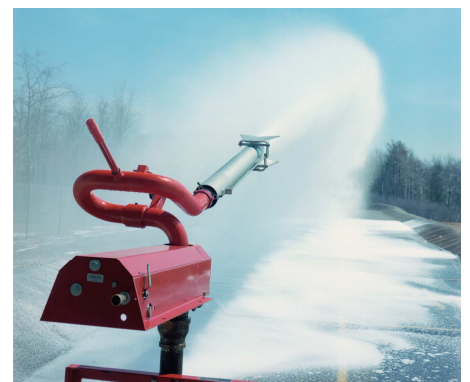


Foam Monitors

Foam Monitors control the horizontal and vertical directions of large capacity discharge streams.

Water-oscillating monitors automatically move side to side using water pressure as the energy source.

Remote Controlled monitors use an electric joystick to control horizontal, vertical and stream pattern. Other monitors are manually operated using a tiller bar or hand wheel.





Sprinkler Discharge Heads

These are available in aspirating and non-aspirating versions. Aspirated sprinkler heads are required for protein and Fluoroprotein foams in deluge systems. Non-aspirated heads used with AFFF agents are more economical and can be used in either open deluge or closed-head sprinkler systems

Foam Chambers and Foam Makers

These air aspirating devices are designed to protect flammable liquid storage tanks by applying foam down the inside of the tank.

Foam Generators

Foam Generators deliver large quantities of expanded foam by blowing air through a screen coated with a high-expansion foam solution. Because of its high-expansion ratio, little water is required to generate large quantities of foam.

Fire Detection and Alarm Control Equipment

In many fire protection applications, an automatic detection and Alarm system is required. Thermal detectors or quick-response flame detectors can be installed to provide input to an electric control panel. The control panel provides vital output functions such as sounding alarms, shutting of fuel pumps, monitoring water flow, supervising valves and actuating foam systems.



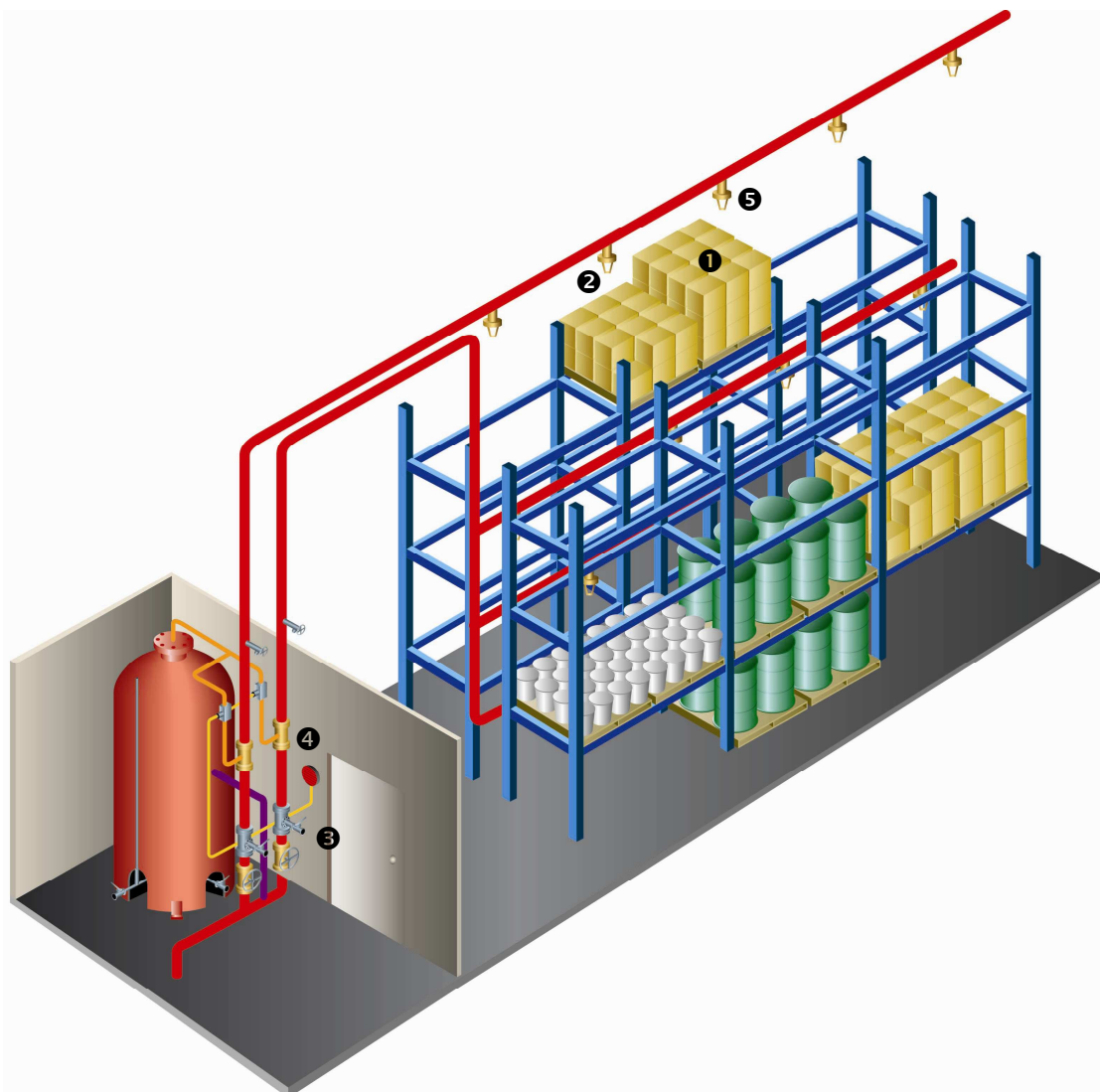
Foam Enhanced Sprinkler Systems

Full scale fire tests conducted by Tyco Fire & Integrated Solutions in partnership with the NFPA have shown that foam enhanced sprinkler systems give superior performance over conventional sprinkler systems in flammable liquid risks. They provide rapid extinguishment, and lower the risk of re-ignition. In addition, they also reduce the system water requirements and minimise the risk of post fire pollution and damage to the environment and wildlife.

The following diagram and description represents the operation of a typical foam enhanced sprinkler system. Although many types of system are available, a basic foam system always requires foam concentrate storage, proportioning equipment, one or more discharge devices, and a manual and/or automatic means of detecting a fire and actuating the system.

Typical operating sequence of a foam enhanced sprinkler system

- 1 Fire breaks out in the rack storage area of a flammable liquid storage warehouse.
- 2 Rising heat ruptures the heat sensing device in the sprinkler heads, starting the flow of water.
- 3 Flowing water through the alarm check valve opens the hydraulic foam concentrate valve to the foam proportioner, if required.
- 4 Foam concentrate flows from the bladder tank into the proportioner where it is mixed with the flowing water at the designed foam solution percentage.
- 5 Foam is generated as the foam solution discharges through the sprinkler heads onto the fire.



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a vital part of your world

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