

**tyco**

*Fire & Building  
Products*

Foam Products

*a vital part of your world*

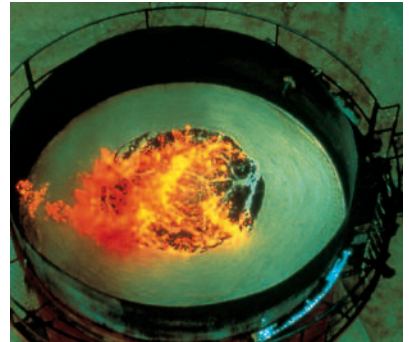
ENGLISH

# Tyco Fire & Building Products Foam Products

Today's technological innovations bring chemical and material fire hazards. Our lines of sprinklers and alarm valves have an excellent record for performance, consistency and dependability. However, many production plants and facilities contain fire hazards that standard automatic sprinklers systems cannot control or extinguish. These are termed "Special Hazards".

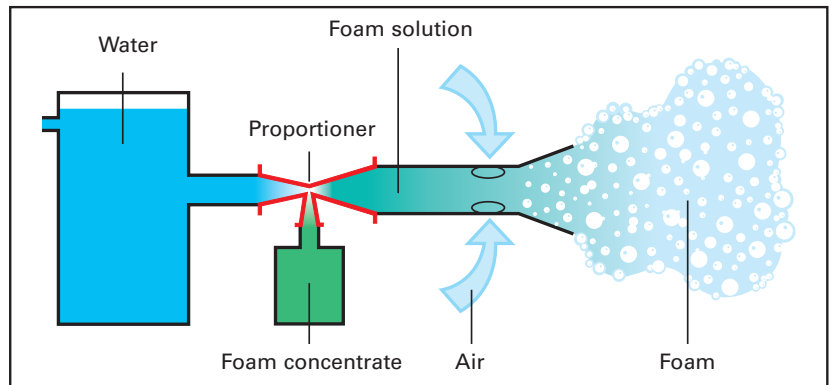
In general a special hazard is classified as an area, process or piece of equipment contained within a facility where conventional methods of fire protection cannot offer adequate safety. Tyco Building Services Products therefore offers a complete range of "Special Hazards" equipment designed to meet the needs of these particular facilities. Within our range of products we offer Foam Concentrates, Fixed Foam Hardware, Aquamist Nozzles and Control Valves in various materials such as Stainless Steel and Titanium (others available upon request).

Please view our range of equipment for a better understanding of the products to be used in your Special Hazards fire protection systems. If you require further information, please contact your local sales office; one of our product specialists will help you make the right choice for your specific application.



# What is Foam?

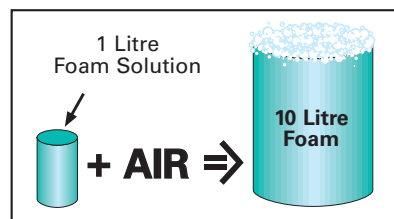
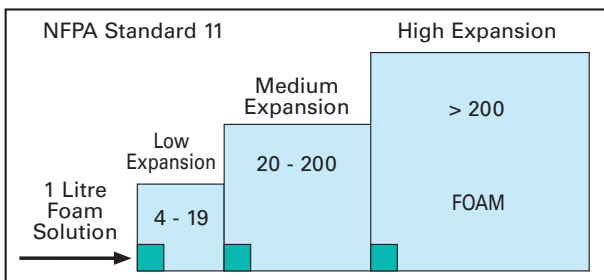
Foam is a collection of air-filled bubbles. Foam is made up of three ingredients; water, foam concentrate and air. Unlike cleaning foams, fire-fighting foam is resistant to fire. Many firefighting foams also contain chemicals like Fluorine, which prevent combustion. Water is mixed with a foam concentrate (proportioned) to form a foam solution. Foam is aerated by forcing foam solution through foam making equipment (i.e. discharge devices).



## Expansion Ratio

Expansion ratio is the ratio of foam solution to expanded foam.

For example: 1 litre of foam solution expanded 10 times with air, equates to a 10 to 1 expansion.



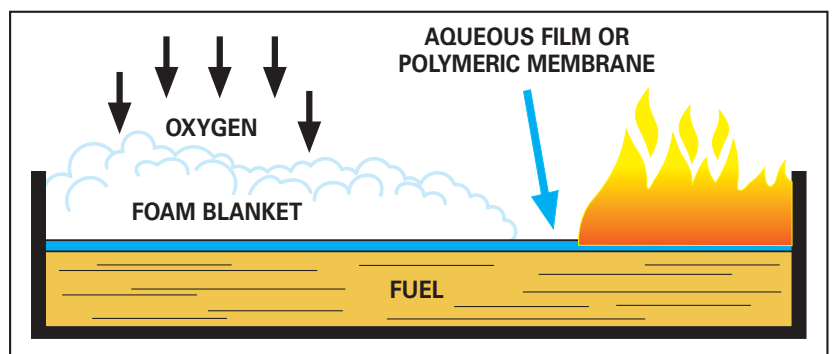
## How do foam agents work?

Foam solution extinguish fire utilising five main assets:

1. Unlike water, foam is less dense than the burning liquid or combustible material; therefore it floats and creates a continuous foam layer.
2. This foam layer prevents air (oxygen) from reaching the liquid and smothers the fire.
3. Containing the fire in this manner ensures that no vapors are able to escape. If able these vapors would re-ignite upon contact with the atmosphere due to re-oxygenation.

4. Due to the high water content in the foam, the fuel surface rapidly begins to cool resulting in a less volatile situation.

5. Fluorine in some foam terminates the combustion chain reaction thus preventing any potential for further combustion.



## Foam agents

Foam is used to extinguish flammable liquid and combustible material fires, to control the release of flammable vapors, and to cool fuels and sources of ignition. Foam concentrate is available in a variety of options:

### **AFFF**

AFFF is a totally synthetic concentrate that reduces the surface tension of water to form an aqueous film on Class B hydrocarbon fuel fires. It is available with or without freeze protection in concentrations of 1%, 3% or 6%.

### **AFFF ARC**

AFFF ARC is a totally synthetic alcohol resistant concentrate, which contains a polymer that forms a protective layer on water-soluble Class B fuels. The concentrate is available with or without freeze protection, in concentrations of 1% or 3% for hydrocarbon fuels and 1%, 3% or 6% for watersoluble liquid fuels.

### **FFFP ARC**

We offer a full range of protein-based foam concentrates, including alcohol resistant film forming fluoro-protein. Fluoroprotein and FFFP concentrates are highly resistant to fuel contamination; making them suitable for sub-surface injection in hydrocarbon storage tanks.

### **Multi-Purpose**

Multi-Purpose foam concentrates are based on synthetic detergents. They are useful for total flooding high expansion systems and to disperse and control flammable vapors.

### **Silv-Ex**

Silv-Ex is the original Class A foam. It is especially effective on forest and coal fires and in Class A storage areas.



## Bladder Tank Systems

Balanced pressure bladder tank systems use a pressure tank with an internal nylon-reinforced elastomeric bladder. System water pressure is used to squeeze the bladder containing the foam concentrate providing pressurized concentrate to the proportioner. The resulting foam solution is piped to discharge devices protecting the hazard area. A distinct advantage of bladder tanks is that no external power supply is required other than a pressurized water source. Due to the tanks containing no moving parts, bladder tanks require very little maintenance. We offer horizontal and vertical tanks, with capacities from 135 litres to 11,000 litres.



## Proportioners

Proportioning is the introduction of foam concentrate at a defined percentage into a flowing stream of water to produce a foam solution. Accurate proportioning is essential for optimum foam system performance.

In-line balanced pressure proportioners offer the advantage of proportioning concentrate in several locations remote from a common pump and agent storage tank. Various sizes can be combined in a single system to match the required flows. Line proportioners can prove most economical when water supply pressure is sufficiently high. Individual units are designed to proportion correctly at specific water pressures and flow rates in conjunctions with atmospheric tanks.

## Foam Discharge Devices

A special discharge device is required to aerate the foam solution where flow rates or expansion ratios are higher than can be produced by a sprinkler, or where the foam must be introduced in a controlled manner. We offer a wide range of devices for fixed systems and for fire fighters including low, medium and combination branchpipes, floating roof foam makers, foam chambers, high expansion foam generators and various discharge nozzles.



# Typical closed head sprinkler foam system

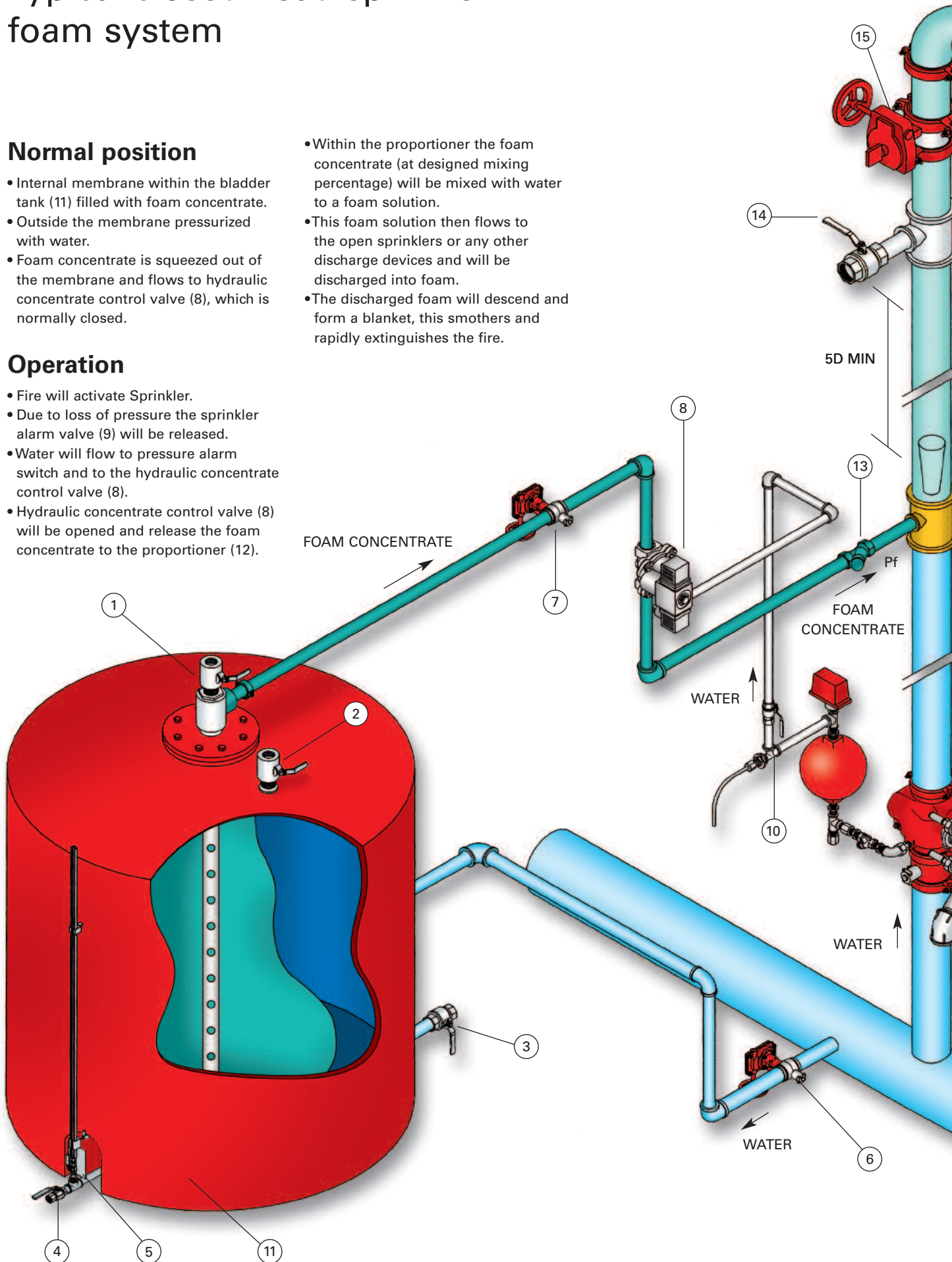
## Normal position

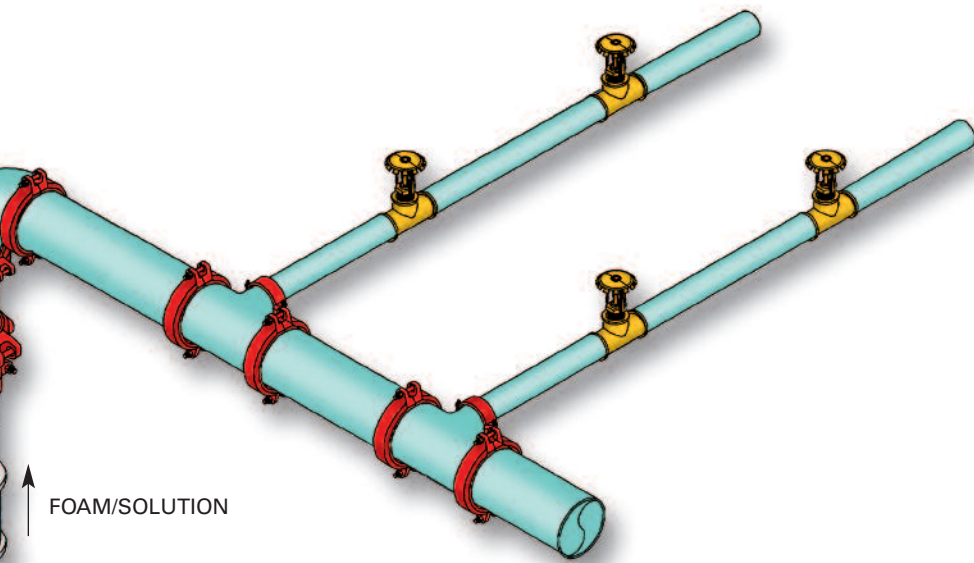
- Internal membrane within the bladder tank (11) filled with foam concentrate.
- Outside the membrane pressurized with water.
- Foam concentrate is squeezed out of the membrane and flows to hydraulic concentrate control valve (8), which is normally closed.

- Within the proportioner the foam concentrate (at designed mixing percentage) will be mixed with water to a foam solution.
- This foam solution then flows to the open sprinklers or any other discharge devices and will be discharged into foam.
- The discharged foam will descend and form a blanket, this smothers and rapidly extinguishes the fire.

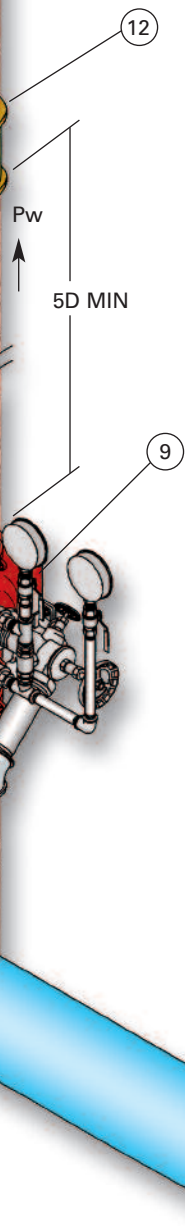
## Operation

- Fire will activate Sprinkler.
- Due to loss of pressure the sprinkler alarm valve (9) will be released.
- Water will flow to pressure alarm switch and to the hydraulic concentrate control valve (8).
- Hydraulic concentrate control valve (8) will be opened and release the foam concentrate to the proportioner (12).





$\Delta P_w - P_f = \text{max. } 0,2 \text{ bar (3 Psi)}$   
 $P_f = \text{Foam concentrate pressure}$   
 $P_w = \text{Water pressure}$



### Main system components

Pos.	Description	Normal Position
1	Bladder vent/fill valve .....	Close
2	Tank shell vent valve .....	Close
3	Tank shell drain valve .....	Close
4	Bladder drain/fill valve .....	Close
5	Sight gauge valve (level indicator) .....	Close
6	Valve water supply bladder tank .....	Open
7	Valve foam concentrate supply proportioner .....	Open
8	Hydraulic concentrate control valve .....	Close
9	Alarm valve .....	Close
10	Valve water supply to pos. 8 .....	Open
11	Vertical bladder tank .....	-
12	Proportioner* .....	-
13	Check valve .....	-
14	Valve test connection .....	Close
15	Stop valve .....	Open

\* Use wide range proportioner for sprinkler alarm systems with closed heads.

### Calculation example foam concentrate

Total water flow demand calculated: 3900 l/min (15 mm/min @ 260 m<sup>2</sup>)  
 Foam concentrate: AFFF 3%  
 Duration of foam: 30 minutes  
 (As per NFPA or other Standard)

#### 1. Calculate foam concentrate demand

Total demand = total flow x mixing percentage x duration + test demand (10%)  
 = 3900 x 0.03 x 30 x 1.10  
 = 3861 litres foam concentrate

#### 2. Bill of quantities

All components as prescribed above in Main System Components, where:  
 Bladder tank capacity is 4000 litres  
 Proportioner; suitable for flow of 3900 l/min  
 Foam Concentrate required 4000 Litre AFFF 3%

# We deliver the complete line!



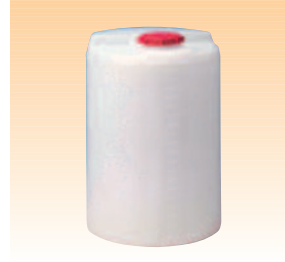
## Foam agents

We offer a wide range of foam agents: AFFF, ARC, FFFP, FFFP ARC, Multiple-Purpose, Silv-Ex.



## Bladder Tanks

Horizontal and vertical  
Capacity: 135-11000 litres.



## Atmospheric Tanks

Polyethylene for inductors and foam pumps  
Capacity: 200-10000 litres.



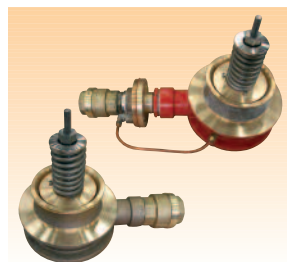
## Foam skids

Pre-assembled foam skids.



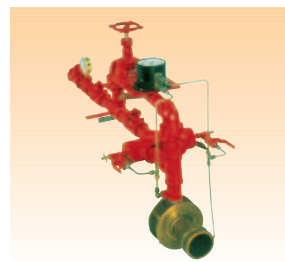
## Balanced pressure proportioners

For bladder tank and foam pump systems  
DN80-200, 300-13000 l/min.



## Wide range balanced pressure proportioners (WRP)

For bladder tank and foam pump systems  
dn150-250, 100-15000 l/min



## In-line balanced pressure proportioners (IBP)

For foam pump systems, proportioning remote from tank.  
dn50-200, 100-15000 l/min



## Inductors

Used in conjunction Atmospheric Tank Systems and can be supplied in various sizes, flow rates and pressure. These units can be designed to your actual requirements.



## Foam sprinklers and nozzles

Available with various K-Factors, discharge patterns and different functions. We are able to supply these in special materials upon request.



## Fixed and portable discharge devices

Low/medium expansion foam branchpipes, foamchambers, floating roof foam makers.



## High expansion foam generators

Expansion ratio up to 800:1



## Monitors and nozzles

(Non) Oscillating, portable or fixed.  
1000 l/min-12000 l/min.



## Alarm valves

Wide range of alarm and deluge valves along with various accessories.



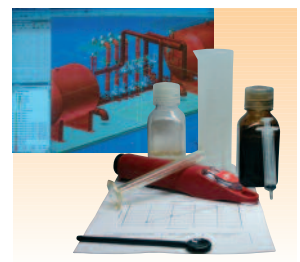
## Titanium products

For corrosion resistance and low weight; Sprinklers, Nozzles, Deluge valves, Alarm valves, Shut-off valves.



## Twin agent systems

Most effective Suppression by combining the flame knock down characteristics of dry chemical with the cooling features of AFFF.



## Technical support

Specialists for supporting customers in engineering foam fire protection systems and solving problems.