



**ANGUS
FIRE**



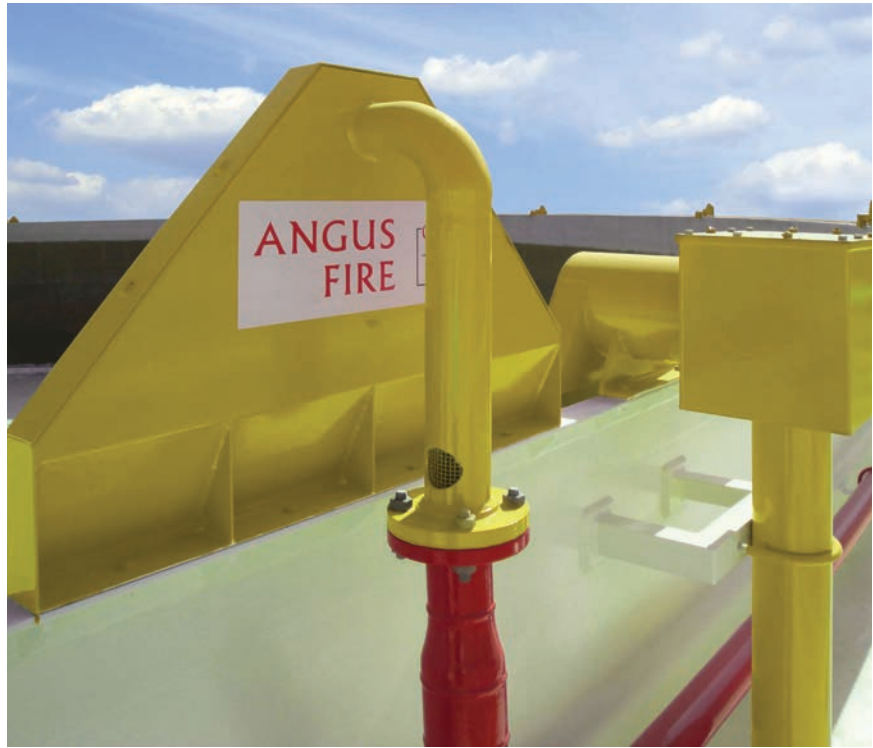
Fixed Foam Equipment

Fixed Foam Equipment

Angus Fire manufactures an extensive range of Fixed Foam Equipment for Tank Protection and other applications. When it comes to fire protection you can count on Angus Fire's long standing expertise in supplying reliable, superior quality products, which are durable and low maintenance.

The Fixed Foam Equipment range includes both foam delivery and proportioning devices. From a range of foam pourers to foam generators, bag tanks and inline inductors, Angus Fire offers you a great choice for your fire protection requirements.

For further information on tank fire protection please refer to the Angus Tank Protection Brochure.



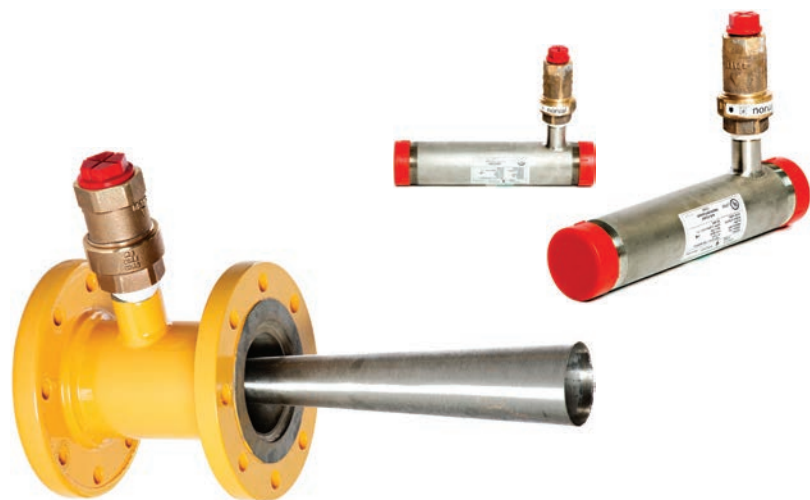
Foam Proportioning – essential for firefighting performance

Foam proportioning is the heart of a fire protection system. The selection of the correct proportioning system is of paramount importance to ensure foam is delivered at the required application rate to extinguish the fire. Not enough foam can lead to unsatisfactory performance, too much foam will waste resources and money. The foam solution demand can be constant or variable depending on the type of risk or the system design. Generally foam proportioning products include the following:

- Fixed In-line Inductors.
- Bag Tanks.
- Balanced Pressure Foam Proportioners.
- Balanced Valves.
- Helijector.

Fixed In-line Inductors

- Provide a simple and reliable method of proportioning foam concentrate in constant flow applications.
- Mostly used to supply foam solution to fixed installations such as tank and bund protection foam water nozzle systems.
- Deliver the required performance when calibrated to provide a specific flow that does not fluctuate.
- Suitable for use in extreme environments.



Foam Delivery

Top Pourer Sets – TPS MK4 /TPS MK5

Top Pourer Sets are used to protect storage tanks with fixed roofs. They are installed on the outside of the tank, with the nozzle penetrating through the tank wall to deliver foam above the high fuel level.

- Combine vapour sealing (to keep the tank contents from escaping) with foam generation via a uniquely engineered nozzle that pulls the finished foam back onto the internal tank wall in a butterfly pattern.
- Calibrated with the available pressure to match the specific flow demanded by the individual tank.
- Two types available, each in 4 sizes with flow rates from 75lpm up to 3,300lpm at operating pressures between 3 bar and 10bar.
- MK5 for tanks with internal pressure not exceeding 1.5psi.
- MK4 for tanks having nitrogen or other inert gas blankets.



Rimseal Pourers

Rimseal Pourers are installed on the edge of the tank wall to protect the rimseal area of floating roof tanks. The unique design of the Angus rimseal pourers produces well-formed free flowing foam.

- Low profile ensuring the foam flow is not affected by high wind.
- Foam always reaches the rimseal even if the roof is at its lowest level in the tank.
- Consists of two elements – the Rimseal Foam Generator (RFG) which produces expanded foam when supplied with foam solution, and the Rimseal Foam Pourer (RFP) which delivers the foam gently into the rimseal area.
- Flow rates from 54 litres/minute at 4 bar to 250 litres/minute at 10 bar g.
- Fixing kit to allow Angus Rimseal Pourers to be retrofitted to tanks without the need for hot work.
- One piece unit (combining the RFG and RFP) is available with a flanged inlet.



Full Surface Top Pourers (FSTP)

Used with floating roof tanks of a diameter greater than 60m, where the fire fighting system must be designed for the worst case scenario of a full surface fire. The Full Surface Pourer will deliver the higher flow rates required to extinguish a fire that has spread from the rimseal to the full surface of the roof. Compared with Rimseal Pourers the Full Surface Pourer will deliver up to 4 times as much foam.

- Specially designed outlet delivers foam on to the tank wall so that it 'flows' on to the burning fuel providing gentle foam application.
- 4 sizes with flows from 75lpm up to 3,300lpm at operating pressures between 3 bar and 10 bar.
- Live fire tested.

Full Surface Nozzle

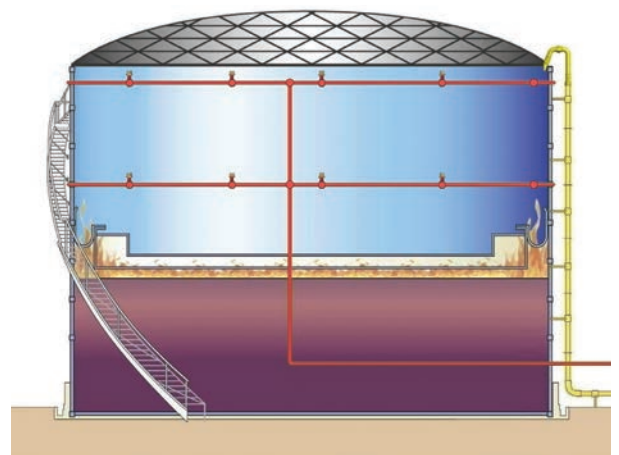
Used in conjunction with the FSTP on large diameter floating roof tanks. Good fire system design estimates that foam will typically flow a maximum of 30m, leaving a doughnut ring in the centre of a large diameter tank that cannot be reached with conventional pourers.

- Features a long throw – up to 50 metres, which will deliver finished foam to the "dead spot" in the centre of the tank.
- The combination of a Full Surface Pourer and Full Surface Nozzle will give complete coverage of the roof area in the event of a major incident or collapse of the floating roof.

Geodesic Foam Pourers

Installed through the geodesic dome roof on floating roof tanks. The unit is a slim profile, low expansion pourer that uses self-supporting pipework without being attached to either the roof or the tank wall.

- Comprises of a RFG (foam generator) and Low level foam pourer (LLP) as standard, with the interconnecting pipe work designed as a bespoke fitting for each tank.
- Produces well-formed free flowing foam that always reaches the rimseal even if the roof is at its lowest level in the tank.
- Operating pressure between 3 and 10 bar.
- Flows from 75lpm through to 250lpm.



High Back Pressure Foam Generators



Used in subsurface foam injection systems, (often referred to as base injection) which are primarily designed for the protection of fixed roof storage tanks containing hydrocarbon fuels. They are particularly favoured for use in Aviation Tank Farms.

- Designed to operate against a 35% back pressure from the tank liquid.
- Available in six models, with foam solution capacities from 225 litres/minute to 3400 litres/minute.

Foam Water Nozzles



The K40 and K20 Foam/Water nozzles are air aspirating discharge heads. They are installed in fire protection systems where a low expansion foam application is needed.

- used in high risk situations where mixed risk flammable liquids are stored.
- Suitable for water cooling application.
- The K40 meets the 6.5 litres/m²/min application rates of NFPA.
- The K20 delivers an application rate of 4.1 litres/m²/min.
- Both designs produce finished foam with an expansion ratio 5:1 to 7:1 over a 1 - 7 bar (15 - 100 psi) operating range.
- Manufactured from 316 stainless steel.



Medium Expansion Bund Pourers



Medium Expansion Bund Pourers are designed for fire protection systems and vapour suppression on banded or diked areas surrounding flammable liquid or toxic chemical storage tanks.

- Corrosion resistant high grade stainless steel, and fitted with bronze nozzles.
- Operating at low pressure minimises both pumping capacities and water requirements, making the units ideal for retrospective installation.
- Once installed, the MEX Bund pourer needs little maintenance.

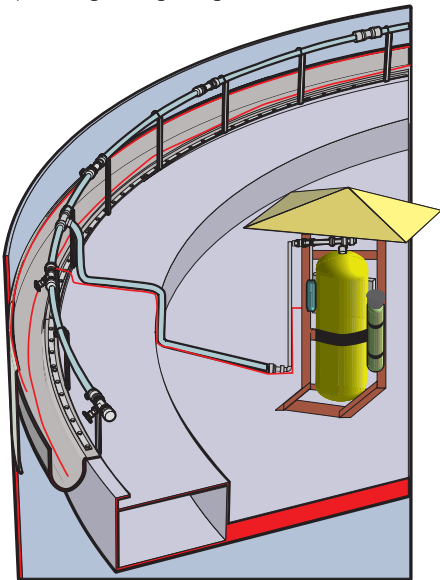
Turbex LNG Systems & Skids

- Used to protect LNG/LPG collection pits in liquefaction plants, and storage and loading plant facilities.
- Meets the demanding performance requirements of the NFPA 11A LNG Fire test, where performance must be unaffected after exposure to extreme temperature up to 1000°C during a 5 minute preburn period.
- Available as self-inducing units
- Can be Skid mounted and supplied with stainless steel discharge hood.
- Versions for industrial applications available.



Floatafoam

The Floatafoam System comprises a number of fully automatic, self-contained foam delivery modules that will detect and extinguish floating roof tank rimseal fires in their infancy. Each module protects 40m of tank perimeter. They can be set up to operate independently, with each protecting its own 40m segment of roof. Alternatively they can be linked with other Floatafoam units to fire off simultaneously to provide maximum protection against the risk of the fire spreading or reigniting.



Floatafoam systems are designed by Angus Fire's engineering department (AFE). They can be tailored to suit your specification. Optional extras include:

- Vessels, foam container, skid and pipes manufactured in 316 stainless steel.
- Low level alarm switches on foam and water containers.
- Option of either electrical Linear Heat Detection or Nitrogen charged thermoplastic tubing.
- Full BS5500 certification package.



Helijector

Developed primarily for offshore helideck monitor protection, Helijector is a self contained skid-mounted foam proportioning system, comprising a foam storage tank, water turbine, foam pump and all interconnecting pipework. All components are manufactured from materials accepted for offshore use and are mounted within a robust steel framed skid.

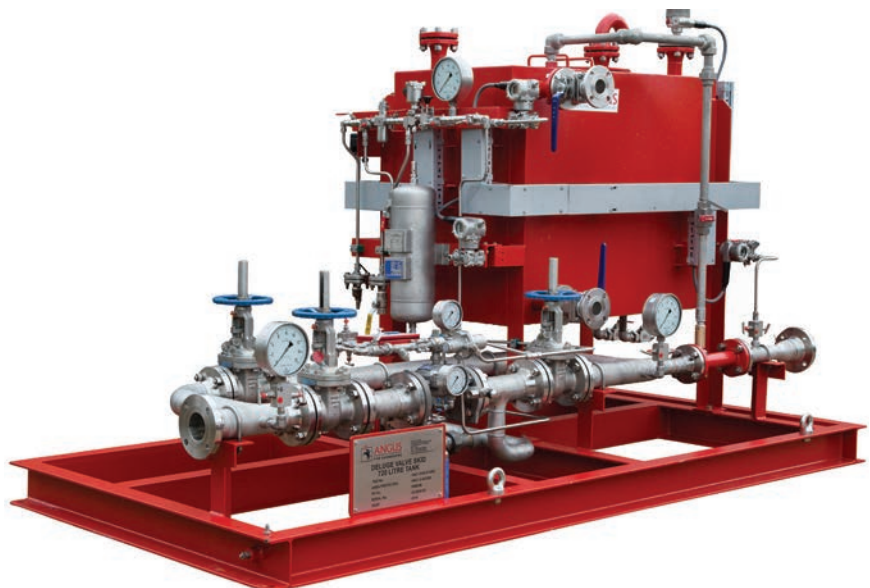
- Available in three sizes to match constant flow rates of 900, 1800 and 2700 litres/minute at 7 bar.
- Complete Helijector systems for offshore helideck protection are designed and supplied by Angus Fire Engineering, (AFE).



Angus Fire can help you to design bespoke fire protection systems. Angus Fire Engineering, (AFE) is a leading fire engineering contractor and specialises in high fire risk industries such as oil, gas, petrochemical, marine, aviation and power generation.

Fully qualified design engineers have a wealth of technical and hands-on experience, and all systems are designed in compliance with the latest standards including NFPA.

AFE offers surveys, consultancy, project management, design and engineering, documentation, procurement, equipment supply, fire testing, installation, commissioning and maintenance.





Bag Tanks

Bag Tanks, often referred to as Bladder Tanks, are free-standing pressure vessels fitted with an internal bladder to hold foam concentrate. They are operated by water pressure, which fills the void between the bladder and tank, to squeeze the foam concentrate into the foam proportioning device.

Bag Tanks should be used with balanced pressure proportioners which will balance the foam concentrate supply with the water pressure.

- Self-contained, no external power source required for operation.
- Accurate foam proportioning over a wide range of foam solution demands.
- Supplied with interconnecting pipework terminating at valved connections for water inlet and foam concentrate outlet.
- Available in capacities up to 15000 ltr.
- Vertical and horizontal options.
- Can be supplied pre-piped with a proportioner.



Balanced Pressure Foam Proportioners

Balanced Pressure Foam Proportioners (BPPs) are used extensively in fixed systems to introduce foam concentrate at a predetermined rate into the firewater supply.

The advantage of Balanced Pressure Proportioners over fixed inductors is that they can induce foam over a varying range of foam solution demands where a number of discharge outlets may be required to operate individually or simultaneously. All models can be calibrated to proportion at rates of 1%, 2%, 3% or 6%.

Balance Valves

Balance Valves are used with Balanced Pressure Proportioners (BPPs). They provide a reliable and cost-effective way of ensuring balanced pressure foam proportioners perform accurately over a range of flows and pressures. They do this by balancing the pressure of the foam concentrate entering the proportioner with the pressure of the water at the inlet.

- Fitted with a duplex pressure gauge, as standard, to give a visual confirmation that the unit is functioning correctly.
- Available in three sizes to match the flow of Angus BPPs.
- Made from gunmetal with stainless steel components for maximum corrosion resistance.



Foam Concentrates

The choice of foam concentrate goes hand in hand with the selection of fixed foam equipment. Choosing the correct foam concentrate will provide the maximum performance from the fixed equipment. Differing applications demand different types of fixed foam devices, and put different demands on the foam concentrate to be used. Therefore, selecting the correct foam type along with the equipment is vital.

- Fuel Type – whether the risks to be protected are solely hydrocarbons, or Polar Solvents, or a mixture of both.
- Fuel Tolerance – the ability of the foam to resist fuel pick-up – when applied forcefully through Type II and Type III devices (as defined by NFPA), or using High Back Pressure Generators.
- Burnback and reignition resistance – the stability of the foam blanket against direct heat and flame impingement, and its life determined by the drainage time - both properties influenced by, firstly the choice of a slow draining foam concentrate, and secondly, the fixed foam delivery device expanding (or aerating) the foam solution sufficiently to make a well formed stable foam blanket.

The Physical properties of foam also play a part in the choice of fixed foam induction equipment, particularly the foam's viscosity, especially in low temperature environments where the concentrate can become viscous making it difficult to induce accurately. Where mixed risks exist and the selection of Alcohol Resistance foam is required care should be taken to ensure that the fixed foam induction device can perform with the selected foam. The consistency of this class of foam concentrate can be anything from "runny honey" to the equivalent of "wall paper paste" which can make foam proportioning more difficult and less accurate. In these cases a high fluidity Newtonian type foam concentrate should be used coupled with a Balanced Pressure Proportioner rather than a fixed inductor.



Approvals

The relevant International approvals should be factored in to the marrying of equipment with foam concentrate, as having the correct approvals can influence the cost of insuring a facility. UL in particular is sought after by many major international companies involved in the production, refining and/or storage of fuel and petrochemicals. It is very specific about approving the equipment and foam concentrate together, to provide an evidenced based minimum level of performance for the system as a whole.



Angus Fire

Angus Fire is a global leader in firefighting technology. In more than 100 countries Angus Fire supplies fire safety products and services to customers operating in a wide range of industries such as oil companies, international airports, harbours, ports, military bases, power stations, and of course to fire and rescue services. Angus is a global name with an impressive history of over 220 years in the firefighting industry. It is this rich heritage and associated expertise, which put Angus Fire at the forefront of the fire industry and makes the company the preferred partner with firefighters worldwide.

