# Wasp Systems

**Foam proportioning technology for closed-head Foam-Water Sprinkler Systems (FWSS)**

- Reliable
- Simple in operation and independent of external power sources
- Accurate foam mixing into the water supply
- Fast response proportioning

The Angus Fire **WASP System** represents a major advance in foam proportioning technology for closed-head Foam-Water Sprinkler Systems (FWSS). The **WASP System** meets four key criteria now being demanded by many insurance organisations and loss prevention consultants:

1. To proportion accurately across the full sprinkler system flow range and fully meet the stringent requirements of NFPA16A:1988.
2. To be reliable, simple in operation and independent of external power sources.
3. To discharge foam at the correct induction rate immediately the first one or two heads operate. This is critical for rapid fire control. Fast response proportioning will minimise financial losses.
4. Simplicity of installation, to give a cost effective 'plug-in' system.

The heart of the **WASP System** is the Wide-range Accurate Sprinkler Proportioner (WASP), which is mounted on a WASP bag tank containing Alcoseal 3-3 AR-FFFP multi-purpose foam.

Standard foam proportioning devices are designed for dry pipe deluge type systems, and therefore cannot operate under the very low flow conditions imposed by a wet pipe FWSS.

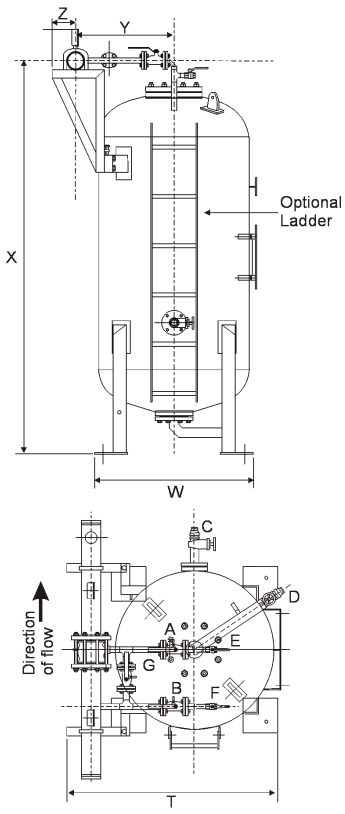
Fast response sprinkler heads are increasingly being chosen to provide quick operation for permanently flooded systems, in recognition that early action provides fast control and minimises resulting loss and damage.

The Angus Fire **WASP System** has been specifically engineered to achieve the fast response proportioning necessary to obtain this rapid control and extinction. The **WASP System** uniquely provides accurate foam mixing into the water supply from the first one or two heads operating up to the maximum operating head scenario. It fully meets the stringent accuracy requirements of NFPA16A:1988 and BS5306 section 6.1:1988. Fast accurate proportioning by the **WASP System** at this early stage is crucial, to avoid serious escalation of the incident, and prevent potentially massive consequential losses.

Flammable liquid warehousing and processing areas, rarely store a single liquid and the inventory frequently changes. Usually there is a cocktail of flammable liquid. The choice of Alcoseal 3-3 AR-FFFP foam ensures that the FWSS will be highly effective not only on hydrocarbon liquids but also on the more aggressive polar solvents which attack and destroy standard foam types. Alcoseal 3-3 AR-FFFP is induced at 3% for all these risks, minimising the size of **WASP** bag tank required and providing the most compact, cost-effective solution.

The **WASP System** is powered by the sprinkler water supply and so performance is not affected by electricity power failures.

In order to fully meet the varied demands of FWSS designs, the **WASP System** is available with three sizes of **WASP** proportioner matched to five sizes of **WASP** bag tank.




**VALVE KEY**

A = Foam Outlet Valve
B = Water Inlet Valve
C = Water Drain, Fill Valve
D = Foam Drain, Fill Valve
E = Bag Vent (Foam Concentrate)
F = Vessel Vent (Water)
G = Flushing Valve

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Table 2 will help you select the **WASP System** to meet your particular requirements.

Designed with retrofitting in mind, each **WASP System i**s factory calibrated and fully tested for quick and simple 'plug-in' installation. Inlet and outlet connections to the WASP System are machined for use with standard Victaulic couplings, to simplify positioning in the FWSS.

In each **WASP System** the **WASP** proportioner is conveniently offset from the centre line of its dedicated bag tank to facilitate easy connection to existing sprinkler pipework layouts. This allows each **WASP System** to be located close to the wall, further reducing the space required for installation.

Additional design considerations allow Angus Fire **WASP Systems** to be located upstream or downstream from the Sprinkler Alarm Control Valve. Should a back flow be caused by other parts of the system, the internal design enables the **WASP** to act as a partial non-return valve, when mounted in the less conventional upstream position. This feature minimises not only the risk of diluting the foam concentrate stock, but also the risk of foam migration into the pipework when the **WASP System** is in its "ready to go" state.

The **WASP System** is also designed to thoroughly mix foam concentrate into the water supply even at low flows, preventing globularization or globular drop out, which can occur when AR foams are used with some standard proportioners. This is particularly important in a wet pipe FWSS where an accurate, stable and uniform AR foam solution is required behind each head.

Each **WASP System** can be supplied in either left hand (LH) or right hand (RH) versions, depending upon whether the water flow is entering the **WASP** proportioner from the left or right side. This must be clearly specified when ordering.

To prevent unintended closing of the foam supply to the FWSS once the **WASP System** is set for operation, padlockable foam and water valves are supplied so they will lock in the open or closed position as an additional safety feature. A flushing line is also provided for use after the FWSS pipework is refilled with Alcoseal 3-3 AR-FFFP foam solution, following operation or annual test. Once again a padlocked valve ensures flushing can only take place when supervised by authorised personnel. Such features instil long term reliability into this low maintenance trouble free system. The water drain and foam fill valves can also be more tamperproof to avoid interference.

Two pressure gauges are fitted either side of the **WASP** proportioner to allow simple pressure drop tests to indicate correct **WASP** operation during routine annual testing. A 50mm (2") test connection is provided to allow foam solution samples to be tested, or to allow connection to test sprinklers replicating low flow conditions outside the risk area.

This connection can also be used to drain premix solution from the FWSS as necessary.

It is recommended that foam induction accuracy tests are conducted at least annually in accordance with NFPA16A:1988.

To avoid unforeseen problems or delays, fast bag tank commissioning and foam accuracy testing is also available by specialist foam system engineers, who are trained to ensure a trouble free system handover. For further assistance consult Angus Fire.

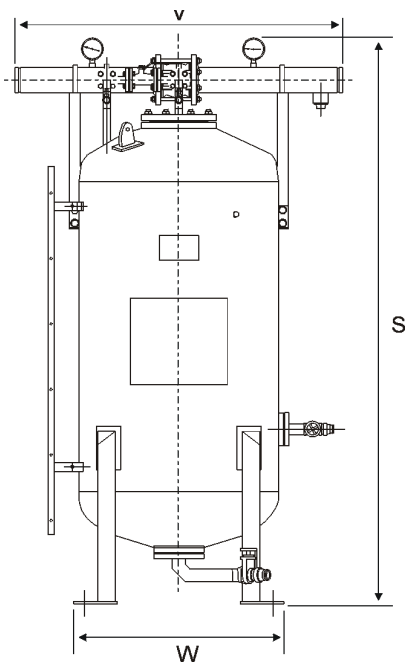


**TABLE 1**

| | WASP 100 | WASP 150 | WASP 200 |
|---|---|---|---|
| Pipeline size in mm (in.) | 100 (4) | 150 (6) | 200 (8) |
| Foam concentrate used | | Alcoseal 3-3 AR-FFFP | |
| Max. operating flow range (litres/min) | 100 - 1900 | 150 - 4200 | 200 - 7500 |
| Recommended minimum flow (litres/min) to meet NFPA 16A:1988 | 150 | 180 | 240 |
| Recommended maximum flow (litres/min) to meet NFPA 16A:1988 | 1800 | 3300 | 6000 |
| Pressure loss across unit at the recommended maximum flow (NFPA) | 1.25 bar.g. | 0.75 bar.g. | 1.35 bar.g. |
| Recommended minimum working pressure | | 3 bar.g. | |
| Recommended maximum working pressure | | 16 bar.g. | |
| Pressure loss across unit at the maximum operating flow | 1.3 bar.g. | 1.25 bar.g. | 1.9 bar.g. |

# Wasp Systems

**Foam proportioning technology for closed-head Foam-Water Sprinkler Systems (FWSS)**

TABLE 2

How to quickly define the WASP System you will need.

**Determine the maximum flow (Q) of your sprinkler system** (in litres per minute).

To do this you must establish:

(i) 'K' factor of your existing sprinkler heads (flow at one bar.g. in litres/min).(in the example we use 'K= 80').

(ii) Maximum number of heads planned to operate (N) (in the example we use 27).

(iii) Water pressure (P) at the heads (in bar.g.) under this maximum operating head scenario (in the example we use 2.3 bar.g.).

1. Now calculate the maximum flow Q (litres/min), using the formula: **$Q = (K\sqrt{P}) \times N$**

   e.g. **Q** = $(80 \sqrt{2.3}) \times 27$

   = 3,276 litres/min

   Select from Table 1 the ***WASP*** flow range to suit your maximum flow Q above, and note the ***WASP*** pipeline size (mm). (in the example we need 150mm ***WASP***)

2. The foam concentrate most suited to your existing and future mixed Hydrocarbon and Polar Solvent liquid inventory is Alcoseal 3-3 AR-FFFP, for accurate 3% proportioning, exceptional fire performance and minimal environmental impact.

3. Determine the maximum foam operating time t in minutes for your system (usually 10 mins).
   Now calculate the bulk Alcoseal 3-3 AR-FFFP foam concentrate requirement (A) to operate the system (in litres).

   **A** = Q x 3% x t

   e.g. **A** = 3,276 x 3% x 10

   = 983 litres of Alcoseal 3-3 AR-FFFP

   Select from Table 2 the ***WASP*** Bag Tank System to accommodate this Alcoseal quantity. Is it LH or RH?
   (in the example we need a 1,125 litre ***WASP*** System incorporating the 150mm ***WASP***).

4. To comply with NFPA16A:1988 you should also allow extra foam concentrate (10%) to fill the FWSS distribution pipework with foam solution plus the usual 100% back-up to recharge the system immediately, after operation.

   Total Alcoseal 3-3 concentrate stockholding = **A** + 15% +100%

   e.g. = 983 + 15% + 100%

   = 2,261 litres Alcoseal 3-3 AR-FFFP concentrate (minimum)

**TABLE 3**

| WASP SYSTEMS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| WASP System Capacity (litres) | 450 | 1125 | | | 2250 | | 3375 | | 4500 |
| WASP Unit Size (mm)* | 100 | 100 | 150 | 200 | 150 | 200 | 150 | 200 | 200 |
| Nominal Dimensions (mm) (S) | 1793 | 2593 | 2620 | 2666 | 2980 | 3006 | 3420 | 3446 | 3621 |
| (T) | 1068 | 1224 | 1224 | 1337 | 1577 | 1577 | 1760 | 1760 | 1835 |
| (V) | 1100 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1700 |
| (W) (square) | 750 | 964 | 964 | 964 | 1350 | 1350 | 1715 | 1715 | 1865 |
| (X) | 1600 | 2400 | 2400 | 2420 | 2760 | 2760 | 3200 | 3200 | 3375 |
| (Y) | 540 | 600 | 600 | 690 | 728 | 728 | 728 | 728 | 728 |
| (Z) | 153 | 142 | 142 | 165 | 174 | 174 | 174 | 174 | 174 |
| Approximate Weight Kg (empty) | 400 | 700 | 730 | 770 | 1100 | 1150 | 1580 | 1630 | 2150 |
| FWSS Test/Drain | 50mm (2") BSP (F) with blanking plug | | | | | | | | |
| Vessel Water Drain | 65mm (21/2") male instantaneous to BS336 | | | | | | | | |
| Foam Concentrate Fill | 65mm (21/2") male instantaneous to BS336 | | | | | | | | |
| System Inlet/Outlet Connections | For use with VICTAULIC Couplings | | | | | | | | |
| Victaulic size required mm (in.) | 100 (4) | 100 (4) | 150 (6) | 200 (8) | 150 (6) | 200 (8) | 150 (6) | 200 (8) | 200 (8) |

*Please specify whether water flow required from left (LH) or (RH)

# Wasp Systems

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**Features of the *WASP* system include:**

1. Fast accurate foam proportioning over a wide range of foam solution demands.
2. Uses multi-purpose Alcoseal 3-3 AR-FFFP foam concentrate for minimal environmental impact.
3. Self-contained - no external power source required.
4. Cost effective space saving design.
5. Factory calibrated and tested.
6. Simple to install and easy to operate.
7. Incorporates tamperproof systems.
8. Requires minimal maintenance.

## CONSTRUCTION

| ***WASP*** Proportioner | | Gunmetal/Cupronickel |
|---|---|---|
| Pressure Vessel | | Carbon Steel welded fabrication. Designed in accordance with BS5500:1991 Cat 2 |
| Internal Bladder | | Reinforced Butyl Rubber |
| Pipework | | Carbon Steel |
| Control Valves | | Cast Steel Bodies with Stainless Steel Balls & Brass Padlocks |
| Drain/Fill Valves | | Brass |
| Vent Valves | | Brass |
| Pressure Gauges | | 316 Stainless Steel with Brass wetted parts |
| Vessel Test Pressure | | 22.5 bar.g. |
| Operating Temperature Range | | 0°C to 60°C |
| Finish | ***WASP*** | Natural |
| | Pressure Vessel | Internal - Bitumastic coal Tar Epoxy |
| | Pressure Vessel & Pipework | External - Zinc Rich Epoxy Primer |

### Principle of Operation

The Alcoseal 3-3 AR-FFFP foam concentrate is stored within a reinforced butyl rubber bladder which is fixed inside the steel pressure vessel. As soon as the first sprinkler head breaks, the WASP System is operated. Solution flowing from the head activates the Sprinkler Alarm Control Valve allowing water at fire main pressure to enter the tank between the vessel wall and the rubber bag. Alcoseal 3-3 AR-FFFP concentrate is then expelled from the sprinkler bag into the ***WASP*** proportioner.

The ***WASP*** bag tank is powered by the sprinkler water supply. Compensation for variations in flow and pressure is automatic. The Alcoseal 3-3 AR-FFFP will therefore always be discharged at this same pressure.

Provided there is flow through the ***WASP*** proportioner creating a pressure drop, accurate induction will occur.

### Optional extras include:

1. Standard access ladder.
2. Hooped access ladder to BS4211:1987.
3. Alternative paint finishes.
4. Full certification to BS5500:1991 Cat.2.
5. Victaulic couplings.

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5113/4 02.14