



## Aspirating Smoke Detection in Harsh Environments

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Aspirating Smoke Detection (ASD) technology is ideal for installation in harsh environments where traditional point or beam detectors are unsuitable, due to environmental conditions or risk access issues can make maintenance difficult.

ASD systems are well suited to harsh environments because the detection units can be situated away from the protected area and any harmful contaminants.

This detection principle is also highly stable because both moisture and dust can be removed, preventing false alarms.

This guide is designed to provide useful information on how to design a sampling pipe network and install FAAST™ in an optimum way to ensure accurate, reliable fire detection and the highest level of system stability.

### Applications

An advanced next generation ASD like FAAST™ provides an advantage over traditional point detection in the following harsh environments:

- Recycling and waste management plants
- Light industrial manufacturing
- Transportation & rail

### Key criteria

Unlike other comparable models FAAST™ features a unique three-stage filtration technology, including a patented aerospace 'Wing Filter', designed to remove a high level of airborne particulates; comparable models only use an inline filter, which is less effective.

To ensure unsurpassed accuracy, FAAST™ also features a unique detection chamber with dual-vision detection technology; this chamber contains two core sensing technologies:

- **Blue LED optics:** Providing the most sensitive smoke detection – down to ultra-trace levels - for the earliest warning of a fire event
- **IR optics:** Designed to identify and ignore any other particulates, preventing false alarms from occurring



## Considerations for optimal performance

### Sampling pipe network

Achieving optimum performance, accuracy and reliability depends upon correct installation of both the device and the sampling pipe network. It is essential to ensure the unit is protected from any contamination and the following recommendations should be considered in order to leverage the full performance capability of the system.

### Pipe installation considerations

PipeIQ™ three-in-one design, configuration and monitoring software is provided as standard with FAAST™. During the planning stage, PipeIQ™ will provide an isometric design of the pipework system and may not take into consideration the following factors that may impact final correct design:

- Environment
- Feeder pipe run
- Offsets
- Obstructions

### Environmental considerations

Environmental conditions can affect installation, operation and maintenance of the system, so please consider the following factors when designing the sampling pipe network:

- **Temperature:** i.e. changes during the day/time of year and changes from ambient to operational temperature (mainly cold storage)
- **Humidity:** Due to process, dust reduction, spray systems and wash down areas
- **Dirty applications:** Dust due to processes, manufacturing, stored material and the storing/moving of loose material
- **External influence:** Internal traffic movement, lorries, forklifts, conveyors, mechanical shovels and accumulative dirt build-up

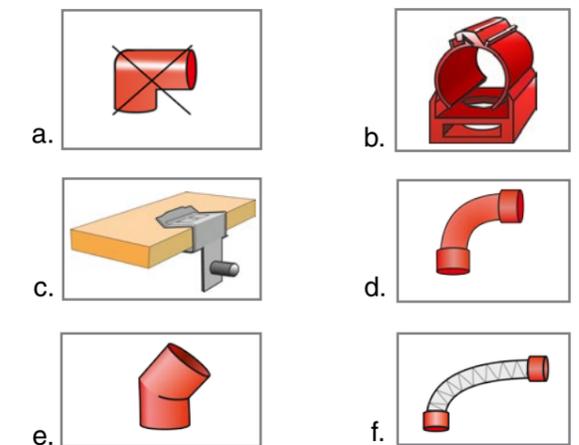
### Installation of the sampling pipe network

Most installations will use ABS Red or White sampling pipe work; this is approved and tested for FAAST™. Optimum system design requires as much straight pipe work as possible. However, in reality bends and offsets will be required to create most application designs.

It is recommended to use the preferred fittings (shown in Figure 2 a-f below), designed for use with FAAST™. **Please note: 90° elbow bends (Figure 2a), should not be used.**

In all cases, the correct pipe clip should be used to accommodate for pipe slippage in the event of expansion and contraction from temperature fluctuations.

Figure 2.



### Accessories image descriptions:

- a. **DO NOT USE** a 90° elbow bend
- b. Standard pipe clip
- c. Girder clip for fitting standard pipe clip\*
- d. Sweep bend
- e. 45° elbow bend
- f. Flexible connector

\* Please note: fixings and hangers are available from a variety of manufacturers.

## Temperature impact on pipes

Most pipes are affected by temperature fluctuations; the amount of expansion is generally 0.1 mm / m for every 10°C / 50°F increase above installation temperature.

Using the appropriate clips allows expansion and contraction to occur naturally. However, positioning the pipe up against a wall or obstruction such as a girder (see Figure 3 below), can prevent expansion/contraction. Please consider the following recommendations to keep the pipe straight.

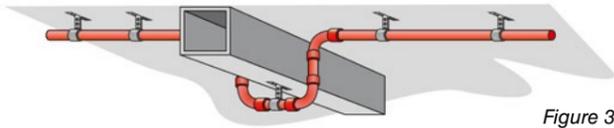
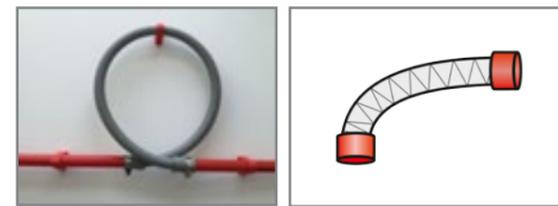


Figure 3.



Expansion clip

Flexible connector

Support clips need to be spaced as detailed in the table below.

Pipe Size	Bracket spacing in metres					
25mm	20°C / 68°F	30°C / 86°F	40°C / 104°F	50°C / 122°F	60°C / 140°F	70°C / 158°F
	1m	0.95m	0.85m	0.75m	0.70m	0.60m

## Using manual blow through systems for high particulates

Where high particulate levels are present in the protected environment, the ASD pipe network sampling points can become contaminated with a

build-up of dust, which sticks to the pipes and reduces the size of the designed sampling points by clogging them. If no counter action is taken, a low flow fault can occur, because airflow will become compromised over time.

In the most extreme dust-rich applications, such as waste plants, the use of hole reducers is not recommended because dirt can build up on the back of the reducer. In high particulate applications sample holes should be drilled directly into the pipe.

Any particulate build up can be easily avoided by installing a manual blow through system (see Figures 4 and 5 below).

With hole reducers or direct drilled pipe

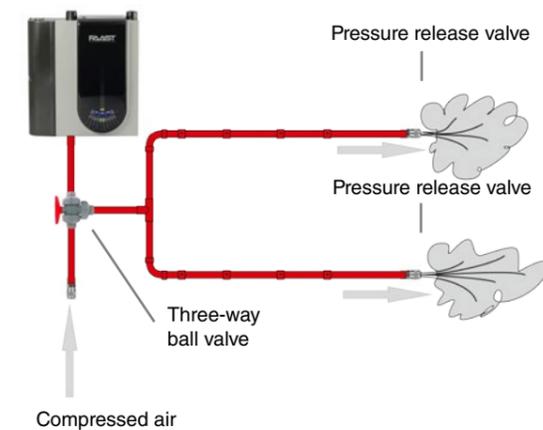


Figure 4.

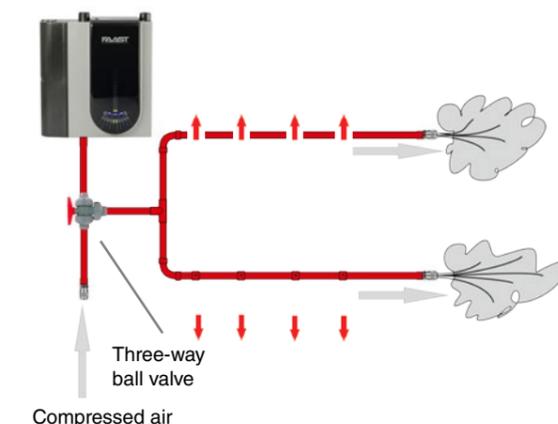


Figure 5.

Before blowing out the system, the fire signal from the unit should be isolated to prevent any spurious alarms. In any situation where compressed air is used, the three-way ball valve must be fully closed before an airline is connected to the system. The correct method is:

1. Apply 3-5 short 10 second blasts
2. Perform a 1 minute blow through
3. Remove the airline and wait 30 seconds before opening the valve to enable the detector to sample from the pipe network again
4. Check that the detector is not in alarm and has returned to normal state before reinstating the fire signal

**Please note:** In the most particulate rich environments like waste plants, the non-return valves should be positioned at a low level (see Figure 6 below), so they can easily be accessed for cleaning if dirt prevents the valve from closing.

Water may also be present in the protected area, so a water trap can be added from a T-joint; this will remove any water from the pipe network and prevent it entering the system.

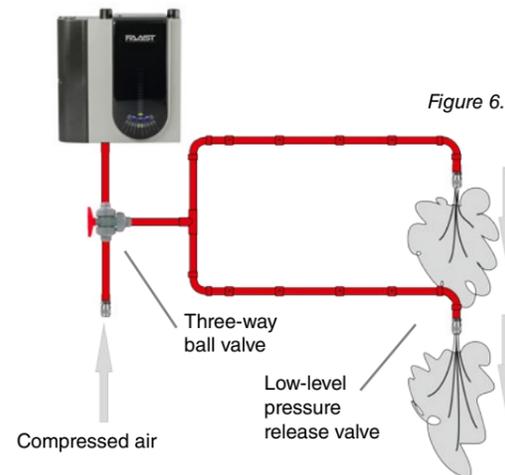


Figure 6.

## Dealing with water and high humidity

Moisture and humidity in the atmosphere or water in wash down areas can potentially create additional issues for ASD system designers. It is essential to ensure that water cannot flow into the detection device and damage the electronics. The following methods remove water effectively.

## Water traps

It is always advisable to have a water trap at the detector; the pipe in the protected area can cause water blockage points. This is particularly true where the pipe is on a flat surface protecting a room below. It is therefore necessary to ensure the pipe is angled 1-2° to ensure a guaranteed flow to a trap where water can be removed (see Figure 8 below).

Within large open spaces pipe typically runs up towards the apex. This means that if there is only a water trap located at the detector, water can potentially accumulate at the low section of the pipe. It is recommended to run pipes away from these low sections to a collection point to avoid this happening.

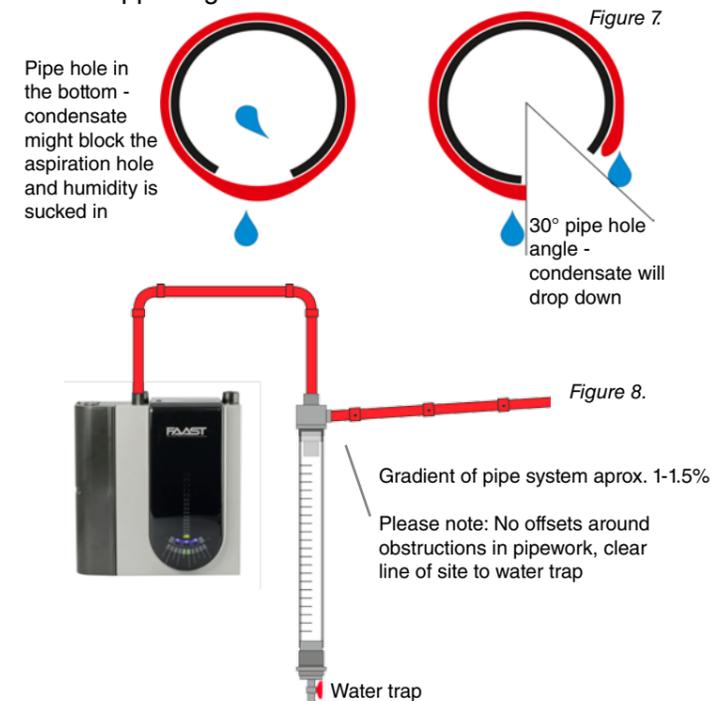


Figure 7.

Figure 8.

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