Xtralis

Removal of Water Condensate

Application Note

June 2009

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Preface

This Application Note outlines techniques/methods for the removal of water condensate from the sampling pipes prior to entering the detector unit. Xtralis recommends these techniques/methods in hot and humid environments particularly where the sampling points and detector are installed in different temperature zones or when regular wash-down activities are performed in the protected zone.

Related Products

Removal of water condensate techniques/methods can be used with all Xtralis detection systems.

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Introduction

Water condensation is a naturally occurring phenomenon that denotes the change of the physical state of water from the gaseous (vapor) to the liquid phase.

Water vapor will condense onto another surface when the temperature of the surface is at or below the dew point temperature of the water vapor. Similarly, the sampled airstream will condense onto the pipe surface when the temperature of the pipe surface is at or lower than the dew point temperature of the water vapor.

Water condensation would normally occur under the following conditions:

- The air in the protected zone is warm and humid and the ambient temperature of the sampling pipes close to the detector is lower than the protected zone;
- Wash down activities is performed in the protected zone and water vapour enters the sampling pipes.

Water condensate must be removed from the sampling pipes prior to entering the detector to ensure reliable detector performance.

Water Condensate Prevention – Chemical Filter

One method of ensuring water condensate does not enter the detector is not allowing its formation from the start. This is accomplished by lowering the humidity of the sampled airstream through a chemical filter prior to entering the detector. One such chemical filter is the E700-FILASSY in-line filter container that houses moisture adsorbent media (i.e. silicon gel) and is located in close proximity upstream from the detector.

Figure 1 shows the basic dimensions and configuration of the chemical filter. The medium foam filter element from the E700-FILASSY in-line filter is placed on the bottom of the container and the top is filled with the moisture adsorbent media. For further information refer to the *Chemical Filter for Corrosive Environments* Application Note (Document No. 14888).

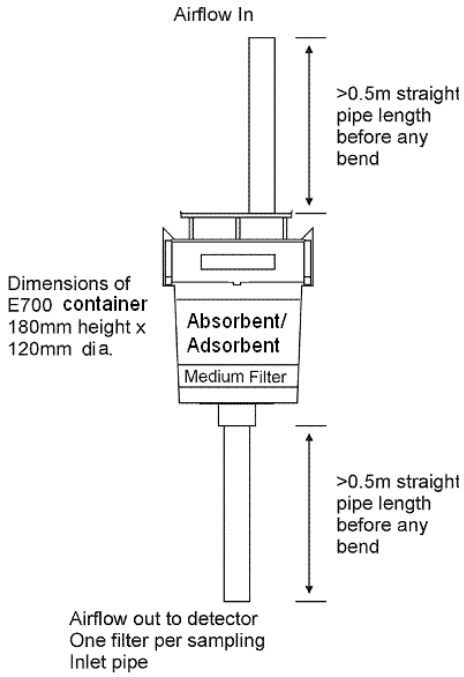

Figure 1 Chemical Filter Dimensions and Configuration

The efficiency of the chemical filter to reduce the humidity of the sampled airstream is directly related to the residence time of the airstream within the media bed and the temperature & humidity of the airstream. The manufacturer of the moisture adsorbent media should be consulted with regards to the detection system operating parameters (i.e. pipe flowrate, sampled air temperature/humidity, area and depth of the chemical media, etc.).

Important Note: The moisture adsorbent media must not support bacterial or fungal growth and must be non-toxic and non-hazardous.

The service interval for the chemical media should follow the manufacturer's instructions. Some manufacturers (i.e. Purafil[1]) offer laboratory analysis to establish the life cycle of the chemical media and hence determine the replacement interval for different operating conditions. A visual check for discoloration of the chemical media can also be used as an indicator for replacement (manufacturer instructions should be followed when adopting this approach).

Important Note: Monitoring the airflow should not be used as an indicator of chemical filter loading.

Water Condensate Removal – Water Trap

In the case that water condensate has already formed inside the sampling pipe it must be prevented from flowing into the detector. This is accomplished with a water trap located in close proximity upstream from the detector or in-line filter.

The water trap is a vertical 0.5m (1.6ft) pipe that collects the water condensate. It is a clear plastic tube (to allow visibility of the water level) connected to the sampling pipe with a Tee junction and comprising a valve at the end to allow the discharge of water (Figure 2). It is recommended the detector be mounted in its inverted orientation to prevent any flow of water into the detector.

Important Note: The water trap must be placed at the lowest point in the pipe-sampling network and the upstream pipe must have a small inclination towards the water trap to assist the flow of water condensate.

Figure 2 Water Tap Arrangement

[1] Purafil: http://www.purafil.com

Maintenance of the water trap involves discharging the water through the valve.

The maintenance interval will depend on the humidity level of the sampled airstream. Following installation, weekly inspections should be performed to assess the water level in the clear pipe to determine the maintenance regime applicable to the protected zone's environmental conditions. Water should not be allowed to overflow in the sampling pipe.

In many cases, if the occurrence of condensation is infrequent, such as during washdown, any condensate formed in the trap may be later naturally evaporated away, avoiding the need for emptying the water trap. The detector will monitor airflow of air past the water trap and if the water trap is not well maintained then a low flow fault will indicate the need for emptying the water trap.

Important Note: The valve must be firmly shut after water discharge to ensure reliable detector performance. Normally an open valve will signal a high airflow fault from the detector alerting the operator.

Ordering information

Chemical Filter

Product	**Part Number**
Metric Pipe Fittings	E700-FILASSY
Imperial Pipe Fittings	IMP-E700-FILASSY
Foam Filter Elements	FIL-FOAM

Further Support

Contact an Xtralis office or distributor for further information.

www.xtralis.com

The Americas +1 781 740 2223 **Asia** +852 2916 8894 **Australia and New Zealand** +61 3 9936 7000
Continental Europe +41 55 285 99 99 **UK and the Middle East** +44 1442 242 330

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