

# REFRIGERATED STORAGE SAMPLING KIT APPLICATION NOTE

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## Preface

Xtralis has developed the Refrigerated Storage Sampling Kit for use in Refrigerated Storage facilities protected by VESDA detectors. The information contained in this document will assist in the installation and maintenance of the Refrigerated Storage Sampling Kit in Refrigerated Storage facilities.

## Related Products

- VESDA detectors (except VEA)
- VSP-860, Xtralis Refrigerated Storage Sampling Kit
- VSP-860-US, Xtralis Refrigerated Storage Sampling for US

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# 1 Background

Refrigerated Storage facilities are unique and challenging environments for any smoke detection system.

- They are characterised by varying low temperatures and frequent traffic from workers on picking machinery in and out of the temperature controlled rooms. While most have some form of fast acting automatic doors or plastic barrier curtains to limit warm air ingress, it is inevitable that warm air will enter the facility. This constant traffic flow with regular warm air ingress often creates condensation within the temperature controlled rooms and thus icing occurs.
- Ice tends to form on any and all ceiling mounted equipment and structures generally within close proximity to the entry points.
- Over time Aspirating Smoke Detection (ASD) sampling points and pipe within this area can become blocked causing airflow issues and inoperative detection of smoke.
- The maintenance required to rectify this problem (i.e. unblocking of holes or pipes) can be very costly and in some instances the simplest solution is to replace the blocked section of ASD sampling pipe with new pipe.
- These types of issues may not be able to be rectified during normal service callouts and may require considerable time, labour and lifting equipment accessing ASD pipes to carry out the work.

There is a strong demand from both existing and new Refrigerated Storage facilities for an effective and easy to install and maintain means of ASD sampling arrangement in these facilities.

The Xtralis Refrigerated Storage Sampling Kit provides a standardised method of smoke sampling for Refrigerated Storage facilities in a considerably improved manner allowing simplified installation with reduced maintenance, thus promoting more reliable and hassle-free operation.

## 2 Refrigerated Storage Sampling Kit

### 2.1 Usage

The Xtralis Refrigerated Storage Sampling Kit has been designed to replace standard cone-shaped sampling nozzles installed at the ceiling in existing or new Refrigerated Storage facilities. This kit can be installed in the entire facility or combined with standard sampling points (nozzles) if required. The aim here is to reduce direct ice blockage of the sampling points and as such this kit is recommended for installation in areas where higher humidity is likely to occur as a result of vehicle and pedestrian traffic, e.g. areas close to doorways, perimeter of the facility, etc.

This kit shall be treated as a standard sampling hole in the VESDA system design, in terms of system parameters, e.g. sampling hole location, hole size, transport time, sampling hole sensitivity, etc.

### 2.2 Key Benefits

Unlike the existing practice of installing the ASD pipes inside the Refrigerated Storage facility, the Xtralis Refrigerated Storage Sampling Kit:

- Enables the ASD pipe to be installed, inspected and maintained outside the Refrigerated Storage facility hence enabling fire contractors to work in ambient conditions most of the time. Note it is suited for facilities with and without ceiling cavities.
- Eliminates the need for using expensive HDPE (high density polyethylene) pipe inside the Refrigerated Storage facility.
- Eliminates the on-going need for costly access high lifting equipment hire for service/maintenance.
- Eliminates the need for heat tracing.
- Is less prone to blockage due to icing.
- Provides a generally more robust ASD installation for these unique environments.
- Provides considerably improved aesthetics.
- Minimises the need for "Back Flush" system.
- Offers all round cost savings.

## 2.3 Materials and Structures

The sampling kit consists of outer and inner parts with sampling pipe penetrating the Refrigerated Storage sandwich panel. A typical set-up is shown in Figure 3.

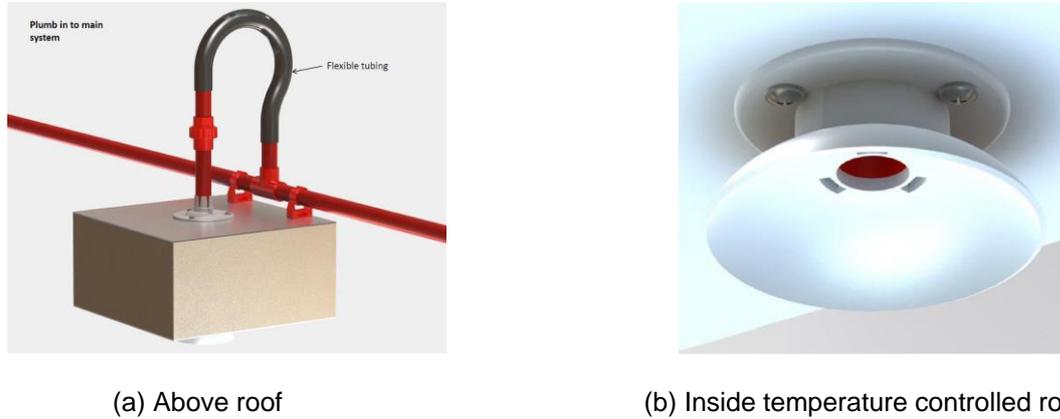


Figure 1: Illustration of the sampling kit

The sampling pipe through the sandwich panel and inner parts are made of ABS plastic which is suitable for low temperatures down to -40 °C (-40 °F). The installation of the pipe through the sandwich panel and individual components are shown in Figure 2.

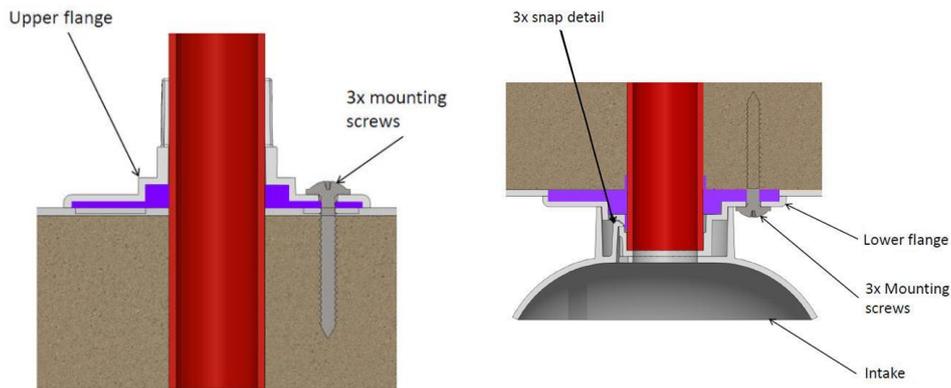


Figure 2: Components of the sampling kit

The restriction assembly, containing a sampling orifice within a socket union, is shown in Figure 3.

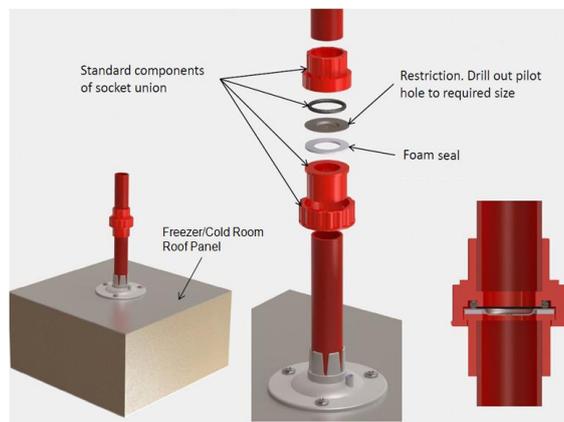


Figure 3: Restriction assembly

## 3 System Installation

### 3.1 Procedure

1. Check and determine the sampling hole locations as per the VESDA system design. Mark the penetration locations on the top of the sandwich panel.
2. Drill a 25mm (1") core hole through the metal surface of the sandwich panel.
3. Drive a sharpened 6mm (1/4") pointed steel rod centrally through the foam material until it indents or protrudes through the underside of the panel.
4. Drill a 25mm (1") core hole through the underside of the sandwich panel where the steel rod protruded.
5. Using an off-cut of 25mm (1") conduit, drive the conduit from the top through the foam until it protrudes through the underside of the sandwich panel. Note the conduit inner edge can be bevelled with a rat tail file to ensure a clean cut.
6. Insert the sampling pipe (330mm (1ft) in length approximately) into the hole with the aid of spring fingers to retain the pipe in the hole. Clean the surface and secure the flange to the sandwich panel using three (3) of the self-tapping screws provided.
7. Mount the lower flange on the bottom of the hole (inside the temperature controlled room). Clean the surface and secure the flange using the remaining three (3) self-tapping screws provided.
8. Ensuring all surfaces are clean and dry, apply sealant (a polyurethane based adhesive recommended) through inlet holes on both top and bottom flanges, see Figure 4.

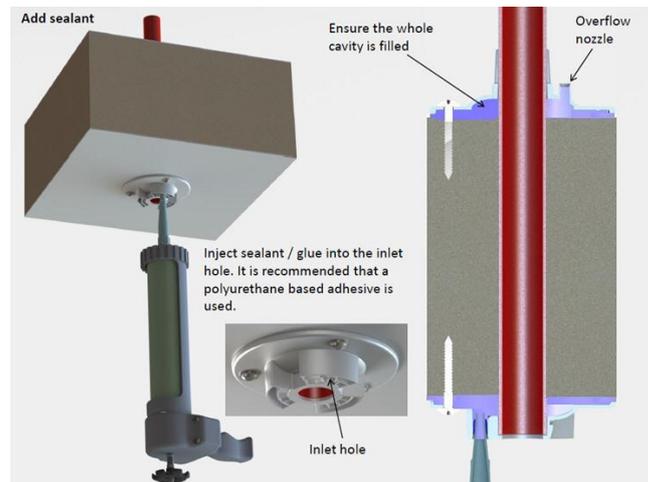


Figure 4: Applying sealant

9. Fit the inlet to the inner gland (bottom flange) which also plugs the adhesive inlet hole, see Figure 5.

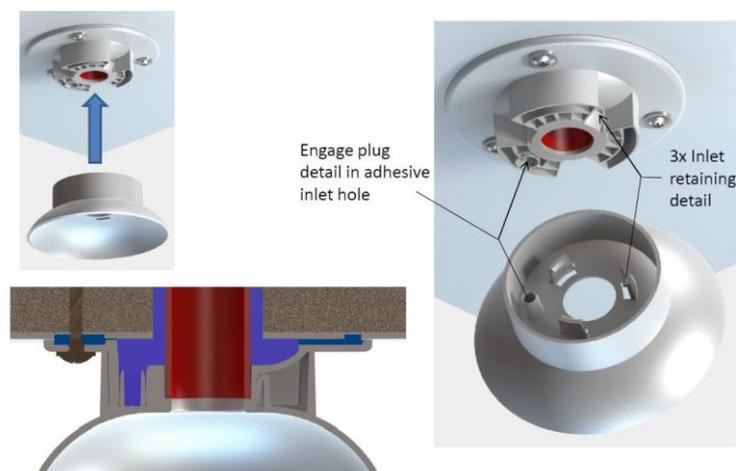
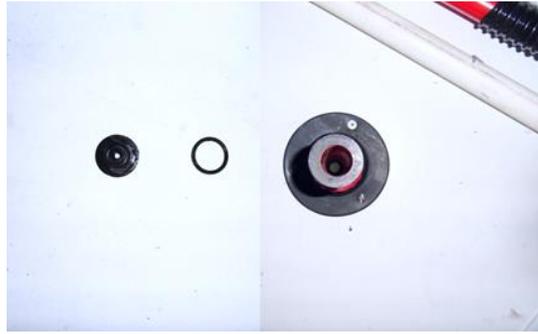


Figure 5: Mounting of inlet

10. Mount the restriction assembly, by using the restriction disc (plate) with the required hole size, see Figure 6.



*Figure 6: Installation of the restriction plate*

11. Connect the sampling kit to the pipe network via the flexible tube provided.
12. Apply insulation material outside the kit and the flexible tube if required as per environmental condition.



**Note!**

Install all the other parts of the VESDA system as per the design and follow Xtralis VESDA system installation guidelines.

## 3.2 Commissioning

Transport time measurement can be conducted in the same way as that for on standard sampling holes. Therefore, the standard commissioning procedure suggested in Xtralis Design Guide of Refrigerated Storage (Doc No.: 11723) shall be followed.

# 4 Maintenance

## 4.1 Air Back Flushing (optional)

Given the unique design of the Xtralis Refrigerated Storage Sampling Kit, the undertaking of regular ‘Back Flushing’ of the VESDA system pipe network is generally not required, since ice is unlikely to form over the sampling hole, as can be the case with standard sampling holes. However, facility management can at their discretion introduce back flushing as part of their normal operation to assist with maintaining the performance of the system.

Back flushing can be achieved manually or automatically. The designs can vary in configurations and operation. The frequency of operation will depend on the environmental conditions of the Refrigerated Storage facility. The procedure for manual back flushing can be found in the Xtralis Design Guide of Refrigerated Storage.

The connection of an automatic back flushing system is shown in Figure 7. Figure 8 shows the components and layout of a commercial purging system.

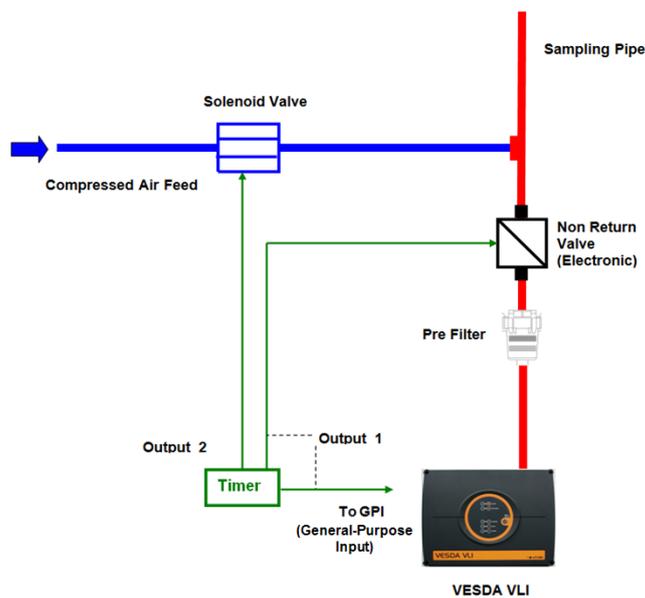


Figure 7: Automatic back flushing system

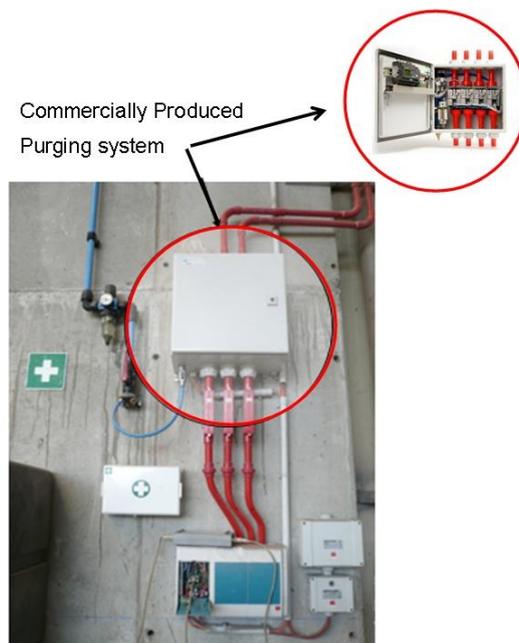


Figure 8: Commercial purging system

## 4.2 Cleaning the Sampling Kit

The maintenance/cleaning of the Refrigerated Storage Sampling Kit may still need to be undertaken periodically subject to the Refrigerated Storage facility conditions, i.e. the rate at which ice may form overtime in the facility.

The cleaning of the Refrigerated Storage Sampling Kit is considerably easier and much quicker than standard sampling points. It can be done from outside the facility on the top of the sandwich panel, providing a distinct advantage over having to enter the Refrigerated Storage facility and conduct the required work at ceiling height.

The cleaning procedure consists of the following steps:

- Disconnect the kit from the main sampling pipe in the roof space, by opening the restriction assembly;
- Check possible ice formation on the sampling hole and clean if necessary;
- Inspect the inner wall of the sampling pipe through the sandwich panel. If ice formation is visible, clean by inserting a rod of an appropriate diameter;
- After cleaning, reconnect the restriction assembly and then connect to the main pipe. Ensure proper sealing is maintained.

**Note!**

Inspection should be carried out periodically. Intervals will be determined by the icing conditions in the Refrigerated Storage facility.

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## Disclaimer On The Provision Of General System Design Recommendations

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