FAAST FLEX™ WINTECH'S SOUTH KOREA WAREHOUSE CASE STUDY

March 2022
Doc. No. 37119_00

Preface

This document details the installation of the FAAST FLEX detector in WINTECH's South Korea distribution warehouse. Presented in this document are descriptions of the customer problem, the solution, installation and detection performances.

Related Product

FAAST FLEX Model FLX-020.

Contents

1 Introduction

The unique environmental characteristics of warehouse applications (size, geometry, ventilation, stratification, etc.) present a challenge for early and reliable fire detection. Deploying Aspirating Smoke Detection (ASD) technology in warehouse applications minimises fire risks and costly damage in this challenging environment. This case study analyses a series of fire tests for demonstration purposes organised by Xtralis within WINTECH's South Korea distribution warehouse. The purpose of this demonstration test was to illustrate the smoke detection capability of Xtralis' FAAST FLEX smoke detector (*model used: FLX-020*) for early warning (EW) detection.

The key area of focus for this demonstration is:

- Detection during the early developing stage of fires.
- Environmental factors that cause smoke dilution due to a high ceiling height, stratification and the action of natural ventilation.

Figure 1: WINTECH's Warehouse

2 Challenges

Warehouse environments present many challenges to any smoke detection technology as far as detection reliability is concerned. The following points capture some of the challenges for effective and reliable smoke detection in a warehouse application environment:

- **Large volume areas** and high ceilings will significantly dilute the concentration of a rising smoke plume. Ceiling point (spot) type smoke detectors that provide only localised detection and beam-type detectors that lack high sensitivity may not respond to diluted smoke.
- **Air movement** from ventilation will dilute, cool and divert the smoke plume away from ceiling mounted detection systems.
- Small fires might not possess sufficient **thermal energy to rise** to the ceiling.
- Poor thermal insulation, incident solar radiation and lack of ventilation will create a warm layer of air preventing smoke from rising to the ceiling, known as "**smoke stratification**".
- Ceiling mounted smoke detectors can be subjected to extreme temperatures in warehouses outside their recommended range, leading to **compromised performance and/or nuisance alarms**.
- Maintenance of smoke detectors mounted **in hard to reach** or awkward places will be a time consuming and resource-intensive task.
- Varying material and ignition sources combined with **a vertical arrangement of material loads** make predicting fire scenarios very difficult to plan for and detect.
- **A dirty / dusty environment** will lead to nuisance alarms and missed alarm events.

3 Solution

FAAST FLEX Aspirated Smoke Detector can effectively protect this challenging environment. FAAST FLEX offers enhanced and standard sensitivity applications offering key ASD advantages, including multi-hole and cumulative sampling, remote detection, and centralised test and maintenance. FAAST FLEX combines effective and reliable smoke detection with ease of design, installation, commissioning, maintenance, and improved user experience.

Installation

- Flexible installation allows for customised pipe networks to be placed, allowing for targeted detection such as along the ceiling, beams, or racking.
- The detector can be installed at ground level, making the cost of installation and configuration easier.
- FAAST FLEX's Bluetooth app allows for simple configuration during the installation process, with features such as duplicating configurations between devices, making the process simple when working with multiple detectors.

Detection

- FAAST FLEX allows detection of diluted smoke from small fires, enabling early investigation and response.
- Two-alarm levels with multiple programmable thresholds enable a staged response for effective and reliable Emergency Response Planning.

Maintenance

- FAAST FLEX actively and constantly monitors the health of its sub-systems, including the airflow in the pipe network, proactively alerting the need for any maintenance.
- Clever design ensures the detector optics remain free from contamination to provide a long calibration-free service life and assurance of detection performance.
- FAAST FLEX simple field replaceable spare parts allow the detector to operate effectively without downtime ensuring business continuity and reduced total cost of ownership (TCO).

4 Installation details

For this smoke test, a FAAST FLEX dual-channel detector (FLX-020) has been selected for this case study to demonstrate the smoke detection performance in WINTECH warehouse [20m(L) x 9.6m(W) x 9.7m(H)].

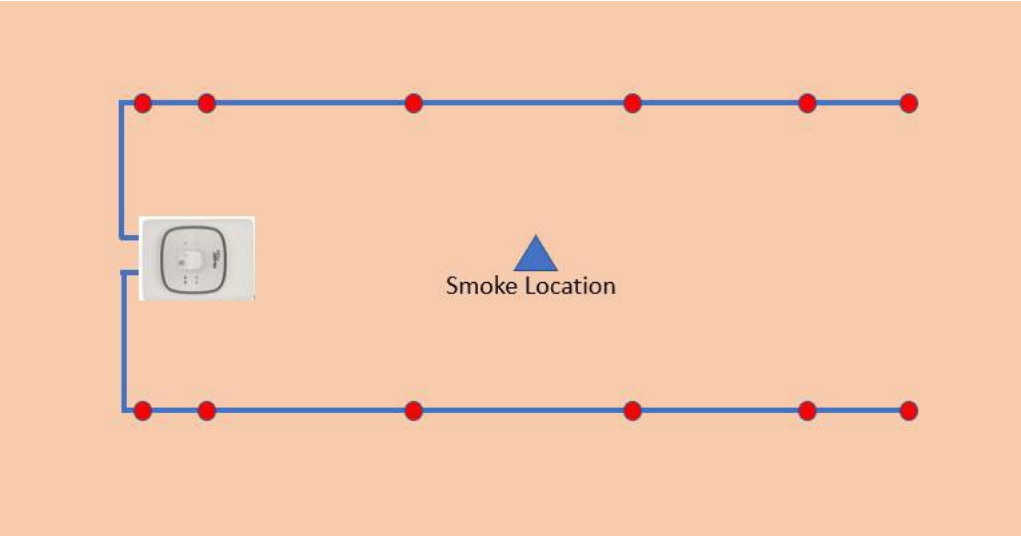

Figure 2: FAAST FLEX Installation Layout

5 Configurations

FAAST FLEX was configured via the ob-board DIP switches as follows:

- Action Alarm: level 4 (0.049 % obs/m)
- Fire Alarm: level 5 (0.07 % obs/m)
- Sampling points = 12
- Aspirator Speed: 6
- Flowrate 40 l/m
- Pipe length = 20m per channel

6 Performance

The test utilised a smoke pellet of 15mg to trigger the FAAST FLEX alarm for this demonstration. The roller doors were open to represent a realistic scenario, which increased the ventilation within the warehouse. This created varying airflow patterns within the warehouse which made smoke detection more challenging.

Figure 3: Smoke Testing Within WINETCH Warehouse

Table 1: Smoke detection performance results

Smoke Source (Smoke pellet, black color, 15mg)	**Responded Time (second)**		
	Action	**Fire1**	**Condition**
FAAST FLEX Pipe-1	35	39	Roller door open
FAAST FLEX Pipe-2	41	45	

For this demonstration, we monitored the response time of each pipe (chamber) separately to understand the product's full performance under these conditions. In the assessment, the results showed that the detector went into alarm within 35 seconds. The varying results between pipe-1 and pipe-2 were attributed to the smoke plume's behaviour caused by the open roller door. This result proves that FAAST FLEX dual-channel product responded in each pipe (chamber) reliably and independently.

7 Summary

FAAST FLEX responded to dense smoke from black smoke pellets reliably and effectively. The difference in response time between Action and Fire1 was only 4 seconds. Additionally, FAAST FLEX's effective and reliable smoke detection performance exceeded the customer's expectations when the roller door was fully open allowing significant smoke dilution.

- Coverage of up to 2,000 m^2.
- Effective and reliable detection mitigating the effects of smoke dilution and stratification.
- Sampling points can be located where smoke is likely to travel.
- Multiple alarm levels to suit the environment for early warning and minimum nuisance alarms.
- The detector can be installed at ground level for ease of access and cost-effective maintenances.

Disclaimer on The Provision of General System Design Recommendations

Any recommendation on system design provided by Xtralis is an indication only of what is considered to be the most suitable solution to meet the needs of the common application environments described.

In some cases, the recommendations on system design provided may not suit the unique set of conditions experienced in a particular application environment. Xtralis has made no inquiry nor undertaken any due diligence that any of the recommendations supplied will meet any particular application. Xtralis makes no warranty as to the suitability or performance of any recommendation on system design. Xtralis has not assessed the recommendation on system design for compliance with any codes or standards that may apply nor have any tests been conducted to assess the appropriateness of any recommendations on system design to a particular application environment.

Any person or organization accessing or using a recommendation on system design should, at its own cost and expense, ensure that the recommendation on system design complies in all respects with the provision of all legislation, acts of government, regulations, rules and by-laws for the time being in force and all orders or directions which may be made or given by any statutory or any other competent authority in respect of or affecting the recommendation on system design in any jurisdiction in which it may be implemented.

Xtralis products must only be installed, configured and used strictly in accordance with the General Terms and Conditions, User Manual and product documents available from Xtralis. Xtralis accepts no liability for the performance of the recommendation on system design or for any products utilized in the implementation of the recommendation on system design, aside from the General Terms and Conditions, User Manual and product documents.

No statement of fact, drawing or representation made by Xtralis either in this document or orally in relation to this recommendation on system design is to be construed as a representation, undertaking or warranty.

To the extent permitted by law, Xtralis excludes liability for all indirect and consequential damages however arising. For the purposes of this clause, ‘consequential damage’ shall include, but not be limited to, loss of profit or goodwill or similar financial loss or any payment made or due to any third party.

Recommendations on system design are provided exclusively to assist in design of system using Xtralis products. Copyright and any associated intellectual property in any such recommendations on system design or documentation remains the property of Xtralis.

www.xtralis.com

Honeywell Products & Solutions Sarl
Z.A. La Pièce 16
1180 ROLLE (SWITZERLAND)

Doc. No. 37119_00
March 2022