

XTRALIS

## WAREHOUSE FACILITIES



**VEU, VLI & OSID-DE**  
- UNBEATABLE  
TECHNOLOGIES  
TO PROTECT ANY  
WAREHOUSE!

- FREEZERS AND REFRIGERATED STORAGE
- DUSTY WAREHOUSES
- FERTILIZER WAREHOUSES
- COTTON STORAGE FACILITIES

## THE RISKS

Storage space has become an expensive commodity forcing storage racks to take up as much volume as possible in logistics warehouses, resulting in tighter and higher racks.

For the ultimate in operational efficiency storage management is carried out with the aid of robots in automated stockers.

Fire loads in warehouses are increasing and changing on a daily basis as stock movements increase to support business operation, all of which has a significant financial and economic value, often several millions of dollars. The cost of a fire in a warehouse goes far beyond the loss of the building and goods; the consequential loss caused by downtime, operation interruption, business reputation and goodwill is significant.

Modern goods tend to have increased flammability, in addition to the presence of large amounts of packing materials such as plastics, cardboard, wooden crates and pallets. There are various possible ignition sources in warehouses including smoking, lighting, electrical equipment, heaters and so on.

Whilst sprinklers are typically installed in many warehouses the absence of a suitable and appropriate early warning smoke detection system may potentially turn the facility into an inferno resulting in the controlled burn down of the facility, at the same time compromising the safety of adjacent buildings.

## CHALLENGES TO RELIABLE AND COST-EFFECTIVE SMOKE DETECTION IN WAREHOUSES

Warehouses come in a wide range of sizes and contain a wider range of goods. Most large warehouses are characterised by high ceilings, extending over 12 m (39 ft) with some modern automated high rack storage facilities having ceiling heights over 40 m (130 ft). In these conditions smoke is heavily diluted making detection difficult for conventional detection technologies. Sufficient heat generated by the fire is required to initiate suppression containment measures (sprinklers).

Typically Codes and Standards set down the minimum requirements in these facilities although certain detection technologies, such as point detectors, are considered unsuitable if deployed at such heights.

Even for warehouses with lower ceilings, the installation, wiring and maintenance of point detectors can make them inconvenient and very costly. Maintenance access for point detectors in some large facilities with high ceilings is simply too difficult.

Maintenance contractors will require costly access equipment (e.g. scissor lifts and cherry pickers) to provide safe access to the detectors. In many cases, the ceiling is virtually impossible to get to after installation. The situation is more challenging in those facilities that operate 24/7 where maintenance is only allowed during a planned maintenance period.

Linear heat cables are sometimes offered as a solution and might be tempting from a maintenance point of view. However their detection point (i.e. flaming stage of fire) is too late to be truly considered as early warning or adequate detection for warehouse and storage racks.

A possible alternative to heat cables, but in the same category, are flame detectors.

Flame detectors require flames to activate and hence by the time they do activate a fire will have well and truly taken hold of the facility compromising assets and business continuity. An important consideration to keep in mind is that many Fire and Rescue Services will enter a burning building to save people not property.

On the other hand, an emerging technology, only approved by UL and FM for special applications, is Video Smoke and Flame Detection. This technology is based on video image analysis of smoke and/or flames in the field of view of cameras. Irrespective of the need for adequate lighting at all times, the fact that smoke has to be seen to be detected creates the need for several cameras per rack - making VSFD a very expensive solution.



## OPTIMUM SMOKE DETECTION TECHNOLOGIES FOR WAREHOUSES

The options for smoke detection technologies, which do not require physical maintenance access above the high bay racks, are Aspirating Smoke Detection (ASD) and Beam Detection.

As part of the product and brand selection process it is important to pay close attention to the following considerations:

- Business continuity – impact on the business following a fire event
- Installation cost – don't simply look at product cost.
- Maintenance cost – the cost people tend to forget to factor in
- Reliability – cost of false alarms

Taking the above considerations into account, VESDA-E VEU, VESDA VLI or OSID-DE are the most optimum and cost-effective smoke detection solutions available to address the fire protection needs of a wide range of warehouse applications.

## TECHNOLOGY SELECTION

The primary consideration when selecting a smoke detection system in a warehouse is the acceptable size of a potential fire, relative to the risk. For the earliest possible warning of a potential fire ASD offers the best solution. Multiple hole sampling combined with sophisticated detection technology allows fires to be detected at the earliest possible stage allowing for the earliest possible intervention. In addition to the early warning capability, ASD systems also:

- allow for the detector to be located at an accessible height removing the need for access to the ceiling for service and maintenance
- accommodate irregular ceiling structures
- are not affected by internal business operations (e.g. forklifts, robotic gantries)
- can provide detection within storage racks for the fastest possible response to a fire threat.

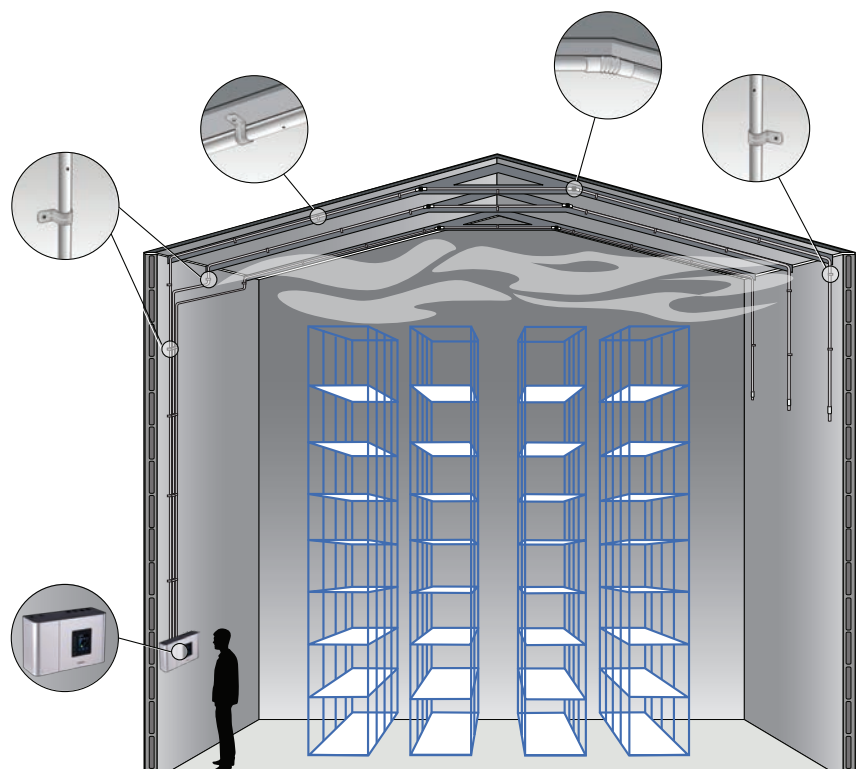
It is for these reasons that ASD has become an industry standard for the protection of warehouses.

Where standard detection may be acceptable and none of the above attributes of ASD are required; open path beam detectors can provide an alternative.



### When it comes to protecting warehouses...

Whether your warehouses are massive structures with high ceilings requiring in-rack and area protection or harsh environments, Xtralis has the optimum solution!



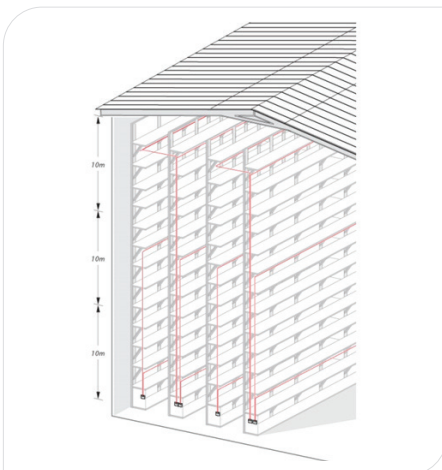
# VESDA-E VEU SOLUTION



For the ultimate in early warning with minimal nuisance alarms VESDA-E VEU offers unparalleled performance in large warehouses.

## INSTALLATION COST

VEU offers linear pipe lengths up to 400 m (1,310 ft) and branched pipe networks up to 800 m (2,625 ft). Longer pipe runs extend detector coverage; reducing the number of detectors required to protect a single fire zone in a warehouse facility. Installing fewer detectors results in reduced power requirements (PSU and batteries), I/O modules, and less cabling and labour. Therefore, a reduced installation cost resulting in tangible and significant cost savings of up to 40% in comparison to other ASD products.



## MAINTENANCE COST

Greater pipe length also facilitates convenient detector mounting, at heights conducive to easy maintenance, even at ground level, thereby reducing maintenance cost by up to 50%. This is made possible due to eliminating the cost of hiring access equipment (i.e. scissor lifts or cherry pickers) and additional labour that would otherwise be required if maintenance were conducted at ceiling height.

VEU detectors are connected using VESDAnet and can be accessed via Ethernet.



## RELIABILITY

VESDA-E VEU's higher sensitivity provides the earliest possible warning in a large volume warehouse area mitigating the effects of smoke dispersion and stratification. For warehouse environments where some levels of airborne dust particles may be present, VEU's robust dust rejection minimizes nuisance alarms by at least 3 times in comparison to other ASD's. Thanks to the Flair detection technology, VEU is extremely stable under varying environmental conditions further increasing the system's reliability.

VEU provides multiple alarm levels and thresholds, facilitating various emergency response plans.

## PROOF OF SUPERIOR TECHNOLOGY

The superior performance of VEU is enabled through the unique and innovative Flair™ detection technology.

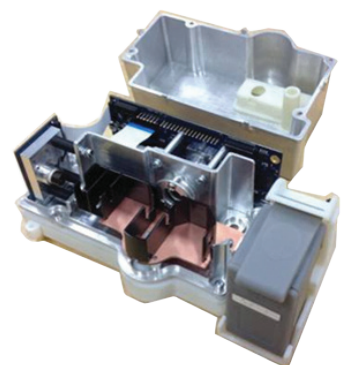
Where competitive ASD products use an LED light source and (a) photo receiver(s), the Flair detection chamber uses a short wavelength laser, a CMOS imager and multiple photo-diodes.

Direct imaging of the sampled particles using the CMOS camera allows data regarding their size, colour and shape to be derived.

Furthermore additional data from five (5) photodiodes allows measurement of light scatter in different directions (i.e. forward, backward and sideways).

The net effect is that there is vastly more data that can be used to derive actionable response about the observed particles, and some of this data is processed as part of the primary smoke detection system.

The additional data improves the effectiveness of smoke detection by providing supplementary information through particle type characterisation for targeted detection and efficient response.



# WHAT ABOUT SPECIAL WAREHOUSES?



There are certain types of warehouses with challenging environments that equally require the best fire protection possible.

A first category to examine is refrigerated storage facilities which pose very specific challenges to traditional smoke detection.

A second category is warehouses with dirty and dusty content which have their very own and specific risks and needs.

## **FREEZERS AND REFRIGERATED STORAGE**

Refrigerated Storage facilities are unique and challenging environments for any smoke detection system. They are characterised by varying low temperatures and frequent traffic flow from workers on picking machinery moving in and out of the 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 room.

This constant traffic flow with regular warm air ingress often creates condensation within the 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.

It is generally accepted that ASD is the best (only) solution for refrigerated storage facilities. However, there are some typical problems associated with applying ASD in these applications.

Over time, ASD sampling points and pipe within the sub-zero area can become blocked causing air flow issues and inoperative detection of



smoke. In some instances the only solution is to remove the iced up section of the ASD pipe network and fit a new pipe.

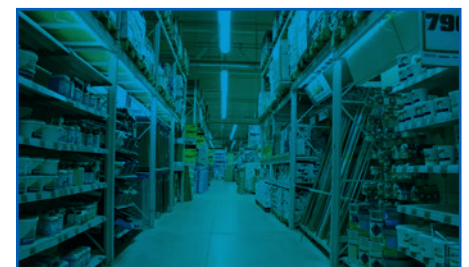
In addition to the significant VEU advantages highlighted previously, Xtralis also offers a unique sampling arrangement specifically designed for refrigerated storage facilities.

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



The Xtralis Refrigerated Storage Sampling Kit provides an ideal solution for problematic areas within the facility or where customers choose to install the ASD pipe outside the protected area:

- Enables the ASD pipe to be installed, inspected and maintained outside the refrigerated environment, (i.e. within roof space) hence enabling fire contractors to work in ambient conditions at all times
- Eliminates the need for costly access equipment hire for service/maintenance
- Eliminates the need for heat tracing
- Eliminates the need for expensive and complex High Density Polyethylene (HDPE) continuous pipe
- Is less prone to blockage due to icing
- Provides a generally more robust ASD installation for these unique environments
- All round cost savings



## DUSTY WAREHOUSES

Certain warehouses have dusty or highly contaminated environments where the performance, longevity and maintenance of the detection equipment is a real concern. Examples of these include fertilizer warehouses, cotton storage facilities and the like.

For these challenging environments Xtralis offers a dedicated purpose built ASD product, VESDA VLI, specifically designed for the protection of industrial applications and harsh environments.

Whilst the VLI has better pipe lengths than competitive ASDs, its key benefits are the extended detector life, reduced maintenance and Total Cost of Ownership (TCO).

VLI has an IP66 enclosure which provides total protection against the ingress of dust and strong water jets. VLI uses an industry first patented intelligent filter which significantly reduces the amount of contaminants entering the detector, hence extending its life.



VLI features Clean Air Zero and absolute calibration to safeguard against nuisance alarms and deliver consistent sensitivity over the life of the product. An integral secondary filter and sub-sampling probe reject larger dust particles further safeguarding against nuisance alarms and extending detector life.



When the warehouse roof structure and rack orientation are favourable, and in-rack detection is not required or practical, beam detection is considered a cost effective solution if standard detection is acceptable. Additionally, the walls of large structures such as those in high bay warehouses flex under various environmental conditions such as low and high temperature, strong wind, heavy rain, etc., causing traditional beam detectors to false alarm due to misalignment. Partially open facilities are exposed to insects, birds, rolling fog, etc., again causing nuisance alarms with standard beam detectors which may also generate excessive faults.

### *An OSID-DE solution can outperform them all!*

So, why is OSID-DE the most optimum solution and not another brand of beam detectors? Let's look again at our detector selection criteria.

### **INSTALLATION COST**

OSID-DE can be deployed for path lengths up to 150 m (490 ft) at maximum sensitivity, outperforming the competition by 50%.

OSID-DE requires only a free line of sight of 0.2 m x 0.2 m (0.66 x 0.66 ft) versus 1.0 m x 1.0 m (3.28 x 3.28 ft) free space for auto-aligning beams. This makes OSID-DE ideal for use through the roof's narrow openings in the metal support structure.

Multi-emitter battery powered solutions can cover up to 5,000 m<sup>2</sup> (53,800 sq. ft) with huge savings on wiring.



The ball and socket arrangement makes alignment of OSID-DE quite simple. A low-cost laser alignment tool is used to rotate the optical spheres until the laser beam from the alignment tool is within proximity to the opposite unit.

No further alignment is required, resulting in extremely fast installation and set-up; approximately four times faster than any other beam detector.

### **MAINTENANCE COST**

Unique in the beam industry, OSID-DE Imagers have an internal log of 10,000 events, storing all significant events such as alarms, faults, UV/IR obscuration, X/Y positioning, temperature and supply voltage, providing vital information about the system's status.

OSID-DE electronically tracks building movement up to 2° wall flex in any direction without generating an alarm or fault. Competitive beams track electronically up to a maximum of 0.6°!

### **RELIABILITY**

OSID-DE's dual wavelength and CMOS imager enable the system to differentiate between smoke and other nuisance sources such as dust, birds, insects, sunlight etc.

The CMOS imager will track building movement and vibration without generating an alarm.

Reflections from shiny surfaces are ignored by the detector's intelligent algorithms.

OSID-DE performs a self-check twice a second verifying its power levels and compensates for dirt build-up on the lenses over 24 hours until 20% of the signal is attenuated.

OSID-DE has the ability to detect and distinguish between flaming and smouldering fires so its detection is optimum at all times.



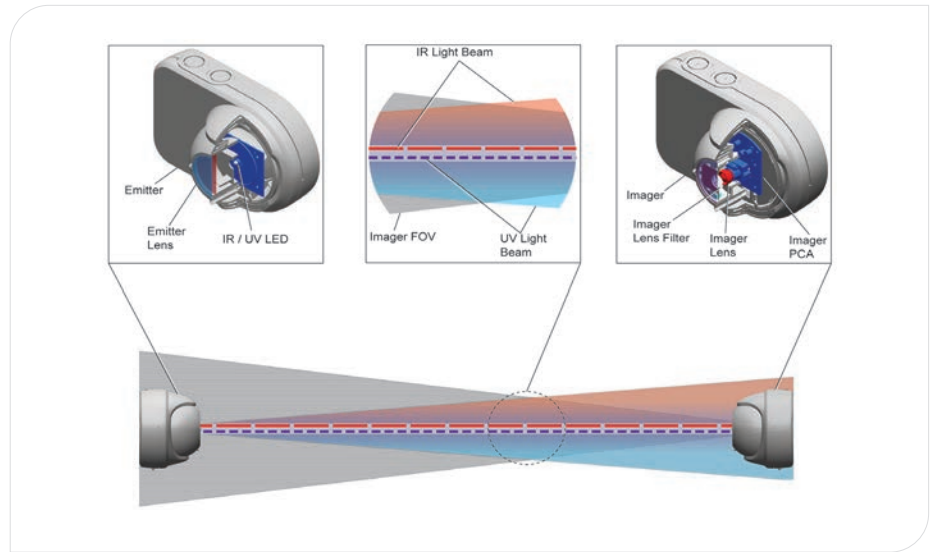
## PROOF OF SUPERIOR TECHNOLOGY

The superior performance of OSID-DE is obtained through the unique and innovative use of dual wavelength beams, UV and IR, and a CMOS optical imaging sensor.

Competitive beams use a single IR wavelength and a photo receiver.

Using dual wavelength beams provides additional information on particle size, where smoke attenuates UV light more than IR, whereas dust and solid objects attenuate both frequencies equally.

In the CMOS CCD camera, every one of the 100,000's pixels is equivalent to a photo receiver, providing significant amount of information on Emitter location and movement.



## SUMMARY

Warehouse applications are wide and varied and present various challenges to effective and reliable smoke detection and ongoing maintenance. Regardless of the type of warehouse Xtralis offers the most optimum smoke detection solutions to meet the application's protection needs, reduce installation cost and provide the highest reliability and lowest total cost of ownership over the life of the installation. VESDA-E VEU, VESDA VLI and OSID-DE are unbeatable technologies to protect any type of warehouse.



## PLEASE ALSO VISIT [WWW.XTRALIS.COM](http://WWW.XTRALIS.COM) FOR RELATED LITERATURE:

- VESDA Warehouse Application Brochure (Doc. No. 11597)
- VESDA Generic Warehouses Application Note (Doc. No. 13341)
- OSID-DE Production Floor Warehouse Application Brochure (Doc. No. 19618)

## ABOUT XTRALIS



Xtralis is a leading global provider of powerful solutions for the very-early and reliable detection of smoke, fire, and gas threats. Our technologies prevent disasters by giving users time to respond before life, critical infrastructure or business continuity is compromised.

We protect highly valuable and irreplaceable assets and infrastructure belonging to the world's top governments and businesses.

**To learn more, please visit us at [www.xtralis.com](http://www.xtralis.com)**