VESDA®

Air Sampling Smoke Detection

Large Open Spaces

Very early warning smoke detection protects the occupants, service and revenue associated with:

- Aircraft hangars
- Airport terminals
- Cathedrals
- Churches
- Exhibition & convention centers
- Hotel atriums
- Large warehouses
- Office tower atriums
- Railway stations
- Shopping centers
- Stadiums
- Superstores

xtralis®

Large open spaces and the challenge of protecting them from the threat of fire.

Consider…

A fire starts because of an electrical fault on the second level of a three storey shopping centre. The smoke spreads to the atrium section of the shopping centre, but the smoke doesn't have sufficient energy to rise up to point-type detectors located on the ceiling of the atrium. The fire is not detected.

Smoke continues spreading on the second level of the shopping centre, until it is noticed by shoppers who panic and run to the escalators. Meanwhile, a maintenance person stumbles across the source of the fire and in an attempt to prevent the fire spreading, he shuts off the power mains. The lighting in the shopping centre goes out, and the occupants are left to fend for themselves in the darkness; smoke is building up and the sense of panic heightens...

Conventional detectors are not suitable for large open spaces

Conventional point-type and beam-type detectors are not sensitive enough to provide early warning of smoke in a large open space. By the time smoke is detected a fire would have to be very large, creating sufficient heat and smoke to rise up to conventional point-type detectors located on the ceiling.

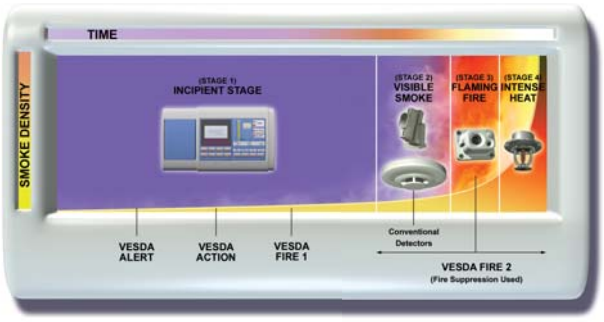


Figure 1 - Fire Growth Curve
The incipient stage (Stage 1) of fire provides the widest window of opportunity to detect and control the spread of fire. VESDA smoke detectors can be configured to multiple alarm levels during the incipient stage of fire.

With VESDA - smoke is detected early, information is available to assess the situation, and a plan is in place to respond accordingly. Lives are saved, assets are protected, and business continues as normal.

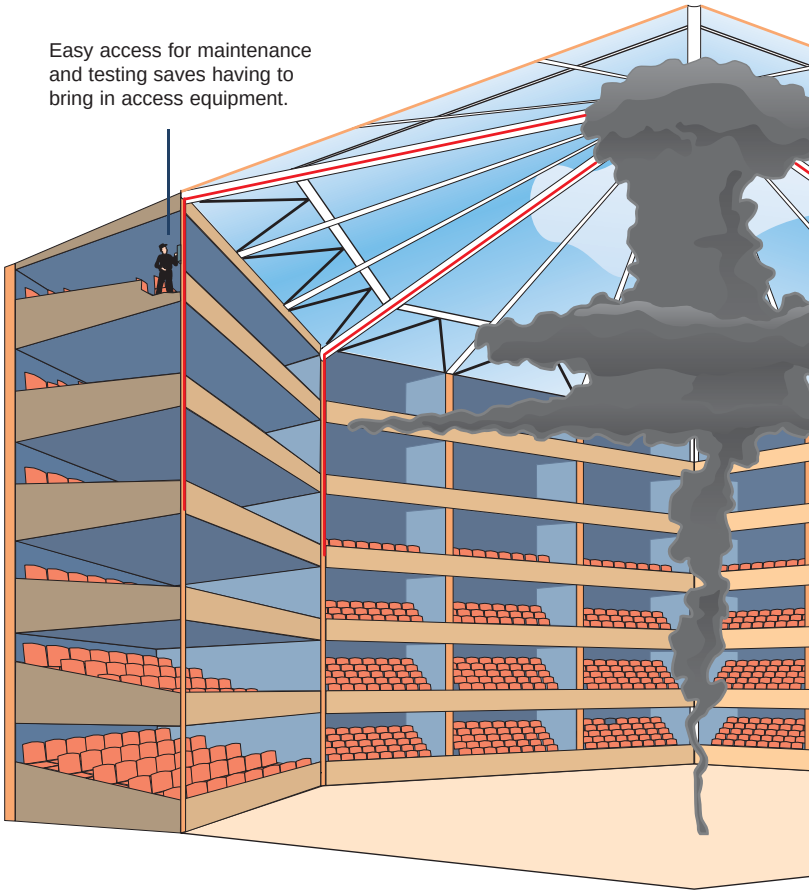
The VESDA advantage

VESDA - the world's leading air sampling smoke detection system - provides the earliest warning of a potential fire event (refer to figure 1). A VESDA system is highly sensitive, and excels at detecting diluted smoke. A safe and orderly evacuation is assured with the extra time that a VESDA smoke detection system provides.

What are the challenges associated with designing a smoke detection system for large open spaces?

Dealing with smoke stratification

Smoke stratification occurs when solar radiation creates a hot layer of air under the ceiling of an enclosed area. When the hot layer of air is warmer than the smoke plume, it will prevent the smoke reaching ceiling-mounted point-type detectors.

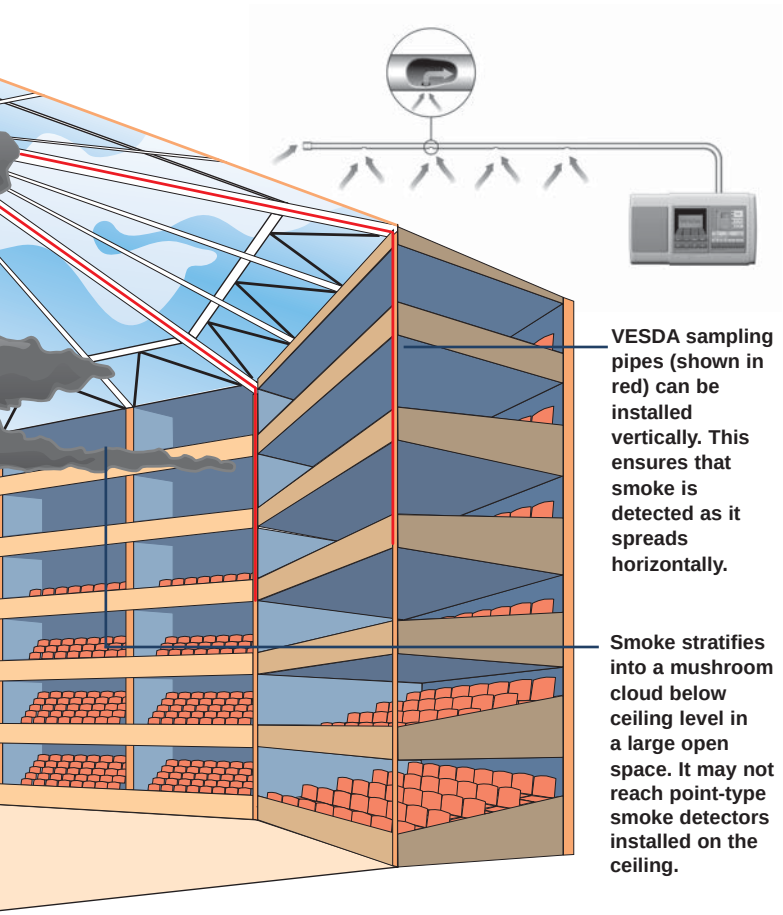


A VESDA system is comprised of a detector and a series of sampling pipes. This enables the designer to place the pipe network where the smoke will travel, in addition to the ceiling, as may be required by codes and standards.

Overcoming the effects of smoke dilution

Smoke in a large open area will be highly diluted as it moves through a large volume of space, an effect which is compounded by air conditioning systems. Selecting a smoke detector with high sensitivity and multiple sampling points is essential in this environment. Beam detectors are often used for this application, but they are relatively insensitive - a fire would be quite large before being detected. A point-type detector measures smoke at a single point in space. If there is not enough smoke pooled at that point, the detector will not alarm.

VESDA detectors sample smoke through holes (sampling points) in the pipe network. Each sampling point contributes to the smoke being measured at the detector, enabling much earlier fire detection.



Maintaining a smoke detection system high above ground level

All detection systems require periodical maintenance and testing, as per local standards. Accessing conventional point-type detectors for maintenance within large facilities with tall ceilings is difficult. Service crews often require costly machinery and platforms to enable safe access to the detectors.

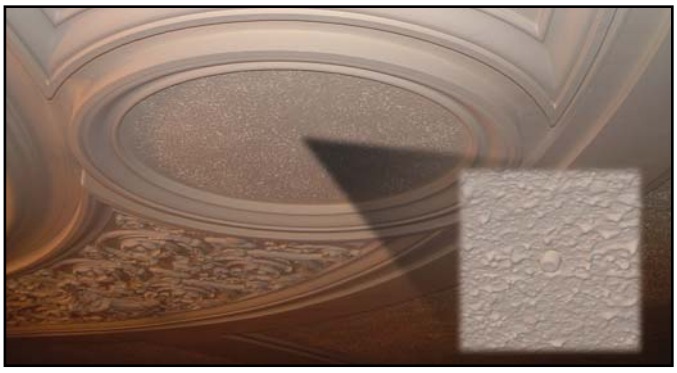
VESDA detectors can be mounted in accessible locations, enabling easy access to the detector and pipe network.

Preventing nuisance alarms

Beam-type smoke detectors are often prescribed for atriums and large open spaces. Unfortunately, seasonal banners and decorations can impede the beam, causing false alarms or faults. A VESDA smoke detection system is not susceptible to such false alarms. VESDA smoke detectors have multiple alarm levels and thresholds, enabling them to be used in conjunction with various planned response options. For example, the first alarm could be used as a low level alarm, instructing a security guard to investigate the event. The second alarm could alert management that the risk has escalated. In the unlikely event that the situation could not be controlled, the third alarm could initiate an evacuation and alert the fire department.

Preserving architectural features

Traditional spot type smoke detectors can detract from the architectural beauty of a building. Using a concealed pipe network to supply air samples to a hidden VESDA smoke detector means that the smoke detection system can be virtually invisible within the building.



Close-up of a VESDA sampling hole in an intricate theatre ceiling

Xtralis's global network of offices and representatives means that help is soon at hand

Examples of large, open spaces that are protected by VESDA smoke detectors:

Sports venues

Sydney Aquatic Center, Australia
Olympic Velodrome, Sydney, Australia
Melbourne Sports & Aquatic Center, Australia
Xscape Indoor Skiing Center, UK

Convention centers

D. H. Lawrence Convention Center, Pittsburgh, USA
Hong Kong Exhibition Center, Hong Kong
Kunming International Convention Center, China
Gaylord Opryland Resort & Convention Center, TX, USA
Hyderabad International Convention Center, India

Hotel & entertainment venues

Jupiters Casino, Gold Coast, Australia
Sydney Opera House, Australia
Museum of Scotland, UK

Shopping centers

Bluewater Shopping Center, UK
The Trafford Shopping Center, UK
Braehead Shopping Center, UK

Transport hubs

ShangHai South Railway Station
Hong Kong Airport Terminal Building
Hong Kong Airport Freight Terminal

Office buildings

Langham Place, Hong Kong
Motorola, Austin, Texas, USA
AstraZenica, Manchester, UK

Heritage

St. Pauls Cathedral, UK
Newcastle Cathedral, UK
Stormant Castle, Ireland

Global Approvals

CCCF

Need more information?

Call the Xtralis's office closest to you, as listed below. Visit www.vesda.com to access information about the VESDA smoke detector product range and our Design Guides.

www.xtralis.com

The Americas +1 781 740 2223 **Asia** +852 2297 2438 **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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