

Industrial VESDA VLI Smoke Detection:
When Ruggedness Meets Sophistication for Volatile Industrial Fire Detection Applications

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The fire and smoke detection markets in developed countries are well established and predominantly driven by fire codes. In North America, fire and smoke detection has been undergoing a paradigm shift to procure more sophisticated and high-quality equipment at competitive rates, with local fire codes supporting the process. For manufacturers, the fundamental challenge is to develop cost-effective, easy-to-use, flexible, and robust solutions that can be manipulated easily and meet strict specifications to satisfy the demands posed by the industry. Industry participants are competing on multiple sensitivity levels for early warning at high-risk facilities and multistage alarm selection in order to avoid unnecessary evacuation. Although the fire industry has many current products available for use, it is transitioning toward more intelligent products better suited to the applications and environments. Unfortunately, more often than not, conventional products are installed or specified in many industrial applications perceived as being suitable; however, most create ongoing issues for the customer.

WEIGHING THE BENEFITS AND PERCEIVED WEAKNESSES OF ASPIRATING SMOKE DETECTORS

Aspirating smoke detectors (ASD) are designed to be exceptionally reliable, long-lasting, hassle-free detectors available for any facility type. Its technology is classified as “Very Early Warning” smoke detection and is the least prone to nuisance alarms. While its high sensitivity level is a major benefit, it is also the basis for the market’s misperception that ASD systems are mostly suitable for clean environments and lack the ruggedness to support industrial applications.

The main concern lies in that high contamination in industrial environments would increase the presence of false alarms in these more sophisticated products, compromise its effectiveness, and reduce the detector’s lifetime. Consequently, industrial customers continue to invest in contemporary detectors that ultimately lead to additional maintenance and operating costs with less reliability.

Xtralis created the Industrial VESDA VLI detector to withstand the toughest environmental conditions, providing a product solution with the desired level of performance within rugged environments and the maximum level of flexibility with minimal cost increases and usability sacrifices. Particular design features of the VLI simplify installation and maintenance, while its rough casing puts the user’s mind at ease.

Its value proposition includes longevity, reduced nuisance alarms, reduced maintenance needs, and full integrity throughout its lifetime.

THE CONSUMER’S DILEMMA AND COMMON MISPERCEPTIONS

While there are a number of alternatives to ASDs for industrial unclean environments, the market tends to opt for spot detectors. This seemingly robust product, although very capable in traditional applications, offers inferior detection that can unnecessarily compromise safety when conditions are less than normal. Detectors are prone to unwanted alarms and contamination issues with increased maintenance. As a passive system, spot detectors must be

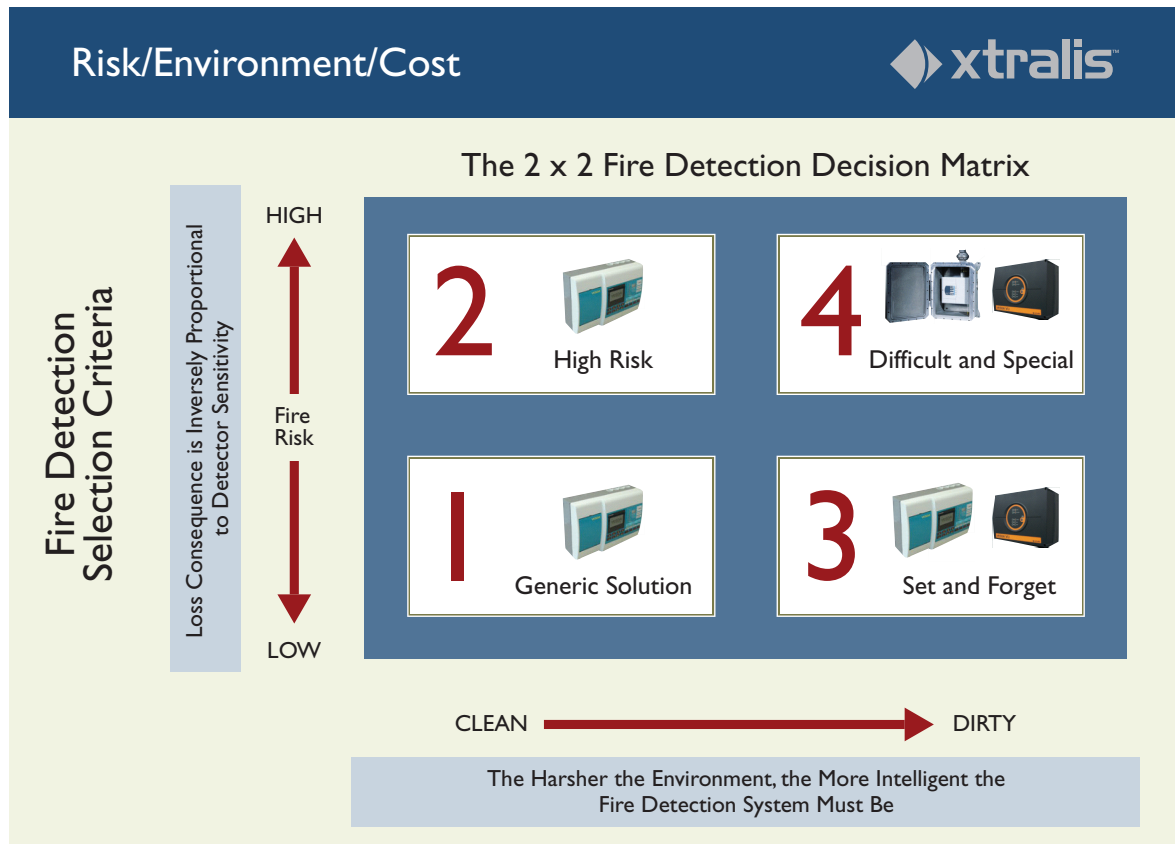
kept clean constantly. Hospital wards are a prime example of an environment that is perceived to be clean but is very challenging to the performance of spot detectors. These facilities are filled with linen that shed fibers, as hundreds of beds are changed daily. Lint can be small enough to pass through the detector's insect screen and cause a false alarm or gradually build up on the screen, obstructing the ingress of smoke, thus preventing proper smoke detection. In addition, these detectors will pass as properly functioning through electrically poling assessments because they are electrically intact. However, there is no consideration for potential smoke blockage that degrades a detector's functioning. In contrast, aspirating systems are fully monitored for integrity, as air samples are constantly drawn and analyzed for proper air passage and smoke intensity.

Unlike passive detection, ASDs are "active" systems that draw in air samples through tiny holes in a pipe network searching for smoke. The samples received at the detector are analyzed and display the smoke intensity at the detector. Typically, the ASD system will also send a signal to a fire detection panel to raise an alarm. Because ASDs analyze air samples for combustion particles at the very early stages, they can alert to a fire often before flames are visible, providing building staff greater reaction time to address the situation and prevent the possible need for evacuation. Its inconspicuous nature blends into the environment, minimizing distraction when designed and installed in museums, for example. While many specifiers, industry practitioners and end users believe that ASD systems are only suitable for "clean" environments because of their sensitive nature, these smoke detectors have been used successfully in paper shredding facilities and even coal-crushing plants. For added protection in these industrial applications, successful use requires an additional protective casing over the installed detector, additional filtration and certainly sensible maintenance practices. Overcoming the consumer's hesitations and simplifying the use of ASDs were motivating factors for Xtralis to develop the VLI.

The selection of the correct or most appropriate form of fire detection for the risk and environmental conditions is the first step in minimizing issues with smoke detection in industrial applications. A risk/application approach can best be illustrated by using a simple 2x2 detection decision matrix (Figure 1). Both the X and Y axes can determine the approach in that "Y," the Fire Risk factor (Low or High), essentially determines the consequence of loss and thus the sensitivity of the detection. On the other hand, the "X" axis, the Environment (Clean or Dirty), can determine the suitability and intelligence of the detector to deal with the conditions. The more contaminated the environment, the more intelligent the detector must be to function reliably in the conditions to offer effective detection, performance and longevity.

While the choice of appropriate detection can be perplexing for some, Xtralis ASD systems fit within all quadrants of the 2X2 matrix and can offer a solution for a multitude of risks and environments.

Figure 1: Fire Detection Decision Matrix



Source: Xtralis

THE VLI RESOLVES ASD MARKET CHALLENGES

Historically, ASD detectors have been widely used in information technology, telecommunications, and clean room facilities. However, their use has seen rapid adoption over the years in many contaminated industrial environments, even in applications such as polluted transportation hubs. Nevertheless, a major challenge persists within the very early smoke detection market to overcome the misperception of ASDs' hypersensitivity and proneness to false alarms in "dirty" environments.

The VLI overcomes market barriers through visible, physical design features and technological advancements that assure the consumer of its durability and proper functioning. Low maintenance costs and excellent performance are key, value-added features that facilitate cost savings of up to 40 percent through the life of the product. Beta trials and previews have been received with great excitement worldwide, including in the United States, India, China, Australia, South Africa and throughout Europe.

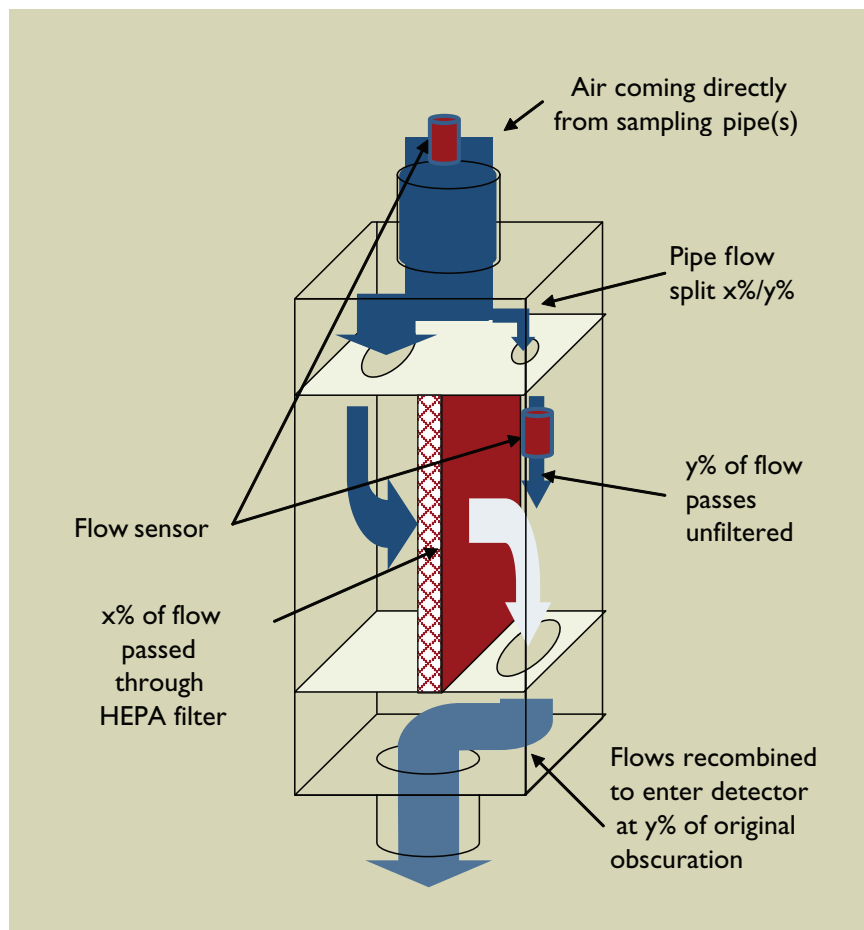
VLI's simple design makes installation and maintenance highly intuitive and user-friendly. A rugged casing makes the detector durable for many of the toughest environmental conditions, including washdowns of a facility. Its all-in-one design means a user simply screws the detector onto the wall and installs the

sampling pipes, in most cases without the additional installation of the external protective casing or pre-filters that are necessary for traditional ASD detectors. Furthermore, the detection chamber, aspirator, and filter are all field-replaceable, providing ease of maintenance and minimizing downtime.

INNOVATION IN THE DETAILS: AN INTELLIGENT FILTER THAT PROLONGS THE DETECTOR'S LIFETIME

VLI incorporates an industry-first, patented, fail-safe “intelligent filter” technology designed to reduce contamination that might enter a detector, extending detector life and reducing service and maintenance requirements. Consistent and reliable detection chamber performance is ensured by another patented Xtralis innovation, a novel “clean air zero” system that safeguards against nuisance alarms. The VLI’s active monitoring of air paths eliminates the need for compensation algorithms, which are required for spot detectors and can compromise very early smoke detection ability. The VLI also builds on VESDA’s absolute calibration, clean-air barriers for optics protection, and ultrasonic flow-sensing—critical features for any industrial smoke detector.

Figure 2: Patented HEPA Filter Incorporated in the VLI



Source: Xtralis

Beyond life safety concerns, an active fire and life safety system requires high reliability and detection capabilities for critical entities with 24/7 operation, high-value infrastructure, or irreplaceable assets.

Having created the VLI, a detector that is visibly more durable and technologically more tolerant of dirty environments, Xtralis enables more users to adopt the superior ASD technology with peace of mind.

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