**PRODUCT**

VEA-040-A00-NTF, VEA-040-A10-NTF Intelligent VESDA-E VEA Point-addressable Air-sampling Smoke Detectors.

# GENERAL

## Scope

This document provides specification details of the VESDA-E VEA Air-sampling Smoke Detection (ASD) products to assist in their installation and commissioning. VESDA-E VEA range provides 40 point-addressable smoke detection points. The Point-addressable VESDA VEA ASD is referred to as ASD throughout this document.

## ASD System Information

1. An Early Warning Fire Detection System like the Point-addressable VESDA-E VEA ASD System shall be installed throughout the areas nominated on the drawings.
2. The ASD system shall consist of:

Highly sensitive LASER-based smoke sensor module with replaceable filter

High capacity pump and a rotary valve connected to a network of individual microbore tubes with individual sampling points on microbore tubes.

An LED display, and when required an optional LCD display may be provided to monitor each ASD detector.

Optional relay module to annunciate individual alarms for the sampling points connected to the microbore tubes.

Optional VESDAnet networking to annunciate alarms and faults through High Level Interface (HLI) and / or on monitoring software such as VSM.

## Approvals and Standards

The ASD must be of a type submitted to, tested, approved, and/or listed to the Standards mentioned below by a Nationally Recognized Testing Laboratory (NRTL):

UL268 and UL268A: UL (Underwriters Laboratories Inc), USA

UL268: ULC (Underwriters Laboratories Canada), Canada

Category 7259: CSFM (California State Fire Marshal), USA

FM (Factory Mutual), and FM approved for Hazardous Locations,

Class 1, Div.2, Groups A, B, C, D (3020906), USA

CSFM (California State Fire Marshall, USA)

LPCB (Loss Prevention Certification Board), UK

ActivFire, Australia

VdS (Verband der Sachversicherer e. V.), Germany

AFNOR, France

VNIIPO, Russia

CCCF, China

KFI, Korea

## Codes, Standards or Regulations

The ASD shall be installed to comply with one or more of the following codes or standards:

NFPA Standards, US

NEC Standards, US

Fire Industry Association (FIA), Code of Practice for Design, Installation, Commissioning & Maintenance of Aspirating Smoke Detector (ASD) Systems

NZS 4512 : 2003

Local codes and standards

## Quality Assurance

### Manufacturer

1. The manufacturer shall have a minimum of 35 years production experience in the design and manufacture of high sensitivity air sampling smoke detection systems.
2. The manufacturer shall be certified as meeting ISO 9001:2008 for manufacturing.

### Equipment Supplier

1. The equipment supplier shall be authorized and trained by the manufacturer to calculate/design, install, test and maintain the ASD system.
2. The equipment supplier shall be able to produce a certificate of training from the manufacturer.

### Installer

1. The equipment installer shall be authorized and trained by the manufacturer and shall have the ability to design a system based on code requirements.
2. The installer shall be capable of providing calculations, design, and testing documents upon request.

### Warranty

1. The manufacturer shall guarantee the product by warranty for a period of two years.
2. Any damage to the ASD due to poor handling or operating outside its operational limits will void its warranty.
3. The installation and programming of the ASD shall be completed by a factory-trained installer.

### Training

1. The manufacturer and their representatives shall make available adequate accreditation training to all personnel involved in the supply, installation, commissioning, operation and maintenance of the ASD system.

## Documentation

The following documentation shall be supplied.

Product data and site drawings shall be submitted and shall include pipe layout, operational calculations and performance criteria. Tools such as ASPIRE may be used to generate this material.

A copy of the manufacturer’s installation, operation and maintenance manuals shall be supplied upon completion of the installation.

System commissioning data shall be supplied (in a format recommended by the manufacturer and per the instructions provided by the manufacturer) within 30 days of completion of the installation.

# SYSTEM DESCRIPTION

## ASD System Features

The ASD system shall:

Consist of a highly sensitive LASER-based light scattering smoke sensor module, filter, rotary valve, pump, microbore tubes and sampling points.

Be modular, with each detector having display with indicator LEDs and a reset control button and/or optionally with a LCD Display showing detector status including fault categories and smoke level relative to the fire alarm setting.

Consist of an air sampling microbore tube network with each tube having individual sampling point at the end to transport air to the detection system.

Support up to 40 point-addressable detection points with two individual smoke detection chambers each supporting 20 detection points.

Support optional equipment which may include a dedicated graphics package such as VSM.

Be tested and approved to cover up to 3,345 sq. m. (36,000 sq. ft.) area subject to system design and local regulatory requirements.

Be approved to provide Early Warning Fire Detection (EWFD) / Class A / Class B and Standard Fire Detection (SFD) / Class C.

Generate a global detector level fire alarm during smoke event and then identify the fire location through addressable detection sampling points by scanning through the rotary valve.

Provide four output levels for the global detector alarm corresponding to Alert, Action, Fire 1 and Fire 2.

Provide individual sampling point tube Fire 1 alarm once global Fire 1 alarm is raised.

Allow:

Detection of sampling point and microbore tube blockage.

Detection of microbore tube breakage and sampling point presence at set intervals.

Cleaning of sampling point at set intervals.

Have a facility to perform centralized smoke testing.

Report any fault on the detector by direct communications on the SLC loop of a fire alarm control panel or a monitoring software tool running on a PC or hand-held device such as a tablet or smart phone.

Be capable of setting filter life based on the environment.

## Detection Technology

### Light Source

The Detection Chamber shall employ a highly sensitive LASER light source.

### Detection Method

The detection sensing method shall use a laser light source and at least one photodiode spaced inside the detection chamber to detect smoke particles. Smoke detection shall include:

Minimizing the effect of large dust particles on the true smoke obscuration.

Settable filter life based on the environment with notification when filter maintenance is required.

### Absolute Calibration

The detection chamber shall be factory calibrated and shall not use adaptive algorithms or drift compensation techniques to adjust the sensitivity or detector output from that established during commissioning.

## Intelligent Fire Alarm Control Panel Connectivity

The ASD shall be capable of connection to the ONYX series Fire Alarm Control Panels (FACP) NFS-320, NFS2-640 and NFS2-3030 via a Signaling Line Circuit (SLC) using the communications protocol native to the system, without the use of any additional hardware.

The FACP shall be capable of monitoring and annunciating up to four smoke event thresholds on the ASD and several trouble conditions.

The FACP shall be capable of monitoring and annunciating individual alarms for the sampling points connected to the microbore tubes on the ASD.

Each event threshold shall be capable of being assigned a discrete type ID at the FACP, including Aspiration Alarm, Aspiration Pre-Alarm, Aspiration Supervisory, Aspiration Non-Fire, and Aspiration Air Reference, which will determine how the event will be annunciated at the FACP.

The FACP shall support flexible system programming for all event levels, and shall be capable of simultaneous activation of multiple event levels.

The following operations shall be able to be performed on the ASD via the FACP:

Disable/enable

Reset airflow baseline

Detector trouble conditions annunciated at the FACP shall include indications for:

Low air flow

High air flow

Configuration (programming) fault

Device in service mode

Communications loss

Time lost or not set

Aspiration fault

Filter fault

Detector fault

Detector initializing warning

Power fault.

## Secondary Communications

Detectors shall provide inbuilt secondary communications for monitoring and configuration using the following physical media:

USB

10/100 BaseT Ethernet

WiFi (802.11b/g)

# PRODUCTS

## Manufacturer

Air Sampling Smoke Detection System: Acceptable Manufacturer.

NOTIFIER By Honeywell, 12 Clintonville Road, Northford CT 06118, USA

## Manufactured Units(s)

The VESDA-E VEA ASD system can be supplied in the following configurations:

|  |  |
| --- | --- |
| **Part Number** | **Description** |
| VEA-040-A00-NTF | VESDA-E VEA VESDA-E VEA-40 Aspirating Smoke Detector with LEDs, 40 Point-addressable Detection Points, coverage area up to 3,345 sq. m. (36,000 sq. ft.) subject to system design and local regulatory requirements. |
| VEA-040-A10-NTF | VESDA-E VEA VESDA-E VEA-40 Aspirating Smoke Detector with LEDs and LCD, 40 Point-addressable Detection Points, coverage area up to 3,345 sq. m. (36,000 sq. ft.) subject to system design and local regulatory requirements. |
| VSP-980-xyy to  VSP-984-xyy | VESDA-E VEA Sampling Points (x = W for White = B for Black, yy = blank for single sampling point = 22 for a set of 22 sampling points) |

## Detector Features

The detector shall incorporate the following features.

For the VEA Detector, the Smoke Sensor Module, Filter, Pump, Rotary valve and Relay Outputs shall be housed in a metal enclosure and shall be arranged in such a way that air is drawn from the fire risk area by the pump and a sample is passed through a sample filter and the smoke sensor module.

The detector shall employ a highly sensitive LASER light source and a photodiode.

The detector shall have 40 microbore sampling tube inlets and must employ a flow measurement arrangement to detect individual flow per tube.

The detector shall generate a global detector level fire alarm (Fire-1) during smoke event and then identify the fire location through addressable sampling point detection point by scanning the rotary valve.

The detector shall have four output levels for the global detector alarm corresponding to Alert, Action, Fire 1 and Fire 2. The Fire-1 level shall be selectable from three options corresponding to sampling point sensitivity of High = 1.6% obs/m (0.5% obs/ft), Enhanced = 4% obs/m (1.3% obs/ft), and Standard = 8% obs/m (2.5% obs/ft).

The detector shall have two pre-alarm smoke alarm thresholds with adjustable Alert threshold set to a % of Fire-1 threshold and Action threshold set in the middle of Alert and Fire-1 thresholds.

The detector shall have global Fire-2 alarm automatically set to 2xFire-1 setting.

The detector shall have a test port per detection chamber to facilitate centralized smoke test under user control.

The detector shall have ability to perform leak test by isolating the external microbore tube network to ensure integrity of internal detection air path.

The detector shall employ modular construction allowing field replacement of the filter, smoke sensor module, rotary valve and the pump.

The detector shall also incorporate facilities to transmit the following fault categories:

Detector

Air flow

Filter

System

Zone

Network

Power

Chamber

Module

The filter shall be a disposable filter cartridge and shall be capable of filtering particles in excess of 20 microns from the air sample.

A second filter shall be ultrafine, removing more than 99% of contaminant particles of 0.3microns or larger, to provide a clean air barrier around the detector’s optics to prevent contamination and increased service life.

The pump shall be a capable of allowing for multiple microbore sampling tube runs up to 100m (328ft) each with a transport time per applicable local codes.

The Assembly must contain seven or more pre-configured relays. The relays must be rated at 2 Amp at 30 VDC.

The detector shall have built-in event and smoke logging. It shall store smoke levels, alarm conditions, operator actions and faults. The date and time of each event shall be recorded. Each detector shall allow storage of up to 20,000 events and does not require the presence of a display in order to do so.

The detector shall incorporate a galvanically isolated General Purpose Input (GPI) which activates in the event of an applied voltage of 5 to 50VDC and assigned to Reset function.

The detector shall incorporate a monitored voltage-free input assigned to Reset function, to be used with isolated relay contacts, which is supervised using a 10k Ohm terminating resistor.

## Displays

The VEA detectors shall provide an LED user interface; four LEDs to indicate Alert, Action, Fire 1 and Fire2 alarm events; one trouble LED; one disable / standby LED; and power On / Off indication. All LEDs shall have appropriate symbols without any text.

In addition to the LED user interface, the VEA detector shall optionally provide an LCD user interface with following characteristics:

Color LCD touch screen user interface with bar graph display.

Alarm threshold indicators for Alert, Action and Fire 1.

Fault icons indicating faults for these categories: detector, chamber, filter, flow, aspirator, network, power and external module where applicable.

A touch screen interface to allow scrolling through status screens on the LCD.

## Monitoring

The system shall have available software to monitor all devices connected to a system. Such software shall be provided to run on:

PC-based, Android-based or iOS-based hardware

A dedicated monitoring device mounted remotely from any detector

## Configuration and Programming

Configuration and programming may be performed using a Windows® application such as Xtralis VSC running on a PC by direct connection to a detector or through Ethernet network.

Configuration and programming tool shall support the following features at a minimum:

Programming of any device on the VESDAnet system as per the device documentation.

Viewing of the status of any device in the system.

Adjustment of the alarm thresholds of a nominated detector.

Setting of Day/Night, weekend and holiday sensitivity threshold settings.

Multi-level password control.

Programmable latching or non-latching relay operation.

Programmable energized or de-energized relays.

Programmable high and low flow settings for airflow supervision.

Number of microbore tubes in use and input maximum length of a microbore tube.

Programming if sampling points are used on a VEA detector.

Programmable maintenance intervals.

Facilities for referencing with time dilution compensation.

Testing of relays assigned to a specific zone to aid commissioning.

## Security

The following security measures shall be provided.

Connectivity via wireless access shall support WPA2 encryption with encryption key.

Access to a detector via Ethernet or WiFi shall be protected using a detector password specific to the detector and in addition to the WiFi encryption key.

All software connecting to a detector or peripheral shall support an authentication protocol to verify that it has been supplied by the manufacturer of the system.

## Upgrading

There shall be provision for field upgrading the firmware in the system using a USB memory key connected directly to the detector, avoiding the need for a separate PC for this function.

# APPLICATION

## Global Alarm Levels

The ASD system shall Generate a global detector level fire alarm during smoke event and then identify the fire location through addressable detection sampling points by scanning through the rotary valve.

The ASD system shall have four (4) selectable global alarm thresholds. The four alarm levels may be used as follows:

1. Alarm Level 1 (Alert) - Activate a visual and audible alarm in the fire risk area.
2. Alarm Level 2 (Action) - Activate the electrical/electronic equipment shutdown relay and activate visual and audible alarms in the Security Office or other appropriate location.
3. Alarm Level 3 (Fire 1) - Initiate an alarm condition in the Fire Alarm Control Panel to call the Fire Brigade and activate all warning systems.
4. Alarm Level 4 (Fire 2) - Activate a suppression system and/or other suitable countermeasures for a full zone covered by a VEA detector.

|  |  |
| --- | --- |
| Beschreibung: Hinweis-i2_8 | ***Notes!***  The alarm level functions as listed are possible scenarios. Consideration should be given to the best utilization of these facilities for each application and the requirements of local authorities (e.g. Authorities Having Jurisdiction in the US). |

## Alarm Level Selection

The ASD system global alarm and sampling point alarm shall have following three (3) settings available for selection Fire 1 level:

1. High = 1.6% obs/m (0.5% obs/ft)
2. Enhanced = 4% obs/m (1.3% obs/ft)
3. Standard = 8% obs/m (2.5% obs/ft)

## Default Alarm Settings

Selection for the alarm levels shall be determined by the requirements of the protected environment. However, the setting for Fire 1 (Alarm Level 3) shall always appear as 100% on the bar graph scale. Default settings of the ASD unit shall be:

Alarm Level 1 (Alert) 25% of Fire-1

Alarm Level 2 (Action) Automatically set midway between Alert and Fire-1

Alarm Level 3 (Fire 1) Enhanced

Alarm Level 4 (Fire 2) 2.0% obs/m (0.625% obs/ft)

## Default Settings for the Alarm/Fault delays

Alarm Level 1 (Alert) 10 seconds

Alarm Level 2 (Action) 10 seconds

Alarm Level 3 (Fire 1) 10 seconds

Alarm Level 4 (Fire 2) 10 seconds

Air Flow Fault 4 minutes

## Power Supply and Batteries

The system shall be powered from a regulated supply of nominally 24V DC. The battery charger and battery shall comply with the relevant Codes, Standards or Regulations. Typically 24 hours standby battery backup is required followed by 30 minutes in an alarm condition.

Local Power Supply Standards that may apply:

UL 1481 Listed - provided the power supply and standby batteries have been appropriately sized / rated to accommodate the system’s power requirements.

US Telecommunication Central Office Power Supply - the system shall operate on negative 48 VDC (provided continuously from the telephone central office power source) converted to 24VDC.

## Microbore Sampling Tube Network

### Microbore Sampling Tube

The microbore sampling tube shall comply with the following requirements:

6mm (0.24”) OD / 4mm (0.16”) ID and 4mm (0.16”) OD / 2.5mm (0.1”) ID tubes shall be used.

Tubes shall have adequate marking to meet local codes and standards.

Tubes shall be UL listed / recognized.

Tubes shall be approved for use in the protected environment.

Where false ceilings are installed, the sampling tubes shall be installed above the ceiling, and sampling points shall be installed on the ceiling and connected to the sampling tube.

The sampling tubes shall be of the same length or use the manufacturer’s guidelines to run tubes of the required lengths using two diameter tubes (6mm (0.24”) and 4mm (0.16”) OD).

Maximum tube length shall be up to 100m (328ft), however shorter tube lengths may be accommodated in accordance with the manufacturer’s guidelines.

All joints in the sampling tubes must be air tight and made by using manufacturer recommended connectors.

### Sampling Points

The sampling points shall comply with the following requirements:

Sampling points shall not be separated by more than the maximum distance allowed for conventional point detectors as specified in the local codes and standards. Intervals may vary according to calculations. For AS1670.1-2004 the maximum allowable distance is 10.2m. For FIA the maximum allowable distance is 10.6m. For NFPA the maximum allowable distance is 30ft.

Each sampling point shall be identified in accordance with Codes or Standards.

Sample point shall have inbuilt mechanism to enable sampling point testing and microbore tube integrity testing from the VEA detector.

# EXECUTION

## System Installation

The contractor shall install the entire detection system in accordance with the national and local codes and manufacturer's System Design Manual.

### ASD Detector Mounting

1. The detector shall be capable of vertical mounting with sample air inlet port(s) directed on the right hand side for microbore tube entry.
2. The detector shall be capable of mounting directly to a wall using screw fasteners or by using a stainless steel mounting bracket such as the VSP-970.

### Transport Time

Wherever possible the transport time (i.e. the time taken by smoke sampled to reach the detector) for the least favorable sampling point i.e. from the longest microbore tube shall be less than less than 90 seconds.

Local codes and standards may also apply. For example:

AS1670, Part 1 Australia 90 Seconds

FIA Code of Practice UK 120 Seconds

NFPA 72 The Americas 120 Seconds

NFPA 76 The Americas 60 Second

When used within the EU the maximum transport times shall be in accordance with the limits approved under EN54-20.

## System Commissioning

### Detector configuration

There shall be provision for a PC software tool such as VSC to configure all user modifiable parameters of the VEA detector.

### Commissioning Tests

1. The contractor shall allow for the manufacturer’s representative to attend commissioning of the entire installation in the presence of the owner and/or their representative.
2. All necessary instrumentation, equipment, materials and labor shall be provided by the Contractor.
3. The Contractor shall record all tests and system configuration and a copy of these results shall be retained on site in the System Log Book.

### System Checks

Visually check all microbore tubes to ensure that all tube joints, fittings, sampling points, etc., comply with the Specification.

Check the system to ensure the following features are operational and programmed in accordance with the specification.

Alarm threshold levels (for both day and night settings),

Time delays,

Number of tubes in use,

Detector SLC address,

Display address where applicable,

Clock time and date,

Air flow fault thresholds,

Touch screen operable where applicable,

Units set to U.S./S.I. (for US only) or metric for other regions,

Check to ensure that all ancillary warning devices operate as specified.

Check interconnection with Fire Alarm Control Panel to ensure correct operation and reporting on the correct SLC address.

### Final Tests

The contractor shall:

Introduce smoke into each detection chamber through the local test ports provided on the detector to ensure test ports are functional.

Verify that transport time from the sampling port connected to the longest microbore tube does not exceed the local code requirements using smoke signal rise on the VSC / VSM or the LCD display.

Activate the appropriate Fire Alarm zones and advise all concerned that the system is fully operational. Fill out the logbook and commissioning report accordingly.

## Maintenance and Service

### Sample Filter

1. The detector shall incorporate a replaceable cartridge-style filter such as VSP-972 to remove large contaminants from the sampled air.
2. The filter shall be accessible by opening the cover to the field wiring terminal area.
3. Once accessible, the filter shall be removable and replaceable using a readily available tool.

### Spare Parts

1. The detector shall incorporate a replaceable Pump such as VSP-973, follow manufacturer’s instruction to replace the Pump.
2. The detector shall incorporate a replaceable Smoke Sensor Module such as VSP-971, follow manufacturer’s instruction to replace the Chamber Assembly.
3. The detector shall incorporate a replaceable Rotary Valve such as VSP-974, follow manufacturer’s instruction to replace the Rotary Valve.
4. The detector shall incorporate a replaceable Front Covers such as VSP-975 LED Front Cover and VSP-976 LCD Front Cover, follow manufacturer’s instruction to replace the Front Covers.