



## **FAAST Consultant's Specification Guide**

# FAAST

## High Sensitivity Aspirating Smoke Detection Systems

### Scope of Work

Under this section the contractor shall supply, install and commission a very high sensitivity Aspirating Smoke Detector (ASD) system in the designated areas identified in the tender document, the ASD will provide detector sensitivity class selection of A, B, or C as set out in EN54-20 and the FIA Design, Commissioning & Maintenance of Aspirating Smoke Detector (ASD) Systems C.O.P Feb 2012 and or local C.O.P for fire detection and alarm systems.

The ASD will incorporate dual source detection technologies comprising blue LED and Infra Red laser light scattering principles combined with built in advance algorithms to provide immunity to false alarms.

The ASD shall have the capacity to cover an area of 1800m<sup>2</sup>.

The sampling pipe network design shall be by the manufacturer or the manufacturer's approved and trained ESD and shall be produced via the ASD manufactures EN54-20 software design, configure, monitoring tool.

The EN54-20 software design, configure, monitoring tool Pipe IQ shall have Multilanguage selection inclusive of: English, Italian, Spanish, German, French, Dutch, Portuguese, Russian, Swedish, Norwegian, Finish, Hungarian, Chinese.

The EN54-20 software design, configure, monitoring tool Pipe IQ shall produce 3D sampling pipe network designs.

The EN54-20 software design, configure, monitoring tool Pipe IQ shall allow for ASD configuration, sampling pipe network design and ASD monitoring.

The EN54-20 software design, configure, monitoring tool Pipe IQ shall generate the 7 required design documents that verify the design compliancy with EN54-20 and the local Code of Practice for ASD system application inclusive of : System design Class, Transport time, Hole sensitivity, Sample air flow rate, Sample point location, Sample air pressure and sample pipe network configuration.

A single ASD shall not cover more than 2000sq meters or more than 1 fire zone

The ASD will incorporate interchangeable top and bottom pipe network and cable entry.

The installation of the ASD system shall comply with EN54-20 approved equipment inclusive of pipe and pipe fittings and accessories along with the FIA Design, Commissioning & Maintenance of Aspirating Smoke Detector (ASD) Systems C.O.P Feb 2012 and or local C.O.P for fire detection and alarm systems.

The following parts of the ASD system shall be clearly labeled;

- Sample pipe
- Sample points
- ASD Unit
- Power Supplies and Battery enclosures.

The labelling shall clearly identify the purpose and where appropriate the zone location of the equipment.

Where access is restricted i.e. lift shaft, atrium a test point shall be installed in an accessible location to facilitate testing without having to gain access to the protected area.

The commissioning of the installed ASD system must comply with and include performance testing as defined in the FIA Design, Commissioning & Maintenance of Aspirating Smoke Detector (ASD) Systems C.O.P Feb 2012 and or local C.O.P for fire detection and alarm systems.

## **Specification ASD Design Description and Requirements**

The ASD will incorporate dual source detection technologies comprising blue LED and Infra Red laser light scattering principles combined with built in advance algorithms to provide immunity to false alarms.

The ASD sensitivity range will detect smoke particles between 0.0015%/m – 13.0%/m

The ASD will incorporate inbuilt sensitivity drift compensation setting options, so that in the event of contamination by exterior conditions detector sensitivity is maintained.

The ASD will incorporate inbuilt day and night selection options.

The ASD will incorporate an inbuilt mechanical particle separator that removes dust particles > 20 microns to provide immunity to false alarms.

The ASD will incorporate a separate replaceable inbuilt filter that has a 4 year life span as a second filtration process to provide immunity to false alarms.

The ASD will incorporate dual air flow detection consisting of ultrasonic and electronic detection technology monitoring air flow through the pipe network and the detection chamber.

The ASD will incorporate an independent 10 segment air flow pendulum graph indicating low or high air flow alarms at 20% segment intervals as required by EN54-20.

The ASD will incorporate 5 alarm levels and 10 pre-alarm levels via a 10 segment bar graph, the 5 alarm levels will provide the following: Alert, Action1, Action2, Fire1, and Fire2.

The ASD will incorporate 8 form C 3amp programmable relays with latching options that will provide the following alarm signals for external equipment: Alert, Action1, Action2, Fire1, Fire2, Minor fault, Major fault and Isolate.

The ASD will incorporate an in built event log with the capacity to store up to 18000 events.

The ASD will incorporate the facility to create and monitor live or historical trend graphs.

The ASD will incorporate network capabilities complete with integral Ethernet port housing hardware that uses IP/TCP protocol that allows the ASD to be remotely accessed and interrogated via PC, tablet or smart phone, the device will include integral web server for remote monitoring without the need for any specialist software.

The ASD will incorporate 3 password access levels as defined in EN54-20.

No additional software shall be required to achieve the above remote connectivity.

The ASD in-built network features shall be capable of generating any of the ASD alarms to 6 different e-mail account users.

The EN54-20 software design, configure, monitoring tool shall have the capacity to import drawings in dxf format.

The system shall include all materials, equipment and wiring required to install the complete Fire Detection and Alarm System. The system shall include but not be limited to one or more control panels, repeater panels, and detectors, call points, audible and visual alarm indicating devices and relays.

The installation shall include the laying of all cables required for connection of the detection, alarm indicating and other devices along with connections to the power supply as appropriate to the design. All cabling shall conform to the requirements and recommendations of the Fire Alarm Control Panel manufacturer. Any openings /chasing in walls, ceilings or floors shall be fire-stopped as appropriate and made good.

The system shall be designed such that no more than 80% of the available signalling / detection loop capacity is employed to allow for future requirements.

## **Design and Application Codes of Practice**

The fire detection system shall be designed, installed and commissioned in accordance with, and all elements shall meet the requirements of:

- FIA Design, Commissioning & Maintenance of Aspirating Smoke Detector (ASD) Systems C.O.P Feb 2012.
- FIA C.O.P Cold store and freezer application and design.
- FIA C.O.P Clean room application design.
- FIA C.O.P Heritage building application and design.
- FIA C.O.P In- Cabinet detection application and design.
- FIA C.O.P Dusty environment areas application and design.
- FIA C.O.P Primary sampling for AHU return grills application and design.
- BS 5839-1: (2002) + A2:2008 C.O.P Fire detection and fire alarms for buildings.
- BS 6266 (2011) C.O.P for fire protection for electronic equipment installations.
- EN54-20: 2006 Fire detection and fire alarm systems-Part 20 Aspirating smoke detectors.
- CEA 4022 12/1999 Specifications for fire detection and alarm systems-requirements and test methods for aspirating smoke detectors.
- Regulatory Reform (Fire Safety) Order 2006.
- VdS 2095: 2010-05 VdS-Richtlinien für automatische Brandmeldeanlagen – Planung und Einbau
- ADPAD R7 (Jul06) Règle d'installation. Détection automatique d'incendie
- EN 54-2:1997 / A1: 2006 Fire detection and fire alarm systems - Part 2. Control and indicating equipment
- EN 54-4:2001/ A2: 2006 Fire detection and fire alarm systems - Part 4. Power supply equipment

- EN 54-7:2001/ A2: 2006 Fire detection and fire alarm systems - Part 7. Smoke detectors – Point detectors using scattered light, transmitted light or ionization
- PrEN 54-27 Fire detection and fire alarm systems - Part 27. Duct smoke detectors (Draft)
- The FIA CoP DSD The FIA Code of Practice for Design, Installation, Commissioning & Maintenance of Duct Smoke Detector (DSD) Systems

## **Electrical, Mechanical and Environmental Specifications**

### **Electrical Characteristics**

External Supply Voltage	18 – 30 VDC
Remote Reset Time	External monitor must be pulled low for a minimum of 100 msec.
Power Reset	1 sec.
Average Operating Current	500 mA @ 24 VDC
Alarm	650 mA – All relays active, all alarm levels displayed. Voltage @ 24 VDC
Relay Contact Ratings	3.0 A @ 30 VDC, 0.5A @ 125 VAC

### **Environmental Ratings**

Operating Temperature	–10°C to 55°C
Sampled Air Temperature	–20°C to 60°C
Humidity	10 to 95% (non-condensing)
IP Rating	IP30
Coverage Area	1,000 sq. m.
Air Movement	0 – 20 m./sec.

### **Mechanical characteristics**

Exterior Dimensions	
Height	337 mm.
Width	330 mm.
Depth	127 mm.
Cable Access	25.4 mm. cable entry holes on top and bottom of unit.
Wire Gauge	0.5mm <sup>2</sup> to 2mm <sup>2</sup> max
Pipe Network Size Up to	1,000 sq. m.
Maximum single pipe length	100m
Network outside pipe diameter,	IPS 25 mm

## **Specification ASD Design Approvals**

CE (Construction Product Directive) to EN 54-20 for class A, B and C

VdS (Verband der Sachversicherer e. V) Germany.

## **Submittals**

Site drawings defining areas covered by the aspirating including the pipe network layout device location and wiring schematic.

The ASD system design shall be produced and submitted via the ASD manufactures EN54-20 software design, configure, monitoring tool with documentation verifying the design calculations conformity parameters inclusive of System design Class, Transport time, Hole sensitivity, Sample air flow rate, Sample point location, Sample air pressure and Pipe network configuration.

Submit the manufacturer's product data inclusive of installation and testing instructions and procedures.

Submit manufacturer's operation and maintenance instruction manuals inclusive of installation, commissioning and maintenance procedures.

Submit manufacturer's equipment warranty.

## **Terms Definitions and Abbreviations**

**F I A** UK Fire Industry Association

**ASD** Aspirating Smoke Detector

A unit consisting of one or more smokes sensing elements, an aspirator, one or more flow sensors and necessary controls/electronics, typically housed in a single enclosure, forming the main part of an ASD system but excluding the sampling device.

**ASD system** Aspirating Smoke Detector System

A smoke detection system in which air and aerosols are drawn through a sampling device and carried to one or more smoke sensing elements by an integral aspirator (e.g. fan or pump)

**CIE** Control and Indicating Equipment

Equipment in accordance with EN 54-2 A1: 2006 Fire detection and fire alarm systems - Part 2. Control and indicating equipment

**C.O.P** Codes of Practice

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

**ESD** Engineering System Designers

The manufacturers approved and trained design house.

**EPD** Electronic Data Processing

Machinery and equipment necessary to receive or transmit data, to process it and either to record or print the output results or to feed the output directly to controlled processes.

**EN54-20:**

Equipment in accordance with EN54-20: 2006 Fire detection and fire alarm systems-Part 20 Aspirating smoke detectors

**EN 54-4:**

Equipment in accordance with EN 54-4:2001/ A2: 2006 Fire detection and fire alarm systems - Part 4. Power supply equipment

**Ethernet**

A collection of wired local area network technologies

**FAAST**

Fire Alarm Aspiration Sensing Technology

**Maintenance Test Point**

A test point, provided beyond the last sampling point, to test the integrity of the pipe work. Such a test point is closed in normal operation and is not subject to the maximum transport time.

**Pipe IQ**

EN54-20 approved 3D design, programming and monitoring electronic software design tool for FAAST

**Sampling Pipe**

A length of pipe which, together with sampling holes makes up the most common form of sampling device.

**Sampling Point**

Any point at which an air sample is drawn into the sampling device

**TCP/IP**

Transport Control Protocol / Internet Protocol - A common suite of addressing and routing protocols used on the Internet

**Transport Time**

The time for aerosols to transfer from a sampling point to the smoke sensing element.