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PRODUCT GUIDE SPECIFICATION

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Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format, including *MasterFormat*, *SectionFormat*, and *PageFormat*, as described in *The Project Resource Manual—CSI Manual of Practice*.

The section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the Drawings. Delete all "Specifier Notes" when editing this section.

Section numbers and titles are from *MasterFormat* 1995 Edition, with numbers and titles from *MasterFormat* 2004 Edition in parentheses. Delete version not required.

SECTION 13850 (28 31 46)

ASPIRATING SMOKE DETECTION SYSTEM(S)

Specifier Notes: This section covers AirSense Technology Limited Stratos® series Aspirating Smoke Detection Systems. This section may also be placed under Section 15905 (23 09 13.23) – Sensors and Transmitters (Instrumentation and Control for HVAC) for duct smoke detection and smoke management applications. Consult AirSense Technology USA Limited for assistance in editing this section for the specific application, if required.

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aspirating Smoke Detection Systems.

1.2 RELATED SECTIONS

Specifier Notes: Edit the following list of related sections as required for the project. List other sections with work directly related to this section.

When integrating Stratos into conventional (zoned) fire alarm systems, as under Section 13853 (28 31 12), no additional interface equipment will be required for zoned supervised Aspirating Smoke Detection alarm and trouble monitoring. When integrating Stratos into addressable/analog (intelligent) fire alarm systems, as under Section 13853 (28 31 11), simple interface via dry contact monitoring modules may be required for address-specific supervised Aspirating Smoke Detection alarm and trouble reporting. Consult AirSense Technology USA Limited for assistance in interface design and system integration for the specific application, if required.

- A. Section 13853 (28 31 11) – Fire Alarm System (Digital Addressable Fire Alarm System).
- B. Section 13853 (28 31 12) – Fire Alarm System (Zoned DC Loop Fire Alarm System).

1.3 REFERENCES

Specifier Notes: List standards referenced in this section, complete with designations and titles. Delete references that are not applicable to the specific project.

This article does not require compliance with standards, but is merely a listing of those used.

- A. The design, equipment, installation, testing and maintenance of the Aspirating Smoke Detection System shall be in accordance with the applicable requirements set forth in the latest edition of the following publications, codes and standards:
1. CSFM – California State Fire Marshal
 2. MEA – New York City Material and Equipment Acceptance Division
 3. IFC – International Fire Code
 4. IMC – International Mechanical Code
 5. NFPA 72 – National Fire Alarm Code
 6. NFPA75 – Protection of electrical computer and data processing equipment
 7. NFPA76 – Standard for the protection of telecommunications facilities
 8. NFPA 92A – Recommended Practice for Smoke Control Systems
 9. Factory Mutual Insurance (FM) Approval Guide
 10. UL 268 – Standard for Smoke Detectors for Open Areas
 11. UL 268A – Standard for Smoke Detectors for Duct Application
 12. Underwriters Laboratories Canada (ULC) Fire Protection Equipment Directory
 13. Manufacturer’s System Design Guide (current edition)
- B. The standards listed, as well as other applicable codes and standards shall be used as “minimum” requirements. Also to be considered are the requirements of the “Authority Having Jurisdiction” and good engineering practices.

1.4 SYSTEM DESCRIPTION

Specifier Notes: Edit the following paragraph as required to describe the aspirating smoke detection system(s), their purpose and relationship to other building systems.

- A. Aspirating Smoke Detection Systems:
1. Stratos®-HSSD Aspirating Smoke Detection System(s) shall be installed in areas designated on construction drawings and shall provide very early “active” detection of smoke and products of combustion present in both still and high airflow environments.
 2. The system shall consist of a distributed air sampling pipe network connected to the inlet manifold of a central detection unit housing precision flow sensor(s), high efficiency aspirator, particle filtration system, precision high sensitivity laser chamber, processing card, and termination points for system networking and interface to other systems.
 3. Detection shall be based on laser light scattering mass detection and particle evaluation principles.
 4. The air sampling pipe network design shall be supported by calculations from the manufacturer’s computer-based design modeling tool, such as PipeCAD™, for validating performance criteria such as aspirating flow, suction balance and transport times.
 5. The system(s) shall have a detection sensitivity measurement range of 0.00046% to 7.62% obs/ft with a particle sensitivity range of 0.003μ to 10μ.
 6. The detector(s) shall provide programmability of four smoke density alarm thresholds within the system(s) sensitivity measurement range. Setting of time delays for each of the four alarm thresholds shall also be programmable. Relay outputs shall be provided for remote indication of alarm conditions.

7. Resistance to unwanted alarms while still achieving maximum sensitivity is of paramount importance. The system shall incorporate advanced statistically based signal processing techniques proven to reduce unwanted alarms. The system(s) shall utilize a system of perpetually updating Perceptive Artificial Intelligence to ensure a consistent level of protection by continually varying its operating parameters to match environmental changes within the protected area. Aspirating smoke detection systems using a method of fixed sensitivity, where settings are manually or automatically set then remain fixed until manually altered, are not permitted.
8. The detector shall incorporate a dual technology system for the automatic discrimination of signals from non-fire related sources such as dust. The system shall automatically compensate for changes in environmental conditions and the negative effect of filter contamination.
9. Shall supervise filter contamination, detection chamber operation, microprocessor malfunction, network condition, and airflow in sampling pipes outside normal limits. Configurable relay output shall be provided for remote indication of fault conditions.
10. The system shall provide for automatic detector chamber sensitivity adjustments to compensate for the negative effect of filter contamination/ageing. The system shall also be capable of monitoring filter usage, and allow programming of maintenance interval reminders.
11. An airflow sensor shall be provided in each pipe inlet for supervising an increase or decrease in flow rate through the air sampling pipe network. The system(s) shall be capable of having programmable fault thresholds, per pipe inlet, to accommodate normal fluctuation present in the protected area.
12. System programming shall be by an integral or remotely located programmer/network controller, or by PC via RS232. Both RS232 and RS485 shall be integral to each detector. No additional equipment shall be required for direct interface of an individual detector to a PC.
13. All system devices shall be capable of communicating with each other via an RS485 network. The digital communication port of each device shall comply with EIA RS485 Protocol. The RS485 network shall be able to support up to 127 detectors of any type per loop. Remote displays, programmers, and network relay modules residing on the network shall not take up an available network address. There shall be no additional hardware required for making a device network compatible. Remote displays, programmers, and network relay modules residing on the network shall not take up an available network address.
14. The RS485 network shall be capable of being configured in a fault tolerant loop for both short circuit and open circuit. Any communication faults shall be reported unambiguously and shall be clearly attributable to an individual device or wire link in the fault messages.
15. PC based configuration tools shall be available to configure and manage the entire network of devices.
16. Detector(s) shall be approved, listed, and labeled in accordance with UL 268 and UL 268A.
17. Detector(s) shall be capable of being efficiently installed, tested, and maintained in accordance with NFPA 72, 90A, and 92A.

Specifier Notes: Stratos detectors are UL268A listed for duct applications and provide an excellent solution for very early warning detection in these applications. When applied as a duct detector, include lines 18 through 20. Consult AirSense Technology USA Limited for assistance, if required.

18. When applied in duct applications, provide early detection of smoke and products of combustion present in air moving through HVAC duct supply, return, or both.
19. Prevent recirculation or spread of smoke in areas by air handling system's fans and blowers.
20. Complete HVAC-related systems may be shut down in event of smoke detection.

21. Other related building automation and life safety systems shall be activated as required in event of smoke detection.

1.5 SUBMITTALS

- A. Comply with Section 01330 (01 33 00) – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, including installation and testing instructions.
- C. Operation and Maintenance Manual: Submit manufacturer's operation and maintenance manual; including installation, operation, maintenance, testing, adjustment, and cleaning instructions; replacement parts list; accessories list; and electrical wiring diagrams.
- D. System Performance Calculations: Submit report generated from manufacturer's system performance calculation program illustrating performance criteria such as aspirating flow, suction balance and transport times.
- E. Site Drawings: shall include pipe layout, equipment hardware location, wiring and mounting details.
- F. 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
- G. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

- A. Approvals:
 1. UL and CUL Listed: UL 268 and UL 268A.
 2. CSFM Listed.
 3. MEA Accepted.
 4. FM Approved.
- B. Qualifications:
 1. Manufacturer: Manufacturer shall have a minimum of 10 years experience in the manufacturing of Aspirating Smoke Detection systems.
 2. System Designer/Commissioner: Designer/Commissioner shall be factory certified for the system supplied.
 3. Contractor: Contractor shall have a minimum of 5 years experience in the installation of fire protection systems.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- C. Handling: Protect materials during handling and installation to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. AirSense Technology USA Limited 297 Kingsbury Grade, Suite D, Lake Tahoe, Nevada 89449-4470.
Phone (775) 832-5327, Fax (503) 641-2453, email info@airsense.us

2.2 MANUFACTURED UNIT(S)

Specifier Notes: Specify Stratos-Micra[®], Stratos-Ex[®], and/or Stratos[®]-HSSD detectors to provide optimum early warning protection performance. Modify the list of detectors from the following paragraphs to meet the specific requirements of your application. Consult AirSense Technology USA Limited for assistance in choosing detector type, if required.

- A. Aspirating Smoke Detector: Stratos Series.
1. Stratos-Micra 25 Aspirating Smoke Detector: Part no. 30750.
 - a. Ultra small for discrete localized applications
 - b. Single pipe inlet
 - c. Up to 10 sample ports
 - d. 164 ft. maximum pipe length
 - e. Built-in RS232 and RS485
 - f. ClassiFire™ Perceptive Artificial Intelligence
 - g. Dual Technology LDD 3D^{3™} Laser Dust Discrimination and elimination system
 - h. Fitted with on-board status LED's for OK status, Alarm and Fault
 2. Stratos-Micra 100 Aspirating Smoke Detector: Part no. 30740.
 - a. Small packaging for discrete localized applications
 - b. Two pipe inlets
 - c. Up to 20 sample ports
 - d. 328 ft. maximum pipe length
 - e. Built-in RS232 and RS485
 - f. ClassiFire Perceptive Artificial Intelligence
 - g. Dual Technology LDD 3D³ Laser Dust Discrimination and elimination system
 - h. Fitted with on-board status LED's for OK status, Alarm and Fault
 3. Stratos-Ex Aspirating Smoke Detector: Part no. 30731.
 - a. Explosion proof housing for hazardous area applications
 - b. ATEX rated EEx d IIB + H₂ T3. Equipment group 2 (zones 1, 2, and 3). Group gases A and B + Hydrogen
 - c. Single pipe inlet
 - d. Up to 10 sample ports
 - e. 135 ft. maximum pipe length
 - f. RS485 built-in as standard for networking and remote communications
 - g. ClassiFire Perceptive Artificial Intelligence
 - h. Dual Technology LDD 3D³ Laser Dust Discrimination and elimination system
 - i. Fitted with on-board status LED's for OK status, Alarm and Fault
 4. Stratos-HSSD Aspirating Smoke Detector:
 - a. Four pipe inlets (selectable - 4 on rear, 4 on top).
 - b. Up to 100 sample ports
 - c. 820 ft. maximum pipe length entire detector
 - d. Built-in RS232 and RS485
 - e. ClassiFire Perceptive Artificial Intelligence
 - f. Dual Technology LDD 3D³ Laser Dust Discrimination and elimination system

Stratos-HSSD detectors are available in the following configurations:

Part Number	Description
30621	Detector in lightweight cabinet with integral graphic LED display and LCD programmer.
30620	As above with fitted Command Module for global network capability and advanced system communications. Fitted with integral graphic LED network display and network programmer with large matrix LCD screen. BACnet interface equipped.
30706	Detector in rugged sheet metal enclosure, fitted with integral graphic LED display and LCD programmer.
30707	As above with fitted Command Module for global network capability and advanced system communications. Fitted with integral graphic LED network display and network programmer with large matrix LCD screen. BACnet interface equipped.
30710	Detector in rugged sheet metal enclosure, fitted with minimum LED display indicating OK status, Fire and Fault – programming by PC or network Command Module.

B. Sampling Pipe:

1. Sampling pipe network design shall be validated using PipeCAD™ aspirating system modeling program.
2. A variety of pipe material can be used provided it meets manufacturer's guidelines, local building code requirements and application environmental considerations such as temperature and/or chemical exposure.

Specifier Notes: Sampling ports can be remotely located from the main sampling pipe network. A variety of remote sampling port configurations are available. Consider specifying remote sampling ports where aesthetics or covert detection is required. Consult AirSense Technology USA Limited for assistance in choosing remote sampling port type, if required.

3. Remote sampling ports, where required, are constructed using flexible FPE rated tubing connecting the remote sampling port assembly to the main sampling pipe network. Follow manufacturer's guidelines when using remote sampling ports.

C. Power Supply:

1. The system shall be powered from a UL1481 listed regulated supply of nominally 24V DC. The power supply shall be provided with battery backup (sized accordingly) in the event main AC power is interrupted. Typically 24 hours standby battery backup is required followed by 15 minutes in an alarm condition.

Stratos power supplies are available in the following configurations:

Part Number	Description
30902US	Single Zone 24V DC Regulated Power Supply, 2.5amp, Multi Agency Listed.
40902US	Multi Zone 24V DC Regulated Power Supply, 1.5amp per circuit, Multi Agency Listed.

2.3 ACCESSORIES

Specifier Notes: Specify required accessories. Delete accessories not required.

All accessories must be compatible for use with specific aspirating smoke detectors. Consult AirSense Technology USA Limited for more information regarding the specifying of accessories for use with Stratos series aspirating smoke detectors, if required.

A. Remote Display Unit(s).

1. Each Stratos series detector is fitted with some form of status display as described above. When required, a Remote Display Unit (RDU) can be installed anywhere along the RS485 network and associated with a specific detector residing on the network. Remote Display Units provide the following features:
 - a. 20 segment bargraph display.
 - b. Four independent high intensity alarm indicators: Auxiliary, Pre-Alarm, Fire 1 and Fire 2, corresponding to the four alarm settings of the detector.
 - c. Common fault indicator.
 - d. OK indicator.
 - e. Optional remote relay board.
2. Remote Display Units can be mounted in an individual wall mount enclosure or in a variety of 19 inch rack configurations. An optional remote relay board can also be fitted on an individual RDU if desired positioning the detector relays in a more convenient location for interfacing with other systems. Possible configurations and associated part numbers are as follows:

Part Number	Description
30802	Remote Display Unit for 19" card frame mounting or in single wall mounted enclosure.
30803	Remote Display Relay Board. Used if remote positioning of detector relays is required. Provides all four alarm relays plus one fault relay.
30817	Rugged sheet metal wall mount enclosure for housing RDU card (part number 30802) and optional Remote Display Relay Board (part number 30803).
30814	19 inch Sub Frame. Suitable for mounting up to 8 RDU cards (part number 30802 and optional Remote Display Relay Board (part number 30803).
30824	19 inch Sub Frame. Suitable for mounting up to 24 RDU cards (part number 30802 and optional Remote Display Relay Board (part number 30803).
30812	In-fill plates for 19 inch sub frames (part numbers 30814 and 30824). Size as per RDU. Brushed aluminum finish.
30813	In-fill plate with PC port for 19 inch sub frames (part numbers 30814 and 30824), or for wall mount enclosure (part number 30817). Size as per RDU. Brushed aluminum finish. Position anywhere along the RS485 network to provide a convenient PC interface access point (PC interface HLI required).

B. Programmers.

1. PC Programming – Individual Detector
 - a. Each detector has an integral RS232 port and can be individually programmed using a PC running the manufacturer's configuration software (packaged with each detector or available for free download by visiting the manufacturer's website). No additional hardware is required.

2. LCD Programming – Individual Detector
 - a. Stratos-HSSD detectors (part numbers 30621, 30620, 30706 & 30707) each incorporate an integral LCD programmer allowing direct programming.
3. LCD Programming – Entire Network
 - a. Stratos series detectors residing on an RS485 network can be globally programmed using the integral LCD programmer on Stratos-HSSD detectors fitted with a Command Module (part numbers 30620 & 30707) or by a stand-alone Command Module (part numbers 30624 & 30709).
4. PC Programming – Entire Network
 - a. Stratos series detectors residing on an RS485 network can be globally programmed by interfacing a PC on the integral RS232 port on Stratos®-HSSD detectors fitted with a Command Module (part numbers 30620 & 30707) or by a stand-alone Command Module (part numbers 30624 & 30709). Programming by PC requires the manufacturer's configuration software (packaged with each detector or available for free download by visiting the manufacturer's website). No additional hardware is required.
 - b. Where a PC interface port (part number 30813) resides on the RS485 network, global network programming of Stratos series detectors can be accomplished. This method requires a PC interface HLI (part number 30811) connected to the interface port and a PC running the manufacturer's configuration software.
5. All methods of programming shall support the following features at a minimum:
 - a. Programming of individual Stratos detectors.
 - b. Initiating ClassiFire "Perceptive Artificial Intelligence" viewing window.
 - c. Viewing of the status of Stratos detectors.
 - d. Facilities for referencing.
 - e. Testing of relays assigned to a specific zone to aid commissioning.
 - f. Adjustment of any adjustable parameter.
 - g. Event log viewing/printing.

C. Command Module Network Controller.

1. Stratos Command Modules are equipped with a graphical bargraph LED display and large matrix LCD programmer. They provide a single location display, control and interfacing option for systems of up to 127 networked detectors.
2. Provide connection to SenseNET™, a computer based system management alarm/graphics package.
3. Equipped with RS485, RS232, and BACnet communication protocols.
4. Equipped with on-board relays. Can act as a single point of interface to other systems.
5. Can be optionally equipped with Addressable Protocol Interface Cards (APIC) for direct protocol communications to other compatible manufacturer's equipment.

Stratos Command Modules and accessories are available in a variety of configurations:

Part Number	Description
30620	Stratos-HSSD detector fitted with Command Module for global network capability and advanced system communications. Includes integral graphic LED network display and network programmer with large matrix LCD screen. RS232, RS485 and BACnet interface equipped.
30707	Same as above but housed in a rugged sheet metal enclosure.
30624	Stand-alone Command Module for global network capability and advanced system communications. Includes integral graphic LED network display and network

programmer with large matrix LCD screen. RS232, RS485 and BACnet interface equipped.

30709

Same as above but housed in a rugged sheet metal enclosure.

30627

19-inch rack mountable Command Module. 3U high brushed aluminum faceplate which incorporates a graphic LED network display, network programmer with large matrix LCD screen and an RS232 communications port. Also RS485 and BACnet interface equipped.

30805

SenseNET Contact Monitor. Enables the integration of other manufacturers' equipment via relay contacts into the SenseNET network. Relay outputs from other devices are monitored for alarm levels and fault. Two other general purpose inputs are also available. Connects to the RS485 communications loop for monitoring connected devices via a Command Module or through SenseNET, a Windows based graphical system management system.

D. SenseNET System Management Software package: Part Number 30804

1. Stratos SenseNET is a PC Windows based graphic system providing an intuitive user interface with advanced communications and diagnostic tools enabling management of up to 16 network loops, each of up to 127 Stratos detectors.
2. Package includes RS485 to RS232 High Level Interface, link cables and SenseNET PC software.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive aspirating smoke detectors.
- B. Notify Architect/Engineer of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

- A. Install aspirating smoke detectors in accordance with manufacturer's instructions and NFPA 72.

Specifier Notes: Include **one** of the following **two** sentences (B & C) regarding locations to install aspirating smoke detector, power supply and any associated accessories.

- B. Install aspirating smoke detectors, power supplies and all associated accessories at locations indicated on the Drawings.
- C. Determine locations to install aspirating smoke detectors, power supplies and all associated accessories. Confirm selected location with Architect/Engineer.
- D. The sampling pipe network shall be installed and identified in accordance with NFPA 72, local building code requirements and the manufacturer's guidelines.
- E. Sampling pipe shall be marked "Aspirating Smoke Detection System Pipe - Do Not Disturb". All sampling holes shall be identified with an adhesive label.

3.3 COMMISSIONING

- A. Commission the system in accordance with the manufacturer's recommendations.

3.4 FIELD QUALITY CONTROL

- A. Visual Inspection:
 - 1. Visually check all pipes to ensure that all joints, fittings, bends, sampling points, etc., comply with this Specification and the manufacturer's guidelines.
 - 2. Inspect wiring interconnection to ensure each component is correctly wired in accordance with the manufacturer's requirements.
 - 3. Check system configuration settings to ensure all features are programmed in accordance with this Specification.
- B. Operational Testing: Perform operational testing of aspirating smoke detectors in accordance with manufacturer's instructions to determine correct operation of system.
 - 1. Normal (standby) state.
 - 2. Trouble (supervisory) state.
 - 3. Alarm state.
- C. Functional Testing: Perform functional testing of aspirating smoke detectors in accordance with manufacturer's instructions after operational testing is completed to determine correct alarm operation of detectors.
 - 1. The installed system shall be proven capable of satisfactorily responding to an appropriate system performance test. Appropriate performance tests may be selected from those detailed in the following documents.
 - a. BS 6266 1992
 - b. NFPA 72
 - 2. In areas where smoke/performance verification is inadvisable due to contamination, the system shall be able to simulate an alarm condition to the host fire Alarm System.
- D. Using the manufacturer's standard form, prepare and submit a completed commissioning report.

3.5 TRAINING

- A. Provide training to owner designated personnel on the operation, testing and maintenance of the aspirating smoke detection system.

3.6 PROTECTION

- A. Protect installed aspirating smoke detectors and associated accessories from damage during construction.

END OF SECTION