

# **PRO** **Series**<sup>™</sup>

## **Aspirating Fire Detector Engineering Specifications**

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## **INCIPIENT FIRE DETECTOR FOR VEWD**

### **(Very Early Warning Detection)**

**Pro100 Mini<sup>®</sup>, Pro200<sup>®</sup>, Pro200+<sup>®</sup>, Pro200D<sup>®</sup>, Pro200D+<sup>®</sup>, Pro200DSC<sup>®</sup>, Pro200DSC+<sup>®</sup>, ProX4<sup>®</sup>, and ProLocator Fire Sniffer<sup>®</sup>**

## **ENGINEERING SPECIFICATIONS**

CSI SECTION [            ]  
AIR SAMPLING SMOKE DETECTION SYSTEM (S)

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. Section includes high sensitivity incipient fire detection systems.
- B. Related Sections
  - 1. Section 16720 - Fire Alarm and Detection Systems
  - 2. Section 15300 - Fire Protection Systems

#### **1.02 REFERENCES (A, and one of the following B, or C)**

- A. National Fire Protection Association (NFPA)
  - 1. NFPA 72 Standard for Protection Signaling Systems
- B. Underwriters Laboratories Inc. (C-UL-US) Fire Protection Equipment Directory

#### **1.03 SYSTEM DESCRIPTION**

- A. Design Requirements
  - 1. Shall consist of a high sensitivity type detector using CCD (Cloud Chamber Detection) Technology that can detect from 0.000 to 100% obs/ft without the use of a laser.
  - 2. Shall be air sampling by utilizing a system aspirator, selector valve (multi-zone systems) and micro-controller.
  - 3. Shall be self contained, including micro-controlled base technology with optional unit LCD Display showing graphic display of system integrity and particle background.
  - 4. Shall consist of an air sampling pipe and/or tubing system network to continuously transport air from protected areas utilizing either 1, 2, 3, or 4 zones to the detection system. The pipe/tubing network must be available in both "laser style" (low pressure) and CCD (high pressure) systems.
  - 5. Optional equipment may include 24-hour battery backup, Booster Blower and interface with building fire alarm systems.
  - 6. Must include intelligent remote operating software.
  - 7. The system will also be furnished with an ultra sensitive, handheld, portable air sampling detector using CCD. The handheld portable must be battery powered, less than 14 lbs. and must have the capability of detecting inside cabinets via a non-conductive sample probe. The portable must also be capable of detecting an invisible, odorless fire down to the source. Upon notification of an early warning from the system, the portable detector can be used to determine the location of the alarm. The equipment in question can then be powered down and inspected, or the source removed.

8. The system shall have four individually programmable alarm levels which each can be set to any of ten different sensitivity settings. The detector must be able to automatically change the individual sensitivity settings three times per day with the ability to be set different for each day of the week.
9. Each alarm level must be capable of being set to simulate four different types of smoke/fire detectors.
10. Shall report any equipment related fault through a fault output relay.
11. The system must be fully networkable via an RS485 loop and have the capability of graphically displaying, via LCD display, the system parameters and system status. The emote display must be capable of programming each detector on the loop or just display.
12. The system must be immune to dust, dirt, gases, and pollutants that normally cause false alarms. Time delays and signal averaging will not be acceptable.
13. The detector must be generic in design allowing it to be a drop in replacement for any air-sampling system on the market without requiring any piping changes.
14. Shall be installed to comply with NFPA standards and the Authority Having Jurisdiction.

B. Performance Requirements

1. Shall be C-UL-US and/or FM tested and approved (or pending) to cover:
  - Up to 10,000 sqft. Pro100
  - Up to 20,000 sqft. Pro200, Pro 200D, Pro 200DSC
  - Up to 20,000+ sqft. Pro200+, Pro200D+, Pro200DSC+
  - (Plus [+] units can be used when extended pipe runs are necessary)**
  - Up to 43,200 sqft. ProX4

#### 1.04 SUBMITTALS

- A. Submit product data and shop drawings, including isometric and plan view layouts, of the air sampling network under provisions of section [            ].
- B. Supply one copy of the manufacturers Installation and Operation Manuals after completion of installation.
- C. Supply one copy of the manufacturers Start-Up forms within 30 days of installation and commissioning.
- D. Each bidder must supply both the proposed sampling system design for the area(s) to be protected, and a letter certifying that the design strictly complies with the limitations established by UL. This will ensure the bidder's testing and approval process regarding the maximum number of sample points and the maximum area of coverage per zone and/or detector.

#### 1.05 QUALITY ASSURANCE

- A. Qualifications
  1. Manufacturer: The manufacturer shall have a minimum of 15 years experience in the design and manufacturer of CCD type particle detection.
  2. Technology: CCD particle detection technology has been utilized and field proven for a minimum of 15 years.
  3. Equipment suppliers: The equipment suppliers shall be factory authorized, and trained by the manufacturer biannually to design, install and maintain all aspects of the air sampling system. The installer must be employed by an authorized distributor.
- B. Regulatory Requirements
  1. Codes and approvals: Equipment supplier shall conform to the local code requirements and approvals applicable to this section. Supplier must obtain and pay all necessary permits prior to beginning work in this section.
  2. The air sampling system shall be Underwriters Laboratories/Underwriters Laboratories Canada and/or Factory Mutual approved and/or listed, or pending approval.

## 1.06 PROJECT CONDITIONS

### A. Physical/Environmental Requirements

1. The cabinet shall be mounted horizontally and where specified on shop drawings in a location to facilitate access and ease of service.
2. The cabinet must be mounted in an ambient temperature range of 32°F to 100°F.

## 1.07 SEQUENCING and SCHEDULING

- A. Coordinate work performed under this section with work specified in other sections as noted in Section [            ].

## 1.08 MAINTENANCE

- A. Maintenance Service: Shall be provided by a factory authorized and factory trained representative in accordance with the manufacturer's, NFPA 72 and local requirements of the authority having jurisdiction.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURER

- A. Air Sampling Incipient Fire Detection System (EWFD): Acceptable Manufacturer: SAFE Fire Detection Inc./Protec • 5915 Stockbridge Dr. • Monroe, NC 28110 • (704) 821-7920
- B. Air Sampling System Pipe/Tube Network: Fabrication using acceptable trade of quality metallic or non-metallic pipe or tubing in accordance local building codes.
- C. Detection Method: Early warning using CCD technology, which can detect from 0.000% to 100% obs/ft.

### 2.02 MANUFACTURED UNITS

- A. ProSeries Incipient Fire Detectors:

Pro100 Mini	Single Zone	Model # 6198604
Pro200	Single Zone	Model # 6198620
Pro200+	Single Zone	Model # 6198642
Pro200D	Single Zone	Model # 6198612
Pro200D+	Single Zone	Model # 6198652
Pro200DSC	Four Zone	Model # 6198627
Pro200DSC+	Four Zone	Model # 6198662
ProX4	Four Zone	Model # 6198625
ProRemote	Display	Model # 6198629
ProLocator	Portable	Model # 6198695

## 2.03 COMPONENTS

### A. CCD Detector Assembly.

1. The CCD detector, and its component assembly shall be mounted in a single enclosure, which draws an air sample from the protected area through the CCD detector.
2. The detection principle shall be the CCD type with the ability to detect particles ranging from 0.002 to 10 micrometers in size, which are produced by overheating and combustion, and can operate within the range of 0.000% to 100% obs/ft. Electrical arcing or overheating shall be easily detected while remaining unresponsive to false alarm conditions resulting from ordinary dust, moisture (water vapor) or ambient combustion particulate changes.
3. The blower shall allow for up to 4 sampling pipe connections, with a maximum transport time of 120 seconds per NFPA 72

### B. The Detector Control Panel Assembly must include the following minimum features:

1. LEDs indicating PreAlarm, Alarm 1, Alarm 2, and Alarm 3 with separate indicators for each.
2. 100 segment LCD bar graph display when Graphic Display is used to provide visual indication of alarm point settings and fire level.
3. Power Indicator.
4. Fault Indicator.
5. Built in RS-232 serial computer interface port.
6. Built in audible alarm.
7. Silence switch to deactivate built in audible alarm.
8. Reset switch to clear all alarms.
9. Four alarm contacts (N.O., or programmable for N.C.) - 1 amp @ 30VDC (max.)
10. Trouble contacts (N.O., or programmable for N.C.) - 1 amp @ 30VDC (max.)
11. Individual and site programmable zone by zone flow supervision.
12. Site or network programmable.
13. Detector fire analysis with continuous sampling
14. 100% solid-state circuitry.
15. Isolated relay contacts for all Alarms and Trouble outputs.
16. Four programmable inputs for remote isolate, disable, reset, fault, battery fail, mains fail, or changing sensitivities
17. 200-item event log.

### D. LCD display on detector or stand alone remote display

1. Will enable programming, indicate alarm, and troubleshoot for any detector on the RS485 network loop.
2. Shall be able to display factory authorized distributor contact information.
3. Shall be able to display user programmable man readable text for zone identification and alarm status or instruction.

## 2.04 EQUIPMENT

1. Detector Alarm Levels: Each of the four alarm levels, for each zone, will have the option of 10 different sensitivity settings independent of each other. These levels can be programmed to change automatically three times per day and set different for each day of the week.
2. Sensitivity Settings: Each alarm level, on each zone, can be set to different levels to simulate different detection technologies.

Example:

Pre-Alarm (Action): Cloud Chamber Detector

Alarm level 1 (Alert): Laser Air Sampling Detector

Alarm level 2 (Fire 1): Laser Spot Detector

Alarm level 3 (Fire 2): Photo Electric Spot Detector

## 2.05 ACCESSORIES

- A. Air sampling system for each zone(s).
  - 1. Shall consist of rigid metallic or non-metallic pipe and/or tubing.
  - 2. Shall be constructed using suitable materials needed to meet the requirements of local building codes.
  - 3. Shall be designed to provide optimum system efficiency for each zone.
  - 4. Sample transport time from the most remote sampling point shall not exceed 120 seconds per NFPA 72.
  - 5. Contractor submittals shall include detailed engineering drawings of the sampling system layout. These shall include isometric layouts of the sampling system and locations of all sample heads or sample points. Sampling system flow calculations must be provided indicating transport times from each sample head or sample point. These calculations shall be generated using the computer software program provided by the manufacturer.
  
- B. 24 Hour Standby Power Supply/Battery Backup.
  - 1. Shall be SAFE Fire Detection's UPS-24S or UPS-24L Standby Power Supply or UL equivalent. In the event of primary AC power loss, the system shall automatically transfer to the battery backup standby power supply. Batteries shall be sealed lead acid type and of sufficient Ah rating to maintain continuous system operation for a minimum of 24 hours, and a full alarm condition for a minimum of 5 minutes. After 24 hours of continuous use, the battery charging circuitry shall be capable of recharging the batteries to the full rated voltage within 48 hours.
  
- C. Optional Graphic Communications Interface
  - 1. The systems shall be capable of being networked together via an RS485 loop with a remote LCD graphic display, or detector with LCD graphic display used as a network hub and/or host. A PC must not be required when using a detector with display or a remote graphic display. It will also be capable of additional graphic LCD remote displays added to the loop as a device.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Detection System: The contractor shall install the system in accordance with the manufacturer's installation recommendations and the Installation and Operational Manuals recommendations.
  
- B. Air Sampling System Pipe/Tubing network:
  - 1. All pipe/tubing work shall be accomplished using proper tools for cutting and deburring.
  - 2. All pipe/tubing shall be made leak tight. All pipe and tubing connections shall be securely tightened. Use only light pressure on a wrench at the inlet manifold connections, if used.
  - 3. All bends in the pipe/tubing must not have a reduced cross-section. For sharp bends, elbows shall be used. Radius elbows are the preferred method for low pressure installations when changing pipe direction.
  - 4. All pipe/tubing shall be flushed to remove any foreign material or debris.
  - 5. All pipe/tubing shall be appropriately anchored and labeled every 4 feet.
  
- C. Sample Head and Sample Point Location:
  - 1. Sample Heads or Sample Points shall be separated at a distance of 30 feet, or no more than that specified in NFPA 72 guidelines.
  - 2. Reference NFPA 72 for guidelines regarding sample head and sample point location and spacing with regard to high ceilings, forced air, and high airflow applications when using laser style, low pressure piping.
  - 3. Sampling System Calculations shall be provided by a registered ProFlow, CirrusCalc or Cirrus Design software program version 1.4 or later.

### 3.02 FIELD QUALITY CONTROL

#### A. Tests and Commissioning

1. The contractor shall commission the complete installation in the presence of the end user or their appointed representative.
2. All necessary instrumentation, test equipment, labor, and materials shall be provided by the contractor.
3. The contractor shall record all test and commissioning requirements as specified on the manufacturers Start-Up forms. A copy of the Start-Up form shall be provided to the end user or an authorized representative.
4. The contractor shall introduce particulates of combustion into each zone or zones to confirm proper detector operation. The particulate shall be introduced into the sample head or sample point of each zone that is the furthest away from the detector. This will ensure proper operation from the least favorable sampling point.
5. Checks must be made to ensure that all ancillary equipment and warning devices are operational as designed and specified, with care taken not to discharge a suppression system or power down (EPO) the room unless directed to by the owner.
6. Upon completion of commissioning and testing, the contractor shall provide the end user, or authorized representative, with the isometric drawings and sampling system calculations as well as the System Start-Up forms, Installation and Operation manuals.
7. The contractor shall be, or be represented by, an authorized representative of SAFE Fire Detection, Inc. This person must have successfully completed SAFE's technical training seminar and provide documentation of certification. The holder of the certificate must be employed by the company indicated otherwise the certificate is void. The certificate is valid for a period of two years from the date on the certificate.