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Product Guide Specification

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format 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 00)

FIRE DETECTION AND ALARM SYSTEM

Specifier Notes: This section covers Gamewell-FCI 7100 Series fire alarm system. Consult Gamewell-FCI for assistance in editing this section for the specific application.

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. 24 VDC, analog/addressable, multiprocessor-based, fire alarm system.
 - 1. System shall include, but not be limited to:
 - a. Control equipment.
 - b. Control panel.
 - c. Analog addressable sensors.
 - d. Addressable modules.
 - e. Audible and visual notification appliances.
 - f. Accessories necessary to provide complete and operable system.
 - g. Conduit, wiring, and fittings.

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.

- A. Section 13800 - Building Automation and Control.
- B. Section 13900 (21 00 00) - Fire Suppression.
- C. Section (27 15 00) - (Fire Alarm Communications Horizontal Cabling).

1.3 REFERENCES

Specifier Notes: List standards referenced in this section, complete with designations and titles. This article does not require compliance with standards, but is merely a listing of those used.

- A. National Fire Protection Association (NFPA):
 1. NFPA 12 - Standard on Carbon Dioxide Extinguishing Systems.
 2. NFPA 12A - Standard on Halon 1301 Fire Extinguishing Systems.
 3. NFPA 13 - Installation of Sprinkler Systems.
 4. NFPA 15 - Standard for Water Spray Fixed Systems for Fire Protection.
 5. NFPA 16 - Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems.
 6. NFPA 16A - Standard for the Installation of Closed Head Foam-Water Sprinkler Systems.
 7. NFPA 17 - Standard for Dry Chemical Extinguishing Systems.
 8. NFPA 17A - Standard for Wet Chemical Extinguishing Systems.
 9. NFPA 70 - National Electrical Code.
 10. NFPA 72 - National Fire Alarm Code.
 11. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
 12. NFPA 101 - Life Safety Code.
 13. NFPA 750 - Standard on Water Mist Fire Protection Systems.
 14. NFPA 2001 - Clean Agent Fire Extinguishing Systems.
- B. Underwriters Laboratories (UL):
 1. UL 268A - Standard for Smoke Detectors for Duct Application.
 2. UL 864 9th Edition- Standard for Control Units and Accessories for Fire Alarm Systems.

1.4 CODES AND STANDARDS

- A. Equipment shall be listed by Underwriters Laboratories, Inc., approved by Factory Mutual Research, or as accepted by the Authority Having Jurisdiction (AHJ).
- B. Codes: The fire alarm system in its entirety shall be in compliance with all applicable fire and electrical codes and comply with requirements of the local Authority Having Jurisdiction over said systems.
- C. UL Standards: System shall comply with applicable provisions of the following UL standards and classifications:
 1. UL 864 9th Edition.
 2. UOJZ, Control Units, System.
 3. SYZV Control Units, Releasing Device.

4. UOXX, Control Unit Accessories, System.
5. SYSW Accessories, Releasing Device Service.

D. NFPA Standards: System shall comply with applicable provisions of the following NFPA standards:

1. NFPA 72.
 - a. Central Station Fire Alarm Systems.
 - b. Local Fire Alarm Systems.
 - c. Auxiliary Fire Alarm Systems.
 - d. Remote Station Fire Alarm Systems.
 - e. Proprietary Fire Alarm Systems.
2. NFPA 90A.
3. NFPA 101.

1.5 SYSTEM DESCRIPTION

A. Multiprocessor-Based:

1. The system shall be of multiprocessor design to allow maximum flexibility of capabilities and operation.

B. Field Programmable:

1. The system shall be capable of being front-panel programmed or by means of Field Configuration Program (FCP) allowing programming to be downloaded via portable computer.

C. RS-232C Serial Output:

1. A supervised RS-232C serial port shall be provided to operate remote printers and/or video terminals, accept downloaded program from portable computer, or provide 80-character readout of alarms, troubles, location descriptions, time, and date.
2. Communication shall be the standard ASCII code operating at 9600-baud rate.

D. Control-by-Event (CBE) Program:

1. Operation of manual station or automatic activation of any smoke sensor, heat sensor, or waterflow zone shall activate system control-by-event program to cause:

Specifier Notes: Specify **one** of the following first **three** sentences.

- a. All notification appliances to sound in a temporal pattern and strobes to flash.
- b. All notification appliances to sound in march time code pattern and strobes to flash.
- c. All notification appliances to sound in continuous pattern and strobes to flash.
- d. Shut down all air-handling units as specified herein.
- e. "SYSTEM ALARM" LED shall flash and panel sounder shall pulse.
- f. Indicate on the 80-character alphanumeric panel display description of specific analog/addressable device in alarm. Display shall be of the liquid crystal type (LCD), clearly visible in the dark or in poor light conditions.

Specifier Notes: Specify **any** of the following **four** sentences as required.

- g. Close all magnetically held doors automatically.

- h. Energize programmed solenoids for activating deluge or preaction systems.
 - i. Perform additional functions as specified herein or as indicated on the drawings.
 - j. Notify the Fire Department.
- E. General System Operation:
1. When an alarm occurs, the control panel shall indicate alarm condition until manually reset.
 2. Alarm may be acknowledged by pressing "ALARM ACKNOWLEDGE" switch.
 3. This shall silence the panel sounder and change the "ALARM" LED from flashing to steadily lit.
 4. All notification appliances may be silenced by operating the "SIGNAL SILENCE" switch.
 5. This shall steadily light the "SYSTEM SILENCED" LED.
 6. If a subsequent alarm is activated, notification appliances shall "resound" until again silenced.
 7. Once silenced, all notification appliances may be restored by operating the "SIGNAL SILENCE" switch.
 8. Waterflow zones shall be non-silenceable.
- F. Alarm Verification:
1. Smoke detector alarm verification shall be a standard option on all zones, while allowing any dry contact device, such as manual stations and heat detectors, to create immediate alarm.
 2. This feature shall allow smoke sensors that are installed in environments prone to nuisance or unwanted alarms to operate according to following sequence:
 - a. System Ready: Prior to smoke sensor alarm.
 - b. Smoke Sensor Alarm: At time = 0.
 - c. Pre-alarm Window: 15 seconds. A distinctive pre-alarm indication shall be displayed.
 - d. Zone Reset: 5 seconds. Occurs at end of pre-alarm window.
 - e. Alarm Verification Window: 90 seconds. The system shall respond to a second alarm from same smoke sensor as a system alarm.
 - f. System Ready: No alarm verification.
 - g. The verification sequence is suspended once the system alarm is activated.
- G. Alarm Signals:
1. All alarm signals shall automatically latch or "lock in" at the control panel until the operated device is returned to normal and the control panel is manually reset.
 2. Alarm signals shall be programmable for "non-latching" operation when required by the Authority Having Jurisdiction. When used for waterflow, the "SIGNAL SILENCE" switch shall be bypassed.
- H. Electrically Supervised:
1. Each signaling line circuit and notification appliance circuit shall be electrically supervised for opens, shorts, and ground faults.
 2. Occurrence of a fault shall activate the system trouble circuitry, but shall not interfere with proper operation of the circuit that does not have a fault condition.
 3. The yellow "SYSTEM TROUBLE" LED shall light and the system audible sounder shall steadily sound when trouble is detected in the system. Failure of power, opens, or short circuits on notification appliance or signaling line circuits, disarrangement in system wiring,

failure of microprocessor or identification module, or system ground faults shall activate this trouble circuit.

4. Trouble signal may be acknowledged by operating the "ALARM ACKNOWLEDGE" switch. This shall silence the sounder. If subsequent trouble conditions occur, trouble circuitry shall resound.
 5. During alarm, all trouble signals shall be suppressed with the exception of lighting the yellow "SYSTEM TROUBLE" LED.
- I. Drift Compensation, Analog Smoke Sensors:
1. System software shall automatically adjust each analog smoke sensor approximately once each week for changes in sensitivity due to effects of component aging or environment (i.e.: dust).
 2. Each sensor shall maintain its actual sensitivity under adverse conditions to respond to actual alarm conditions, while ignoring factors that generally contribute to nuisance alarms.
 3. System trouble circuitry shall activate, display "DIRTY DETECTOR" and "VERY DIRTY DETECTOR" indications and identify the individual unit that has been compensated beyond its acceptable limits.
- J. Analog Smoke Sensor Test:
1. System software shall automatically test each analog smoke sensor a minimum of 3 times daily.
 2. Test shall be a recognized functional test of each ionization chamber (analog ionization sensors) and photocell (analog photoelectronic sensors) as required annually by NFPA 72.
 3. Failure of a sensor shall activate the system trouble circuitry, display a "Test Failed" indication, and identify individual unit.
- K. Dual-Mode Walk Test:
1. The control unit shall provide a Dual-Mode Zoned Walk Test Program that shall enable an individual to test the Alarm/Supervision status of each sensor or module connected to the system.
 2. During walk test, the control unit shall automatically reset after an alarm condition enabling the technician to continue testing the system without requiring a return to control panel.
 3. During an Audible walk test, placing a device in alarm shall cause 4 pulses on the notification appliance circuits. Operation of a supervisory switch shall cause 3 pulses, while removal or disconnection of an initiating device shall cause 2 pulses. All tests shall be recorded by printer for reference.
 4. The Silent walk test shall record all tests by printer for reference, while not activating notification appliance circuit(s).
- L. Printed Circuit Boards, Control Panel Components:
1. The control unit shall be contained in steel cabinet.
 2. All groups of circuits or common equipment shall be clearly marked.
 3. The control unit shall be red in color and shall include the following features:
 - a. Auxiliary SPDT alarm and trouble dry contacts.
 - b. A solid-state power transfer circuit that shall switch to standby power automatically and instantaneously if normal power fails or falls below 15 percent of normal ("brown out" conditions). This circuit shall allow batteries to be effectively "floated" on the operating system to avoid upsetting normal microprocessor operation and minimize

- resultant nuisance troubles and/or alarms. This circuit shall be physically isolated from the power supply to facilitate service.
- c. A Ground Fault detector to detect positive or negative grounds on signaling line circuits, notification appliance circuits, and power circuits. Ground fault indication shall occur on display and general trouble devices and shall operate as specified herein, but shall not cause alarm.
 - d. Lightning protection shall be a standard feature of the fire alarm control panel and shall be incorporated in the power supply circuit, common control circuits, and notification appliance circuits. Systems that require an optional module to provide this protection shall not be considered equal.
 - e. Individual overcurrent protection shall be provided for the following: smoke detector (resettable) power, main power supply, battery standby power, and auxiliary (non-resettable) output.
 - f. A common reset and lamp test switch, labeled "SYSTEM RESET/LAMP TEST" shall be provided on panel.

M. City Connection:

Specifier Notes: Specify **one** of the following **three** sentences.

1. The fire alarm system shall be connected via leased telephone lines to a central station or remote station.
2. The fire alarm system shall be connected to a local energy city master box.
3. The fire alarm system shall be connected via Digital Alarm Communicator Transmitter (DACT) over telephone lines to a central station or remote station.

Specifier Notes: Specify **one** of the following **three** paragraphs. Coordinate with Paragraph M. City Connection.

N. Remote Station Option:

1. The fire department shall be consulted as to authorized remote station serving municipality.
2. The fire alarm system shall transmit both alarm and trouble signals with alarm having priority over trouble signal.
3. The contractor shall be responsible for installation charges, while the owner shall be responsible for line lease charges.

O. Local Energy City Master Box Option:

1. The fire alarm system shall be connected to a local energy city master box via the optional Municipal Circuit Option Module (MCOM).
2. The city master box shall be coded and timed in accordance with the requirements of the fire department.

Specifier Notes: Specify box to be surface or flush mounted.

3. The box shall be [surface] [flush] mounted and located as specified by the building engineer or fire department.

P. Central Station Option:

1. The fire alarm control panel shall provide an integral Digital Alarm Communicator Transmitter (DACT) for signaling to Central Station. The DACT shall contain a "Dialer-Runaway" feature preventing unnecessary transmissions as the result of intermittent faults in the system and shall be Carrier Access Code (CAC) compliant, accepting up to 20-digit central station telephone numbers.
2. The fire department shall be consulted as to authorized central station companies serving municipality.
3. The fire alarm system shall transmit both alarm and trouble signals with alarm having priority over trouble signal.
4. The contractor shall be responsible for installation charges, while the owner shall be responsible for line lease charges.

1.6 SUBMITTALS

- A. Comply with Section 01330 (01 33 00) - Submittal Procedures.

Specifier Notes: Edit the following paragraph as required.

B. Equipment Other Than That Specified:

1. Submit to the Engineer appropriate documentation in writing 10 days before the Bid Date, if equipment other than that specified is to be supplied.
 - a. Complete lists, descriptions, and drawings of materials.
 - b. A complete list of current drain requirements during normal supervisory condition, trouble, and alarm conditions.
 - c. Battery standby calculations showing total standby power needed to meet system requirements as specified.

C. Product Data:

1. Submit manufacturers original catalog data and descriptive information for major components of equipment.
2. Submit pertinent information regarding reliability and operation of equipment.
3. Submit sufficient information so the exact function of each installed device is known.

D. Shop Drawings:

1. The submittal of shop drawings shall contain at least 1 booklet of original manufacturer specification and installation instruction sheets. Subsequent booklets may be copies.
2. All equipment and devices on the shop drawings shall be clearly marked in the specification sheets.

E. Scheduling:

1. Submit delivery dates, installation dates, and final test/acceptance dates of equipment.

F. Supplier's Qualifications:

1. Submit supplier's qualifications.
2. Indicate years in business, service policies, warranty definitions, and list of similar installations.

G. Installer's Qualifications:

1. Submit installer's qualifications.

2. Indicate years in business and prior experience with installations that include type of equipment that is to be supplied.
- H. Project Record Drawings:
1. Complete set of reproducible project record drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of equipment.
 2. Deliver to the Owner after completion of system.
- I. Operating and Instruction Manuals:
1. Submit before testing of system.
 2. Deliver 4 complete sets of operating and instruction manuals to the Owner after completion of testing.
- J. Maintenance Instructions:
1. Shall be complete, easy to read, and understandable.
 2. Provide instructions for replacing components of system, including internal parts.
 3. Provide instructions for periodic cleaning and adjustment of equipment with a schedule of these functions.
 4. Provide a complete list of all equipment and components with information as to address and telephone number of both manufacturer and local supplier of each item.
 5. Provide user Operating Instructions: Prominently display these on a separate sheet located next to the control unit in accordance with UL 864.
- K. Testing Instructions:
1. Complete, accurate, step-by-step testing instructions giving recommended and required testing frequency of all equipment, and methods for testing each individual piece of equipment.
 2. Deliver to the Owner after completion of system.

1.7 QUALITY ASSURANCE

- A. Catalog Numbers: Catalog numbers specified are those of Gamewell-FCI, and are indicative of the quality and type of equipment to be furnished.
- B. Accessory Components: Accessory components as required shall be catalogued by the manufacturer and Listed to operate with the manufacturer's control panel.

1.8 DELIVERY, STORAGE, AND HANDLING

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

1.9 WARRANTY

- A. The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for 1 year (365 days) from date of final acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Gamewell-FCI, 12 Clintonville Road, Northford, Connecticut 06427 . Toll Free (800) 633-1311. Phone (203) 484-7161. Fax (203) 484-7118. Website www.gamewell-fci.com.
- B. Hybridized Systems: "Hybridized" systems (containing equipment from several different manufacturers) shall not be considered acceptable.
- C. Labeling: Label equipment with manufacturer's name and logotype to assure integrity of complete system.

2.2 FIRE DETECTION AND ALARM SYSTEM

- A. Fire Detection and Alarm System: Shall be an FCI 7100 Series, 24 VDC, analog/addressable, multiprocessor-based, fire alarm system.

2.3 WIRING

- A. Wire and Cable: Shall be UL Listed for fire alarm use and be a minimum of 18 AWG or as required by local codes and the Authority Having Jurisdiction.
- B. Wire Used on Fire Alarm System: Shall be UL Listed as fire alarm protection signaling circuit cable in accordance with the National Electrical Code, Article 760.
- C. Raceways containing conductors identified as "Fire Alarm" conductors shall not contain other conductors.
- D. No AC current carrying conductors shall be allowed in the same raceway with fire alarm conductors.

2.4 SYSTEM COMPONENTS

- A. System Cabinet:
 - 1. Surface mounted with texture finish.
 - 2. Houses: 7100 Micro microprocessor and related system circuitry.
 - 3. Wiring Gutter Space: Minimum of 1-inch wiring gutter space shall be provided behind mounting plate.
 - 4. Wiring: Terminated on removable terminal blocks to allow field servicing of all modules without disrupting system wiring.
- B. LED Indicator and Outputs:
 - 1. A green "AC ON" LED on lamp cluster shall indicate presence of primary power.
 - 2. Power Supply Outputs: Maximum combined output for both shall be 1 ampere.
 - a. 24 VDC non-resettable, 1 amp. maximum, power limited.

b. 24 VDC resettable, 1 amp. maximum, power limited.

C. Battery Charger:

1. Power Supply: Contains battery charger with maximum average charging current of 1 ampere.
2. If the system loses AC power, a System Trouble shall occur.
3. Output: Supervised and overcurrent protected.
4. Charger: Shall be capable of maintaining sealed lead-acid batteries up to 31-ampere/hour capacity.

D. Batteries:

Specifier Notes: Specify **one** of the following **two** sentences.

1. Shall be of sufficient capacity to provide power for the entire system upon loss of normal AC power for a period of 60 hours with 5 minutes of alarm signaling at end of this 60-hour period, as required by NFPA 72, Auxiliary Systems.
2. Shall be of sufficient capacity to provide power for the entire system upon loss of normal AC power for a period of 24 hours with 5 minutes of alarm signaling at end of this 24-hour period, as required by NFPA 72, Local Systems.

E. Connections and Circuits:

1. Connections to Light and Power Service: Shall be on a dedicated branch circuit in accordance with the NEC.
2. Circuit and Connections: Shall be mechanically protected.
3. Circuit Disconnecting Means: Shall be accessible only to authorized personnel and clearly marked "FIRE ALARM CIRCUIT CONTROL."

F. Basic System Module:

1. Enclosed within system cabinet, the basic system module shall contain a power supply, microprocessor, memory, system operating software stored on non-volatile EPROM, system configuration memory stored on non-volatile EEPROM, and circuits necessary to support a fire alarm system.
2. Volatile Memory: Not acceptable.
3. Module: Shall function as system control center, processing all messages from field devices supervisory, trouble, alarm.

G. Microprocessor:

1. Microprocessor: Shall execute all supervisory programming to detect and report failure or disconnection of any module or peripheral device.
2. Isolated "Watchdog" Circuit: Shall monitor the microprocessor and upon failure activate system trouble circuits on display.
3. Control-By-Event Functions: The microprocessor shall access the system program, for all control-by-event (CBE) functions.
4. System Program: Shall not be lost upon failure of both primary and secondary power.

H. Signaling Line Circuits:

1. Basic System Module: Shall provide communication with all analog/addressable devices (initiation/control) connected to the 7100 via 2 signaling line circuits.
2. Each Signaling Line Circuit: Shall be capable of being wired Class B, Style 4.

3. Class A, Style 6 Operation Shall be possible with installation of the optional Class A Operating Module (CAOM).
 4. Circuits: Shall be capable of operating in NFPA Style 7 mode when equipped with the CAOM module and isolator modules or sensor bases.
 5. Each Circuit: Shall communicate with a maximum of 99 analog sensors and 98 addressable monitor/control devices.
 6. First 99 Device Addresses (1-99) on Each Circuit: Dedicated to analog sensors.
 7. Addresses 101-198: Reserved for monitor/control devices.
- I. Real-Time Clock:
1. Basic System Module: Shall contain a real-time clock capable of monitoring all real-time programming and all time-control functions.
- J. Notification Appliance Circuits:
1. Two Independent Notification Appliance Circuits: Provided on basic module, polarized and rated at 1.5 amperes DC per circuit, individually overcurrent protected and supervised for opens, grounds, and short circuits.
 - a. Shall be capable of being wired Class B, Style Y.
 - b. With installation of optional Class A Option Module (CAOM), Shall be capable of being wired Class A, Style Z.
 2. Power Output: Shall be regulated so that UL Listed notification appliances with an operating voltage range of 17-26 VDC may be installed on the circuits.
 - a. Voltage: 24 VDC regulated.
 - b. Current: 1.5 amps, maximum alarm.
- K. Trouble Dry Contacts:
1. Trouble Dry Contacts (Form C): Shall be rated 2 amps at 30 VDC (resistive) and transfer whenever system trouble occurs.
- L. Alarm Dry Contacts:
1. Alarm Dry Contacts (Form C): Shall be rated 2 amps at 30 VDC (resistive) and transfer whenever system alarm occurs.
- M. Gamewell-FCI Approved Sensors:
1. Use only Gamewell-FCI approved compatible sensors, UL Listed or FM Approved for use with 7100 system.
 2. The following identifies by model number those approved, acceptable models.
 - a. Analog Ionization Sensor: Model ASD-IL2, IL2F.
 - b. Analog Photoelectronic Sensor: Model ASD-PL2, ASD-PL2F.
 - c. Analog Photoelectronic Sensor with 135-Degree F Thermal Unit: Model ASD-PTL2, ASD-PTL2F.
 - d. Addressable Thermal Sensor, Fixed Temperature: Model ATD-L2, ATD-L2F.
 - e. Addressable Thermal Sensor, Rate of Rise: Model ATD-RL2, ATD-RL2F.
 - f. Standard Analog Plug-in Base: Model ADB-FL, ADB-FLF.
 - g. Base/Sounder Assembly: Model B501BH,/BHT.
 - h. Analog Duct Sensor, with Relay: Model ADP, ADPF, ADPR, ADPRF.
 - i. Isolator Module: Model M500X.
 - j. Isolator Base: Model B224BI.
 - k. Multi-Criteria Sensor: Model MCS-Acclimate2, MCS-Acclimate2F
 - l. Beam Detector: Model ABD-2F, ABD-RT2F.

m. Laser Sensor: Model ASD-LS.

N. Display:

1. System Display: Furnishes audible and visual annunciation of all alarms and trouble signals.
2. Provide dedicated LEDs for the following functions:
 - a. AC Power On: Green.
 - b. Alarm: Red.
 - c. Supervisory: Yellow.
 - d. System Trouble: Yellow.
 - e. Power Fault: Yellow.
 - f. Ground Fault: Yellow.
 - g. NAC 1 Silenced: Yellow.
 - h. NAC 2 Silenced: Yellow.
 - i. System Silenced: Yellow.
3. Eighty-Character Alphanumeric Display: Provides status of all analog/addressable sensors, monitor, and control points. Contains a 12-key keypad which shall permit selection of functions.
4. Type: Liquid crystal type (LCD), clearly visible in the dark and under all light conditions.
5. Panel: Contains 4 functional keys and 3 programming buttons:
 - a. Functional Keys:
 - 1) Alarm Acknowledge.
 - 2) Trouble Acknowledge.
 - 3) Signal Silence.
 - 4) System Reset/Lamp Test.
 - b. Programming Buttons:
 - 1) Menu/Back.
 - 2) Back Space/Edit.
 - 3) OK.

2.5 PERIPHERAL DEVICES

Specifier Notes: Specify peripheral devices as required. Delete devices not required. Consult Gamewell-FCI for more information.

Specify **one** of the following **two** paragraphs describing Analog Smoke Sensors.

- A. Analog Photoelectronic Smoke Sensors, Model ASD-PL2, ASD-PL2F:
1. Analog Photoelectronic Sensors: Low profile and capable of being set at 4 sensitivity settings of "LOW, LOW MEDIUM, MEDIUM, MEDIUM HIGH, and HIGH" levels.
 2. Automatic and Manual Functional Sensitivity and Performance Tests: Shall be possible without necessity of generating smoke. The test method shall test all sensor circuitry. "Failed Test" indication shall display for failed test.
 3. LEDs: Two LEDs providing 360-degree visibility of operating status and alarm indication shall be provided on each sensor. LEDs shall pulse periodically indicating that the sensor is receiving power and communication is taking place. This feature shall be field programmable. Upon alarm, these LEDs shall light continuously. Alarm output shall be available for remote annunciation.

4. Sensitivity: The system shall check sensitivity of each sensor periodically. If a sensor alarm threshold sensitivity has changed due to aging and/or dust accumulation, the system shall automatically compensate for this change (drift compensation).
5. Sensitivity Levels: Each sensor shall allow for setting of 2 sensitivity levels. Levels may be programmed so when building is occupied, a sensor shall be less sensitive than when building is unoccupied. This feature permits sensors to be more reliable and at same time reduces/minimizes unwanted alarms. This feature shall also incorporate programmable weekend days, where the sensor shall remain at the unoccupied sensitivity level.
6. Sensor Screen and Cover Assembly: Shall be removable for field cleaning.
7. Interchangeable Sensors: Each sensor shall be interchangeable with Models ASD-IL2, ASD-IL2F; ATD-L2/RL2, ATD-L2F/RL2F sensors via adapter and twistlock mounting base, to ensure matching the proper sensor to potential hazards of the areas being protected. In all cases, the system shall recognize when improper sensor type has been installed in previously programmed sensor type location.
8. Thermal Sensor: Model ASD-PTL2, ASD-PTL2F sensor shall contain, in addition to above, a 135-degree FT thermal sensor.

B. Analog Ionization Smoke Sensors, Model ASD-IL2, ASD-IL2F:

1. Analog Ionization Sensors: Low profile and contain dual-chamber ionization sensors. Each sensor shall be capable of being set at 7 sensitivity settings ranging from 3.0 to 1.0 percent/ft equivalent obscuration, with a predefined setting of 3.0 percent.
2. Automatic and Manual Functional Sensitivity and Performance Tests: Shall be possible on all sensors without necessity of generating smoke. The test method shall test all sensor circuitry. "Failed Test" indication shall display for failed test.
3. LEDs: Two LEDs providing 360-degree visibility of operating status and alarm indication shall be provided on each sensor. LEDs shall pulse periodically indicating that the sensor is receiving power and communication is taking place. This feature shall be field programmable. Upon alarm, these LEDs shall light continuously. Alarm output shall be available for remote annunciation.
4. Sensitivity: The system shall check the sensitivity of each sensor periodically. If a sensor alarm threshold sensitivity has changed due to aging and/or dust accumulation, the system shall automatically compensate for this change (drift compensation).
5. Sensitivity Levels: Each sensor shall allow for setting of 2 sensitivity levels. Levels may be programmed so that when building is occupied, a sensor shall be less sensitive than when building is unoccupied. This feature permits sensors to be more reliable and at the same time reduce/minimize unwanted alarms. This feature shall also incorporate programmable weekend days, where the sensor shall remain at the unoccupied sensitivity level.
6. Sensor Screen and Cover Assembly: Shall be removable for field cleaning.
7. Interchangeable Sensors: Each sensor shall be interchangeable with Models ASD-PL2/PTL2 , ASD-PL2F/PTL2F and ATD-L2, ATD-L2F Series sensors via adapters and twistlock mounting base, to ensure matching the proper sensor to potential hazards of the areas being protected. In all cases, system shall recognize when improper sensor type has been installed in previously programmed sensor type location.

C. Addressable Thermal Sensors, Model ATD-L2, ATD-L2F; ATD-RL2, ATD-RL2F Series:

Specifier Notes: Specify **one** of the following first **two** paragraphs describing Addressable Thermal Sensors.

1. Addressable Thermal Sensors: Shall be low profile and operate on combination "rate-of-rise" and "fixed temperature" principles with the fixed temperature set point at 135 degrees F, Model ATD-RL2, ATD-RL2F. The sensor shall contain dual thermistor sensing circuitry for fast response.
 2. Addressable Thermal Sensors: Shall operate on the "fixed temperature" principle with the sensor having a set point of 135 degrees F, Model ATD-L2, ATD-L2F. The sensor shall contain dual thermistor sensing circuitry for fast response.
 3. LEDs: Two LEDs providing 360-degree visibility of operating status and alarm indication shall be provided on each sensor. LEDs shall pulse periodically indicating that the sensor is receiving power and communication is being supplied. This feature shall be field programmable. Upon alarm, these LEDs shall light continuously. Alarm output shall be available for remote annunciation.
 4. Interchangeable Sensors: Each sensor shall be interchangeable with Models ADS-PL2, ADS-PL2F and ASD-IL2, ASD-IL2F sensors via twistlock mounting base, to ensure matching proper sensor to potential hazards of areas being protected. In all cases, the system shall recognize when an improper sensor type has been installed in a previously programmed sensor type location.
- D. Addressable Monitor Module, Model AMM-2, AMM-2F:
1. An addressable monitor module with initiating circuit wired Class B, Style B shall be furnished to provide an address for individual, normally open (N.O.) contact devices.
- E. Addressable Dual Monitor Module, Model AMM-2I, AMM-2IF:
1. An addressable monitor module with 2 initiating circuits wired Class B, Style B shall be furnished to provide 2 addresses for individual, normally open (N.O.) contact devices.
- F. Addressable Monitor Module, Model AMM-4, AMM-4F:
1. An addressable monitor module with initiating circuit capable of being configured either Class A, Style D or Class B, Style B shall be furnished to provide an address for an individual, normally open (N.O.) contact device, or collective address for group of such devices.
 2. LED: The AMM-4, AMM-4F module shall contain a yellow status LED that shall flash when in quiescent mode and light continuously when in alarm. The LED shall be field programmable not to provide quiescent status indication, if so desired.
- G. Addressable Sub-loop Monitor Module, Model AMM-4S, AMM-4SF:
1. An addressable monitor module with initiating circuit capable of being configured Class B, Style B shall be furnished to provide a collective address for up to ten (10) Model 1151, 2151, 1451, or 1400, conventional 2-wire smoke detectors.
 2. LED: The Model AMM-4S, AMM-4SF module shall contain a yellow status LED that shall flash when in quiescent mode and light continuously when in alarm. The LED shall be field programmable not to provide quiescent status indication, if so desired.
- H. Addressable Sub-loop Monitor Module, Model MMI-6S, MMI-6SF:
1. An addressable monitor module with 6 initiating device circuits, each capable of being configured for six Class B, Style B, or three Class A, Style A circuits, shall be furnished to provide a collective address for up to ten (10) Model 1151, 2151, 1451, or 1400 conventional 2-wire smoke detectors installed in each circuit.

2. LED: Each circuit shall contain a yellow status LED that shall flash when in quiescent mode and light continuously when in alarm. The LED shall be field programmable not to provide quiescent status indication, if so desired.
- I. Addressable Monitor Module, Model MMI-10, MMI-10F:
 1. An addressable monitor module with 10 initiating device circuits, each capable of being configured Class B, Style B, or 5 circuits each capable of being configured Class A, Style D, shall be furnished to provide an address for an individual, normally open (N.O.) contact device, or collective address for group of such devices.
 2. LED: Each circuit shall contain a yellow status LED that shall flash when in quiescent mode and light continuously when in alarm. The LED shall be field programmable not to provide quiescent status indication, if so desired.
 - J. Addressable Output Module, Model AOM-2R, AOM-2RF:
 1. An addressable Output Module: Connected to the same signaling line circuit as analog/addressable monitor devices and Shall provide relay output (Form "C" 2 amp at 24 VDC, resistive only).
 - K. Addressable Output Module, Model AOM-2S, AOM-2SF:
 1. An addressable Output Module: Connected to the same signaling line circuit as analog/addressable monitor devices and Shall be capable of switching an external power supply or audio amplifier (up to 80 VRMS) to notification appliances.
 2. Notification Appliance Circuit: Shall be capable of being wired Class A (Style Z) or Class B (Style Y).
 3. The module shall supervise wiring to connected loads and report their status as Normal, Open, or Short Circuit.
 - L. Addressable Output Module, Model MMO-6R, MMO-6RF:
 1. An addressable Output Module: Connected to the same signaling line circuit as analog/addressable monitor devices and Shall Provide 6 relay outputs, each with Form "C" 2 amp at 24 VDC, (resistive only) contacts.
 - M. Addressable Output Module, Model MMO-6S, MMO-6SF:
 1. An addressable Output Module: Connected to same signaling line circuit as analog/addressable monitor devices and Shall Provide 6 outputs, each capable of switching an external power supply or audio amplifier (up to 80 VRMS) to notification appliances.
 2. Notification Appliance Circuit: Shall be capable of being wired Class A (Style Z) or Class B (Style Y).
 3. The module shall supervise wiring to connected loads and report their status as Normal, Open, or Short Circuit.
 - N. Fault Isolator Module, Model M500X:
 1. This module enables part of signaling line circuit to continue operating when a short circuit occurs on a section of it.
 2. The LED flashes in normal condition and lights during a short circuit condition.
 3. The module automatically restores the entire circuit to normal condition when the short circuit is removed.

4. The module may be used in multiple, in any combination with other modules, providing circuit operation similar to that of NFPA Style 7, and does not require an address on the signaling line circuit.
- O. Addressable Manual Fire Alarm Station, Model MS-7A, MS-7AF:
1. Each Station: Shall be the non-coded double-action type, designed for installation in the signaling line circuit of the FCI analog addressable control panel.
 2. Activation of Station: Shall cause its assigned address to register at the control panel.
 3. LED: The door shall contain an LED which flashes red in normal condition and lights steadily when the station has been activated.
 4. The station Shall contain screw terminals.
- P. Manual Fire Alarm Stations Suitable for Use with Addressable Monitor Modules:

Specifier Notes: Specify **one** of the following **five** paragraphs describing Manual Fire Alarm Stations.

1. Double-Action Manual Station, Model MS-2:
 - a. Each Station: Non-coded double-action type, requiring the outer door to be lifted to expose actuator door. Upon pulling forward of door, the unit shall lock into a readily observable "alarm" position.
 - b. The station shall be constructed of aluminum Type 6063/T5, equipped with a break glass rod feature, and require a key to reset.
 - c. Key: Shall be keyed alike with the control cabinet.
 - d. Alarm Activation: The station Shall have a highly reliable action to activate an alarm and have exceptionally high resistance to accidental operation.
2. Single-Action Manual Station, Model MS-6:
 - a. Each Station: Non-coded single-action type, requiring pulling forward of the actuator door to activate the alarm switch. Upon pulling forward of the door, the unit shall lock into a readily observable "alarm" position.
 - b. The station shall be constructed of aluminum Type 6065/T5, equipped with a break glass rod feature, and require a key to reset.
 - c. Key: Shall be keyed alike with the control cabinet.
 - d. Alarm Activation: The station Shall have a highly reliable action to activate an alarm and have exceptionally high resistance to accidental operation.
3. Presignal Manual Station, Model MS-2P:
 - a. Each Station: Non-coded double-action type, requiring the outer door to be lifted to expose the actuator door. Upon pulling forward of the door, the unit shall lock into a readily observable "alarm" position.
 - b. The station shall be constructed of aluminum Type 6065/T5, equipped with break glass rod feature, and require a key to reset.
 - c. Key: Shall be keyed alike with the control cabinet.
 - d. Alarm Activation: An additional key-operated switch (keyed differently) Shall be mounted on the front of the lower door for "general alarm" signaling.
4. Institutional Manual Station, Model MS-2L:
 - a. Each Station: Shall require a special key to release the outer door before it can be activated. After unlocking the actuator door and pulling it forward, the unit shall lock into a readily observable "alarm" position.
 - b. The station shall be constructed of aluminum Type 6063/T5, equipped with a break glass rod feature, and require the same key to reset.
5. Multiple-Contact Manual Station, Model MS-2D:

- a. Each Station: Non-coded double-action type, requiring the outer door to be lifted to expose the actuator door. Upon pulling forward of the door, the unit shall lock into a readily observable "alarm" position.
- b. The station shall be constructed of aluminum Type 6063/T5, equipped with a break glass rod feature, and require a key to reset.
- c. Key: Shall be keyed alike with the control cabinet.
- d. Upon operation of the station, a contact shall be available for remote control or annunciation. Contact rating shall be 6 amperes at 30 VDC.

Q. Automatic Initiating Devices: Two-wire smoke detectors approved for use with AMM-4SF Addressable Sub-loop Monitor Module. Maximum of 20 detectors per module.

Specifier Notes: Specify **one** of the following **three** paragraphs describing Photoelectric Area Smoke Detectors.

1. Photoelectric Area Smoke Detectors,
 - a. Type: Photoelectric.
 - b. Designed for 2-wire installations.
 - c. Factory set to detect smoke at nominal 3.0 percent light obscuration per foot.
 - d. Sensitivity Tester: Allows direct readout of actual detector sensitivity in percent obscuration per foot using standard digital voltmeter.
 - e. To minimize nuisance alarms, detectors shall contain screen protecting the sensing chamber from dust and insects, and equipped with self-compensating circuitry to provide maximum stability against effects of aging, dust, and film accumulation.
 - f. Detectors shall be equipped with pulsed LED power supervisory indicator and full functional test feature.
 - g. Alarm Output: Available for remote annunciation.
2. Photoelectronic Area Smoke Detectors,
 - a. Type: Photoelectronic.
 - b. Nominal Sensitivity: 3.0 percent/ft.
 - c. Signal-to-Noise Ratio: 2.0 nominal.
 - d. Perform functional sensitivity and performance test on these detectors without need for generating smoke. Test method shall test all detector circuits.
 - e. Alarm Indication: Provided by latching LED, which shall pulse periodically indicating power is being supplied to detector. Alarm output shall be available for remote annunciation.
 - f. Detectors shall not alarm when exposed to wind gusts up to 2500 feet per minute.
 - g. Detector Screen and Cover Assembly: Removable for field cleaning.
 - h. Wire Connections: Made by clamping plate and screw.

Specifier Notes: Specify **one** of the following **three** paragraphs describing Ionization Area Smoke Detectors

5. Ionization Area Smoke Detectors, System Sensor
 - a. Type: Dual-chamber, ionization.
 - b. Nominal Sensitivity: 1.5 percent/ft.
 - c. Perform calibrated sensitivity and performance test on detectors without need for generating smoke. Test method shall test all detector circuits.

- d. Test Meter: Available to check sensitivity of detectors. Metering points shall be accessible on exterior of detectors.
- e. Alarm Indication: Provided by latching LED, which shall pulse periodically indicating power is being supplied to detector. Alarm output shall be available for remote annunciation.
- f. Capable of operation in air velocities up to 2,500 feet per minute and at altitudes up to 10,000 feet without adjustments.
- g. Detector Screen and Cover Assembly: Removable for field cleaning.
- h. Wire Connections: Made by clamping plate and screw.

Specifier Notes: Specify **one** of the following **two** paragraphs describing Duct Smoke Detectors.

- 7. Duct Smoke Detectors:
 - a. Type: Photoelectric or ionization duct smoke detectors wired in 2 or 4-wire configuration.
 - b. UL Listed under UL 268A for duct smoke detectors.
 - c. Allows remote functional testing without generating smoke.
- 8. Four-Wire Duct Smoke Detectors,
 - a. Type: Ionization or photoelectronic duct smoke detectors wired in 4-wire configuration.
 - b. UL Listed under UL 268A for duct smoke detectors.
 - c. Allow remote functional testing without generating smoke.

Specifier Notes: Specify **one** of the following **five** paragraphs describing Heat Detectors.

- 9. Rate of Rise Heat Detectors, :
 - a. Function on both "rate of rise" and "fixed temperature" principles of operation.
 - b. Low profile design, white in color.
 - c. Locking base for mounting on standard electrical box.
- 10. Rate of Rise Heat Detectors,
 - a. Function on both "rate of rise" and "fixed temperature" principles of operation.
 - b. Also available in explosion-proof and combined weather/moisture-proof versions.
 - c. Explosion-Proof Models: UL and FM approved/listed for Class I, Groups C and D, and Class II, Groups E, F, and G.
- 11. Fixed Temperature Heat Detectors,
 - a. Function on the "fixed temperature" principle of operation.
 - b. Contact Arrangements: SPST or DPST.
 - c. Temperature Set Points: 135 degrees F or 200 degrees F.
 - d. Low profile design, white in color.
 - e. Locking base for mounting on standard electrical box.
- 12. Fixed Temperature Heat Detectors,
 - a. Function on the "fixed temperature" principle of operation.
 - b. Temperature Set Points: 136 degrees F or 190 degrees F.
 - c. Also available in explosion-proof and combined weather/moisture-proof versions.
 - d. Explosion-Proof Models: UL and FM approved/listed for Class I, Groups C and D, and Class II, Groups E, F, and G.
- 13. Fixed Temperature Heat Detectors,
 - a. Function on the "fixed temperature" principle of operation.
 - b. Temperature Set Points: 135 degrees F or 200 degrees F.

c. Replaceable plug-in detecting element.

R. Optional Remote Serial Annunciator, Model LCD-7100:

1. Display: 80-character display. Duplicates all information on basic system display, with exception of menus.
2. Function Keys: Alarm Acknowledge, Trouble Acknowledge, Signal Silence, System Reset/Lamp Test, and System Drill Test.
3. Keylock: A keylock which shall enable switches only when placed in the "ON" position, with exception of the Trouble Acknowledge key which is used to silence the local trouble audible sounder.
4. Contains the following LEDs: Alarm, Supervisory, System Trouble, Power Fault, System Silenced, NAC #1 Silenced, NAC #2 Silenced.
5. Mounting: Mounts on standard 3-gang surface or flush electrical box.
6. 7100 Series Control Panel: Accommodates up to 5 remote Model LCD-7100 annunciators, which can be located up to 4,000 feet from control panel.

S. Optional Serial LED Driver Module, Model LDM-7100:

1. Capable of driving up to 33 remote LEDs.
2. As many as 3 modules may be installed inside a remote, Listed annunciator allowing annunciation of up to 99 points per annunciator.
3. Operation up to 4,000 feet from control panel.
4. Control Panel: Capable of accommodating up to 5 such annunciators.

2.6 AUXILIARY FUNCTIONS

A. HVAC Control:

Specifier Notes: Specify **one** of the following **four** paragraphs describing Designated HVAC Units.

1. Designated HVAC Units: Controlled through auxiliary contacts of heat detectors or 4-wire duct-type smoke detectors.
2. Designated HVAC Units: Controlled through auxiliary contacts of control panel after an alarm has been initiated from any zone.
3. Designated HVAC Units: Controlled through auxiliary zone contacts of control panel after alarm has been initiated from particular zone that is designated to control HVAC units. Disconnect switch shall be supervised.
4. Designated HVAC Units: Controlled by addressable output modules programmed to activate according to areas to be covered.

B. Electromagnetic Door Holders, Model FM-900 Series:

1. Hold fire and smoke barrier doors open until released by alarm.
2. Holding Power: Approximately 35 pounds (15.9-kg).
3. Offer fail-safe operation.
4. Capable of operation on 12 VDC, 24 VAC, 24 VDC, or 120 VAC interchangeably without need of configuration.
5. Holders: Release through contacts of control panel after alarm has been initiated from any zone.
6. Circuits: Separately fused.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install the fire alarm system in accordance with manufacturer's instructions.
- B. Coordinate the installation of fire alarm equipment with the manufacturer or authorized distributor.
- C. Install conductors and wiring according to the manufacturer's recommendations.
- D. Coordinate with the supplier regarding correct wiring procedures before installing conduits or conductors.
- E. Install system components in accordance with appropriate NFPA Standards, specified requirements, National Electrical Code, local and state regulations, requirements of fire department, and other applicable authorities having jurisdiction (AHJ).

3.2 FIELD QUALITY CONTROL

- A. Final Test: Perform the following before the installation shall be considered completed and acceptable by awarding authority:
 - 1. Operate by the Contractor's job foreman, in presence of a representative of the manufacturer, a representative of the Owner, and fire department, every installed device to verify proper operation and correct annunciation at control panel.
 - 2. Perform at least one half of all tests on battery standby power.
 - 3. Where application of heat would destroy any detector, it may be manually activated.
 - 4. Open signaling line circuits and notification appliance circuits in at least 2 locations to verify the presence of supervision.
 - 5. When testing has been completed to satisfaction of both Contractor's job foreman and representatives of the manufacturer and the Owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the Owner and fire department.
 - 6. Leave the fire alarm system in proper working order, and, without additional expense to the Owner, replace defective materials and equipment provided under this contract within 1 year (365 days) from date of final acceptance by awarding authority.
 - 7. Notify the fire department before the final test in accordance with local requirements.

END OF SECTION