

## PART 1 - GENERAL

### 1.01 Intent of Document

The information included in this section is intended to identify the SPECIFIC ITEMS required by Oklahoma State University in the design and construction of facilities on the campus. Items of "normal, code, industry or standard construction practice" are not included in this section.

### 1.02 Contractor Requirements

- A. All workers shall be certified technicians licensed by the State of Oklahoma for Fire Alarm Installation.
- B. Contractor shall provide on-call 24 hour, 7-day week service.
- C. Contractor shall be a stocking distributor for all equipment for immediate replacement of parts from inventory shall have five years minimum experience in fire alarm systems and shall be located within ninety (90) miles of the project.
- D. Submit shop drawings (two copies) to the Owner's Architecture Services and Environmental Health Services departments for review and for approval before installation.

## PART 2 - PRODUCTS

### 2.01 General

Since system is to be part of an overall existing campus fire alarm system, **NO EQUIPMENT OTHER THAN THAT MADE BY THE MANUFACTURERS LISTED** is desired for the equipment specified in this section.

### 2.02 Fire Command Station (FCS)

- A. General:
  - 1. Compact, neat assemblies of circuit boards, solid state plug-in cards, indicating lamps or LED's, switches, power supplies and accessories.
  - 2. Provide electrical supervision for FCS indicating lamps, ground fault, battery condition, power failure, and wiring faults in all signal initiating and audible notification appliance circuits.
  - 3. Provide lightning and transient (voltage surge) protection for all signal initiating, notification, and auxiliary output circuits.
  - 4. No audible trouble signal is to be sounded in the protected building.
  - 5. Provide a "Drill" switch within the FCS. Actuation of switch shall continuously operate notification appliances in the building, but shall not transmit an alarm signal to the Remote Station Receiving Panel or cause the operation of Auxiliary Output circuits. The switch shall be appropriately labeled, colored red, and shall show "ON" and "OFF" position.
  - 6. FCS shall provide a "walk test" feature for single person test of the system.

- B. Power Supplies:
1. Primary power supply - 120 volts AC. (If emergency generator is provided, obtain power from emergency power panel.) Convert 120 volts to 24 volts DC to provide 110% of the required system amperage.
  2. Secondary power supply - batteries and automatic tapering charger with automatic switching to battery power in the event of primary power loss and switching back to primary power supply when primary power is restored. Charger shall be capable of fully recharging the batteries in twelve (12) hours. Provide supervision of battery connections, battery fuse or breaker, and battery condition which shall produce a trouble signal when any condition occurs, which would prevent operation of the secondary power supply.
- C. Indicators: FCS shall have a built-in annunciator with lamps or LED's for individual circuit annunciation of supervisory and alarm signals. Normal condition shall be indicated by **green** light, trouble conditions by **amber** light, and fire condition by **red** light. Fire indicating lights must remain lighted at the control panel until manually reset.
- D. Signal Initiation Circuits:
1. FCS shall contain signal-initiating circuits as designated by the Owner. Circuits shall be numbered and designated by appropriate wording on the FCS at the factory. If circuits cannot be designated on FCS, provide numbers for each circuit on the FCS and separate engraved list of circuit descriptions, style and mounting location as directed by the Owner.
  2. Initiating device circuit cards shall provide not more than four (4) class "B" circuits. Each circuit shall have a clearly marked disconnect switch. Operation of switch shall cause a trouble signal on the associated circuit by disconnecting the circuit's field circuitry.
  3. All initiating device circuits shall provide alarm verification, programmable by zone, with automatic discrimination between smoke detectors and contact devices.
- E. Notification Circuits:
1. Audible Notification Circuits: Provide two (2) march-time coded, Style Y (Class "B") supervised, general alarm, audible notification output circuits with separate, labeled disconnect switch with indicating **amber** light. Operation of switch shall cause the amber lamp to light and register a trouble signal on the FCS.
  2. Visual Notification Circuits: Provide two (2) non-coded, non-supervised general alarm, visual output circuits each with separate, labeled disconnect switch with indicating **amber** light. Operation of switch shall cause the amber lamp to light and register a trouble signal on the FCS.

- F. Auxiliary Output Circuits:
1. Door Release: Provide one (1) non-coded, non-supervised 24 volt DC output with separate, labeled disconnect switch with **amber** indicating light for automatic release of smoke/fire doors upon general alarm with. Operation of this switch shall cause amber lamp to light and register a trouble signal on FCS. Provide remote relays as required for door release.
  2. Spare: Provide one (1) set of Form "C" dry contacts, which operate upon general alarm.
- G. Cabinet(s): Semi-flush or flush mount type to compactly house all equipment required for system. If power supplies and/or batteries cannot be mounted in the FCS cabinet, then provide separate cabinet with blanked hinged cover matching FCS cabinet and mount where directed by the Architect. All lamps and controls shall be behind a hinged locked door ("dead front") with glass or plastic vision panel(s) and CAT-15 lock. Front of cabinet shall not project more than one half inch (1/2") from wall.

### 2.03 Devices

- A. AC Power Disconnect: Separate, dedicated circuit with fuse box and disconnect switch with provision to padlock the box cover and switch in "ON" position. The fuse shall be ten (10) amp, Fusetron screw-in type. Locate the box and switch in an easily accessible location near the "EXIT LIGHT" switch and mount within five (5) feet of the floor. The box shall be labeled with an engraved red plastic sign with "FIRE ALARM CIRCUIT CONTROL" printed in one-half inch white letters. Locks by Owner.
- B. Batteries: Approved gell cell type batteries (nine (9) Amp Hours minimum capacity) for emergency power source. Batteries shall have capacity to power system under trouble and standby conditions for twenty-four (24) hours and operate all notification appliances for at least five (5) minutes after this period.
- C. Door Holder and Air Handler Control Relays: Twenty-four (24) volts DC. Magnetic door holders supplied shall be 120 volts AC.
- D. Locks and Keys:
1. All locks shall be keyed to **CAT-15 key**.
  2. Provide close security of all keys to the alarm system. Equipment Supplier shall retain all but two (2) keys, to be distributed to the Contractor for construction and tests. Equipment Supplier shall transfer all keys to OSU Key Department when equipment is delivered to the contractor. The contractor shall return all keys to OSU Key Department at completion of the job.
- E. Manual Fire Alarm Stations: **Notifier Model BNG-1R (NO SUBSTITUTES)** Non-coded, non-break glass type equipped with **CAT-15 key locks** for test purposes and Double Action Break Station Adapters (Notifier DABC).

- F. Notification Appliances: Audible-visual notification appliances (strobe-horns) designed for semi-flush mounting, red in color, with red grilles and white strobe lamp with "FIRE" in red letters on lens.
- G. Smoke Detector Remote Indicators: Provide each air duct smoke detector and each smoke detector in mechanical rooms with remote indicating lamp mounted on ceiling in the corridor adjacent to door of room of the detector location. Provide label on lamp easily read from floor level, (engraved white letters on black plastic material), indicating location of detector.
- H. Smoke Detectors in Elevator Lobbies: Upon activation shall cause the elevator to go into emergency mode as per ANSI Standard A17.1 (rules 211.3 - 211.8) and NFPA 72, 3-7.3
- I. Air Handling Unit Relays: Air handling unit relays shall be 24 volt DC.
- J. Wire:
  - 1. Insulated, **solid**, copper conductors.
  - 2. Signal initiating and supervisory circuits: **18-gauge** U.L. Listed Power Limited Fire-Protective Signaling cable.
  - 3. Audible - Visual Notification Circuits: **12-gauge** U.L. Listed wire, red and black or blue and white.
  - 4. Accessory Circuits: **16-gauge** U.L. Listed wire, orange and green.
  - 5. Wiring between power supply and control panel if separate cabinet is used: **12-gauge** U.L. Listed wire, yellow and black.
  - 6. Smoke Detector Power Circuits (4 wire type): **16-gauge** U.L. Listed wire, red(+) and black(-).
  - 7. AC Power: **12-gauge** U.L. Listed TW-12 wire, black and white w/green ground conductor.

### PART 3 - INSTALLATION & ACCEPTANCE

#### 3.01 Installation

- A. All devices and controls shall be adjusted and tested by manufacturer or authorized factory representative after final connections have been made.
- B. All wiring shall be installed in separate conduit. Transposing of colors within a circuit will not be permitted. No system wiring shall be run in the same conduit as any other wiring.
- C. All wiring at screw terminal connections shall be with approved "**Stakon**" or equal crimp-on insulated terminals with spade lugs or with saddle-type screw connectors. Identify each wire with number of the terminal and letter of the strip to which it is attached by "**Brady**" **stick-on tabs or equal**. "Sleeve"-type labels will not be acceptable.
- D. All other wiring terminations shall be made in approved junction boxes and shall be soldered or fastened with approved type wire nuts, and well taped.

- E. All system junction box covers shall be painted red and labeled with Owner furnished labels.
- F. Audible - visual notification appliances in corridors shall be wired on alternate circuits so that failure of one circuit shall not cause loss of warning from all signals. **Provide separate wiring to all strobe lamps.**
- G. Install manual fire alarm stations with tops of the boxes four (4) feet above floor level.
- H. Provide one-half inch conduit with one red pair of #18 U.L. Listed fire alarm cable from the fire alarm control panel to main telephone service entrance box. Tag line "FIRE" at telephone cabinet.
- I. Provide one-half inch weatherproof conduit with one pair of #18 U.L. Listed fire alarm cable of appropriate color from building to any fire sprinkler Post Indicator Valves tamper switches.

### 3.02 Testing and Certification

- A. Prepare certificate of compliance as per NFPA 72 2-2.2. **OPERATIONAL ACCEPTANCE TESTS WILL NOT BE MADE WITHOUT THIS ITEM!**
- B. Furnish two (2) copies (one (1) sepia and one (1) print) of a **complete** set of "As-built" plans (as defined in NFPA 72) prior to the acceptance test. Provide two (2) copies of separate drawing showing and identifying all connections made inside control equipment **as installed** shall also be furnished. **OPERATIONAL ACCEPTANCE TESTS WILL NOT BE MADE WITHOUT THESE ITEMS!**
- C. Provide an Owner's manual or manufacturer's installation instructions covering all system equipment prior to the operational acceptance tests (as per NFPA 72 A-2-2.3(a)). **OPERATIONAL ACCEPTANCE TESTS WILL NOT BE MADE WITHOUT THIS ITEM!!!**
- D. Authorized factory representative shall measure and adjust each detector to required stable sensitivity setting. This must be performed at the operational location of the unit and under normal operational environmental conditions in the area. Bench settings are not acceptable. Provide checkout report submitted in duplicate, which shall include, but not be limited, to the following:
  - 1. Date.
  - 2. Name of property.
  - 3. Address.
  - 4. Installer company name, address, and representative.
  - 5. Number and type of detectors per zone for each zone.
  - 6. Serial number for each smoke detector.
  - 7. Voltage (sensitivity) setting for each smoke detector measured in place with HVAC operating.
  - 8. Response time on thermostats and flame detectors (if used).

9. Signature if tester, signature of representative of Owner's Environmental Health Services Department. **OPERATIONAL ACCEPTANCE TESTS WILL NOT BE MADE WITHOUT THIS ITEM!**

E. Following installation, the entire system, including all signal initiating devices, alarm notification appliances, and controls shall be given a thorough operating test by the Contractor. The acceptance test shall be as recommended in NFPA 72H Chapter 2, current edition. Smoke detectors shall be tested as recommended by the manufacturer. A twenty-four (24) hour test of the system to verify system standby battery capacity as herein specified will also be made by the Contractor. These tests shall be witnessed by representatives of the Owner's Architecture Services and Environmental Health Services departments and others they may wish to have present. A thorough check of device and wiring installation and location will also be made at this time by these representatives. Any faults or discrepancies by the Owner to assure proper operation.

F. A stability period of thirty (30) consecutive days during which no unwanted alarms occur, will elapse from the time of the satisfactory operational acceptance test before the Owner will make final acceptance of alarm system. This will give the system an operation check during working days as well as weekends, when any unusual conditions might be encountered. If any unwanted alarms are received during this period, the Contractor shall determine the cause, correct the problem, and another thirty (30) day period stability test will be made.

**3.03 Training and Maintenance**

The Contractor shall provide a qualified representative for up to one (1) day to instruct assigned representatives of the Owner in the operation and maintenance of the system.

**PART 4 - ACCEPTABLE FIRE DETECTION AND ALARM EQUIPMENT**

Component	Manufacturer		
	Fire Lite	Notifier	Pyrotronics
<b>Conventional Control Panels</b>	Sensiscan 2000 MS-5210UD	System 500 System 5000	System 3 PXL
<b>Addressable Control Panels</b>	MS-9200 MS-9600	AM2020/1010 AFP Series	MXL Series
<b>Remote Annunciator</b>	Compatible with Fire Lite FACP	Compatible with Notifier FACP	Compatible with Pyrotronics FACP
<b>Ionization Smoke Detector*</b>	System sensor 100 series plug-in type  System sensor 400 series Direct wire	System sensor 100 series plug-in type  System sensor 400 series Direct wire	System sensor 100 series plug-in type  System sensor 400 series Direct wire

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<b>Addressable Ion Smoke Detectors</b>	CP350	FSI-751	FP-11 ILI series
<b>Photoelectric Smoke Detector*</b>	System sensor 100 series plug-in type  System sensor 400 series Direct wire	System sensor 100 series plug-in type  System sensor 400 series Direct wire	System sensor 100 series plug-in type System sensor 400 series Direct wire
<b>Addressable Photo Smoke Detector</b>	SD 350 SD350T built-in Thermo	FSP-751	FP-11 ILP Series
<b>Air Duct Detector</b>	System sensor DH100PLP	System Sensor DH100PLP	System Sensor DH100PLP
<b>Addressable Duct Detector</b>	N/A	FSD-751P	Compatible with Pyrotronics FACP
<b>Fixed-Temperature Heat Detector</b>	Chemtronics 603	Chemtronics 603	Chemtronics 603
<b>Addressable Heat Detectors</b>	Compatible with Fire Lite FACP	Compatible with Notifier FACP	Compatible with Pyrotronics FACP
<b>Rate-of-Rise Heat Detector</b>	Chemtronics 601	Chemtronics 601	Chemtronics 601
<b>Addressable Mini-Monitor Module</b>	MMF301	FMM-101	N/A
<b>Addressable Monitor Modules</b>	MMF-300 MDF-300	FMM-1	TRI Series
<b>Addressable 2-wire Monitor Module</b>	MMF-302	FZM-1	TRI Series
<b>Voice-evac system</b>	Compatible with Fire Lite FACP	Compatible with Notifier FACP	Compatible with Pyrotronics FACP
<b>Addressable Control Module</b>	CMF-300	FCM-1	TRI Series
<b>Addressable Control Relay Module</b>	CRF-300	FRM-1	TRI Series
<b>Strobe Horn</b>	Wheelock Series NS/NSH Horn/Strobe		
<b>Manual Station</b>	BNG-1R Notifier manual Pull Station (NO substitutions)		
<b>Fan Shutdown Relay</b>	According to Manufacturer's Specification on AHU Shut-Down		
<b>Sprinkler Waterflow</b>	Potter VSR-F flow switch		
<b>PIV or Butterfly Valve Switch</b>	Potter PCVS-1 or -2		
<b>Sprinkler OS&amp;Y Valve Switch</b>	Potter OSYSU-1 or -2		

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\* Supply base as required

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