# SECTION 16700

# FIRE ALARM SYSTEMS

## PART 1 - GENERAL

1.1 GENERAL

A. Provisions of Section 16010 "General Requirements for Electrical Work" apply to the Work of this Section.

B. The work of this section includes providing a complete microprocessor based, addressable, analog fire alarm system including all initiating and notification devices, knox box, controls, software, programming, accessories, raceway, wiring, terminations, documentation, testing and start-up services.

1.2 CODES AND STANDARDS

A. The Fire Alarm System shall comply with the following codes and standards:

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|---|---|---|
| 1. | NFPA 72 | National Fire Alarm Code |
| 2. | NFPA 70 | National Electric Code |
| 3. | NFPA 13 | Sprinkler Systems |
| 4. | ADA | Americans Disabilities Act |

1.3 SUBMITTALS

A. Manufacturer's product data sheets and installation instructions.
B. Complete system one line and wiring diagrams.
C. Battery calculations.
D. Operation and Maintenance instructions.
E. Floor plans showing wiring, location, address, and zone identification of each device.

1.4 MANUFACTURERS

A. Subject to compliance with the Specification requirements:

1. Notifier
2. Pyrotronics
3. Simplex
4. Approved Equivalent

1.5 Installer shall be regularly engaged in the installation of fire alarm systems and shall be factory authorized by the manufacturer to provide sales and service.

## PART 2 - PRODUCTS

2.1 SYSTEM OPERATION

A. The fire alarm system shall provide both general evacuation and local notification as shown on the Drawings and described herein.

B. Notification devices shall be provided with separate audio speaker and visual circuits such that alarms may be silenced and visual alarms continue to operate until the system is reset.

C. All initiating, notification and tamper circuits shall be supervised.

D. Removal of an addressable initiating device shall cause a trouble signal to appear at the Control Panel.

2.2 FIRE ALARM CONTROL PANEL

A. Main Control Panel: Modular type panel installed in a flush steel cabinet with hinged door and cylinder lock for microprocessor based system. Switches and other controls shall not be accessible without the use of a key. The control panel shall be a neat, compact, factory-wired assembly containing all parts and equipment required to provide specified operating and supervisory functions of the system. Panel cabinet shall be finished on the inside and outside with factory-applied enamel finish. Provide audible trouble signal. Provide indication of: Power on, battery power on, and alarm, trouble and supervisory acknowledge switches. Provide permanent engraved rigid plastic or metal identification plates, or silk-screened labels attached to the rear face of the panel viewing window, for all lamps and switches. System power shall be 120 volts AC services, transformed through a two winding isolation transformer and rectified to 24 volts DC for operation of all system initiating, actuating, signal sounding (indicating appliance), trouble signal and fire alarm tripping circuits. Permanently label all switches. Panel shall be provided with the following features:

1. Trouble silencing switch which transfers audible trouble signals (including remote trouble devices, if provided) to an indicating lamp. For non-self-resetting type switch, upon correction of the trouble condition, audible signals will again sound until the switch is returned to its normal position.

2. Evacuation alarm silencing switch which when activated will silence all alarm indicating appliances without resetting the panel, and cause operation of system trouble signals. Subsequent alarm(s) from additional zone(s) not originally in alarm shall cause activation of the evacuation alarms even with the alarm silencing switch in the "silenced" position.

3. Reset switch when activated will restore the system to normal standby status after the cause of the alarm has been corrected, and all activated initiating devices reset. Operation of reset switch shall restore activated smoke detectors to normal standby status.

4. Lamp test switch.

5. Drill switch which will enable test of alarm devices and restoration to normal without tripping the system.

6. CPU with nonvolatile memory for user defined operating parameters. The system shall be field programmable and configurable from a panel key pad. The system shall remain active and provide fire detection while the program is being edited. The system shall operate in real time for event date and time annotation.

7. Menu driven alpha-numeric liquid crystal display which indicates events stored in the system log, the status of all points, alarm and diagnostic messages.

8. Alarm verification, drift compensation and maintenance alert for smoke detectors. Provide dry contact for Owners use.

9. Custom zone labeling.

10. Dual rate battery charger with volt and ammeters.

11. Maintenance free lead-calcium batteries.

12. Transient voltage surge protection.

13. Signaling Line circuit Class A Style 5. Notification Appliance Circuit - Style Y.

2.3 DEVICES

A. Manual Pull Stations: Dual action, key reset, addressable suitable for semiflush or surface mounting. The device shall be painted red with the word FIRE in white raised letters.

B. Area Smoke Detectors: Spot type photoelectric analog addressable with integral communications and device identification. Flashing LED indicator for normal operation with steady illumination on alarm. The smoke detector shall measure the analog level of smoke and report the level to the Control Panel.

C. Heat Detectors: Fixed Temperature, Bimetal, conventional device.

D. Notification Appliances: 24 Volt Xenon Flasher and speaker per ADA guidelines and NFPA for voice evacuation. Minimum intensity 15/75 cd unless otherwise shown on Drawings.

E. Door Holders: 120 volt door holders will be furnished by others.

F. Duct Smoke Detectors: Similar to Area Smoke Detectors with sampling tubes and duct mount housing. Provide each duct smoke detector with a Remote Test / Indicating device.

G. Interlocks: Provide addressable relay modules for all interlocks shown on Drawings with contacts rated 120 VAC.

H. DIGITAL COMMUNICATOR

1. Provide digital communicator for notification of System Supervisor.

## PART 3 – EXECUTION

3.1 INSTALLATION

A. The Contractor shall provide all equipment and materials required for a fully operational system. The Contractor shall prepare layout drawings showing device locations, raceway size, wiring runs, conduit fill and terminations.

B. All wiring shall be installed in electrical metallic tubing or galvanized rigid steel conduit.

C. All junction boxes and fittings shall be color coded red. Junction Box Covers shall be labeled Fire Alarm System.

D. Coordinate device locations with other trades to assure proper installation of devices. Coordinate with other trades where work pertains to fire alarm system, i.e. air handling unit control, fire suppression system.

E. The Contractor shall clean all dirt and debris from the inside of the fire alarm control panels, annunciators, devices, etc. and clean the outside of aforementioned equipment after the completion of the installation. During construction, devices and equipment shall have protective coverings to limit amount of dirt and debris.

F. The manufacturer shall provide on-site supervision of the installation to assure system is installed to meet manufacturers installation requirements.

G. The Contractor shall provide all wiring and terminations for door holders which are furnished and mounted with the door hardware.

3.2 TESTING

A. System Acceptance:

1. A pretest shall be held with the installer and the manufacturers technical representative present. In addition to the requirements listed below, the pretest shall demonstrate that each smoke detector is operative and produces the intended response. Each smoke detector shall be tested in accordance with the manufacturers recommendations to initiate an alarm at its installed location. After certification of a complete pretest, the installing contractor shall provide the authority having jurisdiction with written documentation from the manufacturers authorized representative of the outcome of the test and then shall re-inspect in the presence of the authority having jurisdiction and the manufacturers authorized technical representative. A complete test shall be conducted as follows: the installing contractor, in the presence of a representative of the authority having jurisdiction, shall manually operate every manual fire alarm station, activate every rate of rise type thermodetector with heat, manually operate or electrically short out every fixed temperature thermodetector, actuate every smoke detector with smoke in accordance with the manufacturers recommendations to demonstrate that smoke can enter the chamber and initiate an alarm, activate all automatic extinguishing system switches and activate every water sprinkler/standpipe flow switch by a flow of water.

2. Each manual fire alarm station, thermodetector, smoke detector, extinguishing system switching circuits, flow switch circuit and each alarm horn/strobe circuit shall be opened in at least two locations to test for the correctness of the supervisory circuitry. All communications shall be tested completely.

3. The fire alarm system may be placed in operation prior to acceptance if in the opinion of the authority having jurisdiction, it will enhance public safety or provide property protection during the final phases of construction. In this case all devices will be thoroughly cleaned or replaced prior to the system acceptance test. The system will not be placed in operation without the written permission of the authority having jurisdiction. Under no circumstances will this be considered a final acceptance test.

B. The manufacturer's representative shall provide on-site training for the Owner's representatives upon completion of acceptance testing.

**END OF SECTION 16700**