

SECTION 13851

FIRE ALARM SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire alarm annunciator panels.
- B. Manual pull stations.
- C. Automatic smoke and heat detectors.
- D. Fire alarm signaling appliances.
- E. Auxiliary fire alarm equipment.

1.2 RELATED SECTIONS

- A. Division 1 – General Requirements.
- B. Division 7 – Thermal and Moisture Protection.
- C. Division 8 – Doors and Windows.
- D. Division 13 – Special Construction.
- E. Division 14 – Conveying Systems.
- F. Division 15 – Mechanical.
- G. Section 16010 – Basic Electrical Requirements.
- H. Section 16060 – Grounding and Bonding.
- I. Section 16070 – Hangers and Supports.
- J. Section 16071 – Vibration/Noise/Seismic.
- K. Section 16075 – Electrical Identification.
- L. Section 16095 – Electrical Demolition.
- M. Section 16123 – Building Wire and Cable.
- N. Section 16130 – Raceways and Boxes.

1.3 REFERENCES

- A. See Section 16010 Paragraph 1.2 REFERENCES.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70, latest adopted edition, NFPA 72, NFPA 99, NFPA 101 and IBC.
- B. Furnish products listed and classified by Factory Mutual (FM) and Underwriters Laboratories, Inc. or an independent testing firm, acceptable to authority having jurisdiction, as suitable for purpose specified and shown.

1.5 SYSTEM DESCRIPTION

- A. Existing Fire Alarm System: NFPA 72, addressable manual and automatic local fire alarm system with connections to municipal system. System includes remote annunciator panels and devices. Existing initiating and alarming devices within the existing facility to remain, unless otherwise noted.
- B. New power supplies, batteries, and other materials, components, and equipment shall be provided.

1.6 SEQUENCE OF OPERATON

- A. Upon alarm activation of any duct smoke detector, area smoke detector, heat detector, manual fire alarm pull box, sprinkler water flow, the following functions shall automatically occur:
 - 1. The internal audible device shall sound at the control panel and local and remote annunciators.
 - 2. The display shall indicate all applicable information associated with the alarm condition including: zone, device type, device location and time/date.
 - 3. Remote and local annunciator LCD/LED's associated with the alarm zone shall be illuminated.
 - 4. Evacuation shall be sounded throughout.
 - 5. Activate visual strobes on all floors. The visual strobe shall continue to flash until the system has been reset.
 - 6. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
 - 7. Exit doors required for life safety egress shall unlock to allow occupants to exit.
 - 8. Self-closing fire/smoke doors held open shall be released.
- B. Upon Duct Smoke Activation the following functions shall automatically occur:
 - 1. The internal audible device shall sound at the control panel and local and remote annunciators.
 - 2. The display shall indicate all applicable information associated with the supervisory condition including; zone, device type, device location and time/date.
 - 3. Remote and local annunciator LED's associated with the alarm zone shall be illuminated.
 - 4. Shutdown the local air-handling unit.
 - 5. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.

- C. Upon supervisory activation of any sprinkler valve supervisory switch, the following functions shall automatically occur:
 - 1. The internal audible device shall sound at the control panel and local and remote annunciators.
 - 2. The display shall indicate all applicable information associated with the supervisory condition including; zone, device type, device location and time/date.
 - 3. Remote or local annunciator LCD/LED's associated with the supervisory zone shall be illuminated.

- D. Upon activation of a trouble condition or signal from any device on the system, the following functions shall automatically occur:
 - 1. The internal audible device shall sound at the control panel and local and remote annunciators.
 - 2. The display shall indicate all applicable information associated with the trouble condition including; zone, device type, device location and time/date.
 - 3. Remote or local annunciator LCD/LED's associated with the trouble zone shall be illuminated.

1.7 QUALIFICATIONS

- A. Installer: Company specializing in installing the products specified in this section with minimum three years documented experience, and certified by State of Alaska as fire alarm installer.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with NECA 1 – Standard Practices for Good Workmanship in Electrical Contracting and NECA NEIS 305 – Standard for Fire Alarm System Job Practices.

1.9 SUBMITTALS

- A. Submit under provisions of Division 1 and Division 16.

- B. Shop Drawings: Provide device layout and point to point system wiring diagram showing each new and relocated device including wiring connections required between device and fire alarm control panel.

- C. Calculations:
 - 1. Provide system battery calculations for new and extended initiating device circuits and signaling line circuits. Include capacity and voltage drop for each circuit and capacity calculations for battery system.
 - 2. Provide voltage drop calculations for new and extended notification appliance circuits. Include capacity and voltage drop for each circuit and capacity calculations for battery system.
 - 3. Provide ampere-hour requirements for each new system component and panel component. Include battery recharging period calculation for new batteries required to maintain system operation.
 - 4. The Contractor shall verify existing equipment and submit calculations based on actual existing and new equipment.

- D. Product Data: Provide electrical characteristics and connection requirements.
 - E. Test Reports: Submit satisfactory completion of required tests and inspections.
 - F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of products.
- 1.10 PROJECT RECORD DOCUMENTS
- A. Submit under provisions of Division 1 and Division 16.
 - B. Record actual locations of new and relocated panels, annunciators, initiating devices, signaling appliances, and end-of-line devices on as-built drawings.
- 1.11 PROJECT CONDITIONS
- A. Verify in the field that arrangements shown on Drawings are reasonably accurate.
 - B. Verify locations of panels and devices prior to rough-in.
- 1.12 DESIGN REQUIREMENTS
- A. Conduit Size: ANSI/NFPA 70.
- 1.13 DELIVERY, STORAGE, AND HANDLING
- A. Deliver, store, protect, and handle products under provisions of Division 1 and Division 16.
 - B. Accept Products on site. Inspect for damage.
 - C. Store in a clean dry space. Maintain factory wrapping. Protect products from dirt, water, and construction debris.
- 1.14 COORDINATION
- A. Coordinate Work under provisions of Division 1 and Division 16.
 - B. Determine and maintain required separation between fire alarm panels, annunciators, devices, and other work.
 - C. Coordinate and provide fire alarm panels, annunciators, and device locations to avoid interference with other work.
 - D. Coordinate connection of IDC and NAC circuits from existing system.
- 1.15 OPERATION AND MAINTENANCE DATA
- A. Submit under provisions of Division 1 and Division 16.

- B. Operation Data: Operating instructions for new devices and components.
- C. Maintenance Data: Maintenance and repair procedures new devices and components.

1.16 EXTRA MATERIALS

- A. Furnish under provisions of Division 1 and Division 16.
- B. Provide one of each type of automatic smoke detector and heat detector without base.

1.17 WARRANTY AND SERVICE

- A. Warrant all components, parts and assemblies against defects in materials and workmanship in accordance with the Contract documents. Warranty service shall be provided by a trained specialist of the equipment manufacturer.
- B. Service availability: The supplier shall have sufficient stock on hand and have a fully equipped service organization capable of guaranteeing response time, 24 hours a day, 7 days a week to service completed systems.

PART 2 PRODUCTS

2.1 FIRE ALARM SYSTEM COMPONENTS

- A. Manufacturer:
 - 1. GE Security (Edwards Systems Technology) to match existing.
 - 2. Substitutions: None permitted.

2.2 INITIATING DEVICES

- A. Manual Pull Station: Semi-Flush mounted, non-coded type, single action manual station. Provide manufacturer's standard backbox.
- B. Spot Heat Detector: Combination rate-of-rise and fixed temperature, rated 135 degrees F, and temperature rate of rise of 15 degrees F.
- C. Ceiling Mounted Smoke Detector: NFPA 72, photoelectric type with adjustable sensitivity, plug-in relay base, and visual indication of detector actuation, suitable for mounting on 4 inch outlet box. Provide two-wire detector with common power supply and signal circuits.
- D. Duct Mounted Smoke Detector: NFPA 72, photoelectric type with auxiliary SPDT relay contact, key-operated NORMAL-RESET-TEST switch, duct sampling tubes extending width of duct, and visual indication of detector actuation, in duct-mounted housing. Provide two-wire detector with common power supply and signal circuits.
- E. Initiating Device Circuits shall match existing system circuit Class and Style.

2.3 NOTIFICATION APPLIANCES

- A. Alarm Chime-Strobe: NFPA 72, electric pulsing type at 60 strokes per minute. Sound Rating: 10 dB at 10 feet above maximum anticipated noise level minimum, with adjustable volume control. Provide integral strobe lamp and flasher with red lettered "FIRE" on white lens. Strobe intensity shall comply with ADA requirements. Strobe synchronization shall comply with NFPA 72.
- B. Alarm Strobe: NFPA 72, strobe lamp and flasher with red lettered "FIRE" on white lens. Strobe intensity shall comply with ADA requirements. Strobe synchronization shall comply with NFPA 72.
- C. Building System Mini-Combination Horn/Strobe: NFPA 72, semi-recessed, non-projection type fire alarm horn. Sound Rating: 82 dB at 10 feet. Provide integral strobe lamp and flasher with red lettered "FIRE" on white lens. Strobe intensity shall comply with ADA requirements.
- D. Building System Alarm Strobe Lights: Where installed, fire alarm strobe lights shall be lamp and flasher combination with red lettered "FIRE" on white lens. Strobe intensity shall be minimum 15cd and comply with NFPA 72 and ADA requirements.
- E. Maximum volume for notification appliances in patient care areas shall be 85dB at 10 feet.
- F. Notification Appliance Circuits shall match existing system circuit Class and Style.

2.4 AUXILIARY DEVICES

- A. Door Release: Door closer as specified in Division 8. Magnetic door holder with integral diodes to reduce buzzing. Coil Voltage: 24 VAC.
- B. Remote Annunciator: Provide remote annunciator, compatible with existing fire alarm control panel, with enclosure. Provide interface card(s) as necessary in existing Fire Alarm Panel. Locate remote annunciators as shown on Drawings. Remote annunciators shall mimic all trouble and alarm signals by zone or device reported to the fire alarm control panel.

2.5 FIRE ALARM WIRE AND CABLE

- A. Fire Alarm Power Branch Circuits: Building wire as specified in Section 16123.
- B. Initiating Device and Indicating Appliance Circuits: Power limited fire-protective signaling cable classified for fire and smoke characteristics, copper conductor, 300 volts insulation rated 105 degrees C, suitable for use in air handling ducts, hollow spaces used as ducts, and plenums.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install manual station with operating handle 4 feet above floor. Install audible and visual signal devices 80 inches above floor, unless otherwise indicated on Drawings.
- C. Use 16 or 14 AWG minimum size conductors for fire alarm detection and signal circuit conductors. Install wiring in conduit.
- D. Mount end-of-line device if required "electrically" beyond the last inline device.
- E. Mount outlet box for electric door holder to withstand 80 pounds pulling force. Coordinate with Architectural.
- F. Make conduit and wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control panels, duct smoke detectors and all other equipment and systems.
- G. Automatic Detector Installation: Conform to NFPA 72.
- H. Ground and bond system under provisions of Section 16060.
- I. Provide identification of boxes, conduits, etc. under provisions of Section 16075.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 1 and Division 16.
- B. Test 100 percent of devices in accordance with NFPA 72. Upon failure of any component, replace such component and re-test system and components until the total system and all components produce successful test results.
- C. Submit results of successful tests at substantial completion.

3.3 MANUFACTURER'S FIELD SERVICES

- A. Prepare and start systems under provisions of Division 1 and Division 16.
- B. Include services of NICET certified technician to supervise installation, adjustments, final connections, and system testing.

3.4 FIRE ALARM WIRE AND CABLE COLOR CODE

- A. Provide fire alarm circuit conductors with insulation color coded to match existing system color code and scheme.

3.5 SYSTEM VERIFICATION

- A. Fire alarm equipment supplier shall provide a thorough inspection of the completely installed fire alarm system including all components such as manual stations, thermal detectors, products-of-combustion detectors, sprinkler flow valves and switches, alarm stations, and controls, to insure the following:
 - 1. Complete and functional integral system conforming with requirements of authorities having jurisdiction.
 - 2. Compliance with Underwriters' Laboratories requirements and the provisions and requirements of the NFPA.
 - 3. Installation is in accordance with manufacturer's recommendations and instructions.
 - 4. Adherence to requirements and regulations covering supervision of components.
- B. Provide corrective measures necessary to conform to requirements in items 1 through 4 above in conjunction with technical assistance from the manufacturer.
- C. During the period of this inspection by the manufacturer, supply to the manufacturer one electrician and one apprentice.

3.6 DEMONSTRATION

- A. Provide systems demonstration under provisions of Division 1 and Division 16.
- B. Demonstrate normal and abnormal modes of operation, and required responses to each.

END OF SECTION