SECTION 28 31 00

FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 SUMMARY

A. Section includes fire alarm control panels, voice evacuation devices, stairwell pressurization system fire alarm interface manual fire alarm stations, automatic smoke and heat detectors, fire alarm signaling appliances, and auxiliary fire alarm equipment and power and signal wire and cable.

B. Related Sections:

1. Division 08 - Door Hardware: Door closers, electric locks, electric releases.
2. Division 21 - Pre-Action / Dry-Pipe Sprinkler Systems: Flow detection and alarm devices.
3. Division 23 - Air Duct Accessories: Smoke dampers.
4. Division 23 - HVAC Fans
5. Division 26 - Low-Voltage Electrical Power Conductors and Cables.
6. Division 26 - Grounding and Bonding for Electrical Systems.
7. Division 26 - Identification for Electrical Systems.
8. Division 26 - Electrical Cabinets and Enclosures
9. Division 26 - Enclosed controllers.

1.02 REFERENCES

A. National Fire Protection Association:

1. NFPA 72 - National Fire Alarm Code.
2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

1.03 SYSTEM DESCRIPTION

A. Fire Alarm System: NFPA 72, addressable, manual and automatic local fire alarm system with connections to local central station.

B. Alarm Sequence of Operation: Actuation of initiating device causes the following system operations:

1. Local fire alarm signaling devices sound and display with March time signal.
2. Zone-coded signal transmits to central station.
3. Location of alarm zone indicates on fire alarm control panel and on remote annunciator panel.
4. Signal transmits to stairwell pressurization system firefighter's control panel.
5. Signal transmits to building elevator control panel, initiating return to main floor or alternate floor and lockout for fire service.
6. Signal transmits to building mechanical controls, shutting down fans and operating dampers.
7. Signal transmits by zone to release door hold-open devices.
8. Signal releases magnetic door hold opens.
9. Signal releases electric door locks.

C. Drill Sequence of Operation: Manual drill function causes alarm mode sequence of operation.

D. Trouble Sequence of Operation: System or circuit trouble causes the following system operations:

1. Visual and audible trouble alarm indicates by zone at fire alarm control panel.
2. Visual and audible trouble alarm indicates at remote annunciator panel.
3. Trouble signal transmits to central station.

1.04 SUBMITTALS

A. Division 01 - Submittal Procedures.

B. Shop Drawings: Indicate system wiring diagram showing each device and wiring connection; indicate annunciator layout, and design calculations.

C. Product Data: Submit catalog data showing electrical characteristics and connection requirements.

D. Test Reports: Indicate procedures and results for specified field testing and inspection.

E. Manufacturer's Field Reports: Indicate activities on site, adverse findings, and recommendations.

F. Acceptance or no exceptions taken by the County's Representative on any substitution proposed by the Developer Design/Builder shall not be construed as relieving the Developer Design/Builder from compliance with the project's specifications and performance requirements nor departure there from. The Developer Design/Builder remains responsible for details and accuracy for confirming and correlating quantities and dimensions and for the selection of fabrication processes, techniques and assembly, coordination of his work with that of all other trades and making any needed modifications consequent to the substitution at his own cost and for performing the work in a safe manner.

1.05 CLOSEOUT SUBMITTALS

A. Division 01 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of fire alarm equipment.

C. Operation and Maintenance Data: Submit manufacturer’s standard operating and maintenance instructions.

1.06 QUALITY ASSURANCE

A. Provide wiring materials located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet when tested in accordance with NFPA 262.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, and with service facilities within 50 miles of project.

B. Installer: Certified fire alarm installer with service facilities within 50 miles of Project.

1.08 MAINTENANCE SERVICE

A. Division 01 - Execution and Closeout Requirements: Maintenance service.

B. Furnish service and maintenance of fire alarm equipment for one year from Date of Substantial Completion.

1.09 MAINTENANCE MATERIALS

A. Division 01 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish ten manual station break-glass rods.

C. Furnish six keys of each type.

1.10 EXTRA MATERIALS

A. Division 01 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish three of each type of automatic smoke detector.

PART 2 PRODUCTS

2.01 MAIN CONTROL PANEL – MFACP/RCP

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: Modular networked fire alarm control panel with surface wall-mounted enclosure.

C. Power supply: Adequate to serve control panel modules, remote control panels, remote detectors, remote annunciators, smoke dampers, relays, and alarm signaling devices. Include battery-operated emergency power supply with capacity for operating system in standby mode for 60 hours followed by alarm mode for 10 minutes.

D. System Supervision: Component or power supply failure places system in trouble mode.

E. Initiating Device Circuits: Supervised zone module with alarm and trouble indication; occurrence of single ground or open condition places circuit in trouble mode but does not disable circuit from initiating alarm.

F. Indicating Appliance Circuits: Supervised signal module, sufficient for signal devices connected to system; occurrence of single ground or open condition places circuit in trouble mode but does not disable circuit from signaling alarm.

G. Municipal Trip Circuit: Output connections for future use.

2.02 REMOTE POWER SUPPLY – RPS

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: Modular fire alarm remote auxiliary power supply for notification appliances. Quantity of remote auxiliary power supplies shall be as required to support audible and visual devices.

C. AC Input: 120 VAC @ 2.5 amps

D. Output: 24 VDC @ 6 amps.

E. Auxiliary power circuit: 1

F. Notification circuits: 4

G. Output configuration: Two Class A or four Class b or one Class A and two Class B.

H. Battery charging capacity: 15 AH.

2.03 MANUAL FIRE ALARM STATIONS

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: Manual double-action station with break-glass rod.

C. Mounting: Semi-Flush.

D. Type: Coded.

E. Back box: Manufacturer's standard.

2.04 SPOT HEAT DETECTOR

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: Fixed temperature and spot heat detector.

C. Temperature Rating: 135 degrees F.

D. Rate-of-Rise: 15 degrees F.

2.05 CEILING SMOKE DETECTOR

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: NFPA 72, ionization type ceiling smoke detector with the following features:

1. Adjustable sensitivity.
2. Plug-in base.
3. Auxiliary relay contact.
4. Integral thermal element rated 135 degrees F.
5. Visual indication of detector actuation.

C. Mounting: 4 inch outlet box.

D. Furnish two-wire detector with common power supply and signal circuits.

2.06 DUCT-MOUNTED SMOKE DETECTOR

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: NFPA 72, ionization type with the following features:

1. Auxiliary SPDT relay contact.
2. Key-operated normal-reset-test switch.
3. Duct sampling tubes extending width of duct.
4. Visual indication of detector actuation.
5. Duct-mounted housing.

C. Furnish two-wire detector with common power supply and signal circuits.

2.07 ALARM CHIMES

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: NFPA 72, , electric chime with the following features:

1. Operating mechanism behind dome.
2. Integral strobe lamp and flasher with red lettered "FIRE" on white lens.
3. Size: 8 inch.
4. Sound Rating: 81 dB at 10 feet.

2.08 ALARM LIGHTS

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: NFPA 72, strobe lamp and flasher with red lettered "FIRE" on white lens.

2.09 ALARM HORN

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: NFPA 72, surface type fire alarm horn with the following features:

1. Sound Rating: 87 dB at 10 feet.
2. Integral strobe lamp and flasher with red lettered "FIRE" on white lens.

C. Product Description: Exterior mounted horn with the following features: Sound Rating: 81 dB at 3 feet.

2.10 REMOTE ANNUNCIATOR

A. Manufacturers:

1. Siemens
2. Edwards System Technology
3. Substitutions: Not Permitted.

B. Product Description: Remote annunciator including audible and visual indication of fire alarm by zone, and audible and visual indication of system trouble.

C. Mounting: Factory mounted in surface wall-mounted enclosure.

2.11 DOOR RELEASE

A. Product Description: Magnetic door holder with integral diodes to reduce buzzing.

B. Coil voltage: 120 VAC.

2.12 WIRE AND CABLE

A. Manufacturers:

1. West Penn
2. Alpha
3. Belden
4. Substitutions: Not Permitted.

B. Product Description: Power limited fire-protective signaling cable, copper conductor, 300 volts insulation rated 105 degrees C.

C. Fire alarm circuit conductors have insulation color or code as follows:

1. Power Branch Circuit Conductors: Black, red, white.
2. Initiating Device Circuit: Black, red.
3. Detector Power Supply: Violet, brown.
4. Signal Device Circuit: Blue (positive), white (negative).
5. Door Release: Gray, gray.

2.13 STAIRWELL PRESSURIZATION SYSTEM FIRE ALARM INTERFACE

A. System Description: Fire alarm interface to firefighter's smoke control panel shall conform to requirements per 2007 CBC Section 909.

2.14 FIREFIGHTER'S SMOKE CONTROL PANEL

A. Product Description: Equipment enclosure designed to graphically depict the building arrangement and stair pressurization zones served by the system, lamps and appropriate legend shall indicate the status of each zone. Fans within the building shall be shown in the firefighter's smoke control panel.

B. Mounting: Surface mounted.

C. Status indicators: On-Auto-Off status indicators shall be provided for all stairwell pressurization fans, dampers, and other operating equipment as follows:

1. Fans, dampers and other operating equipment in their normal mode: White
2. Fans, dampers and other operating equipment in their off or closed status: Red.
3. Fans, dampers and other operating equipment in their on or open status: Green
4. Fans, dampers and other operating equipment in a fault status: Yellow

D. The firefighter's control panel shall provide control capability over all stairwell pressurization system equipment. Provide one set of status indicators for each system fan and damper.

E. Control action and priorities: On-Off and Open-Close control actions shall have the highest priority of any control point within the building. No automatic or manual control from any other control point within the building shall contradict the control action.

PART 3 EXECUTION

3.01 EXAMINATION

A. Division 01 - Administrative Requirements: Coordination and project conditions.

B. Verify products and systems receiving devices are ready for installation.

3.02 INSTALLATION

A. Install manual station with operating handle 4 feet above floor.

B. Install audible and visual signal devices 6 feet 8 inches above floor.

C. Install 14 AWG minimum size conductors for fire alarm detection and signal circuit conductors in conduit.

D. Mount end-of-line device in control panel.

E. Mount outlet box for electric door holder to withstand 80 pounds pulling force.

F. Connect conduit and wire to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control panels, stairwell pressurization system fire alarm interface and duct smoke detectors.

G. Automatic Detector Installation: Conform to NFPA 72.

H. Install engraved plastic nameplates in accordance with Division 26.

I. Ground and bond fire alarm equipment and circuits in accordance with Division 26.

3.03 FIELD QUALITY CONTROL

A. Division 01 - Quality Requirements and Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Test in accordance with NFPA 72 and local fire department requirements.

3.04 MANUFACTURER'S FIELD SERVICES

A. Division 01 - Quality Requirements: Manufacturer’s field services.

B. Include services of certified technician to supervise installation, adjustments, final connections, and system testing.

3.05 DEMONSTRATION AND TRAINING

A. Furnish 8 hours of instruction each for two persons, to be conducted at project site with manufacturer's representative.

END OF SECTION