

SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. System duct smoke detectors.

1.3 DEFINITIONS

- A. LED: Light-emitting diode.
- B. NICET: National Institute for Certification in Engineering Technologies.

1.4 SYSTEM DESCRIPTION

- A. Provide new duct detectors compatible with existing system.

1.5 SUBMITTALS

- A. General Submittal Requirements:
 - 1. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. NICET-certified fire-alarm technician, Level II minimum.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
 - 2. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
 - 3. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
- D. Delegated-Design Submittal: For smoke and heat detectors indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Drawings showing the location of each smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the detector.
 - 2. Design Calculations: Calculate requirements for selecting the sensitivity of detection, complying with NFPA 72.
- E. Qualification Data: For qualified Installer.

- F. Manufacturer Certificates:
 - 1. Proof if equipment and device manufacture within nine months of contract date with Owner.
- G. Field quality-control reports.
- H. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - 1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 - 2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
 - 3. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
 - a. Frequency of testing of installed components.
 - b. Frequency of inspection of installed components.
 - c. Requirements and recommendations related to results of maintenance.
 - d. Manufacturer's user training manuals.
 - 4. Manufacturer's required maintenance related to system warranty requirements.
 - 5. Abbreviated operating instructions for mounting at fire-alarm control unit.
 - 6. Copy of NFPA 25.
- I. Software and Firmware Operational Documentation:
 - 1. Device address list.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project. On-site supervision and check-out shall be by personnel certified by NICET as fire-alarm Level II technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing fire alarm system equipment similar to that indicated for this Project and that maintains technical support services capable of providing user with training, parts, and emergency or warranty maintenance and repair with a 4-hour maximum response time.
- C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.7 PROJECT CONDITIONS

- A. Project scope includes replacement of duct detectors. Work will be phased to allow work to be completed in one wing at a time. Maintain operation of existing system as phases are completed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Existing fire alarm system is manufactured by Cerberus. New equipment shall be manufactured by Cerberus to match existing. No equivalent manufacturers will be allowed.

2.2 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
1. Comply with UL 268; operating at 24-V dc, nominal.
 2. Detectors shall be two-wire type.
 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring. Base shall accept smoke, heat, carbon monoxide or combination smoke/carbon monoxide detectors.
 5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.
 7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire alarm control unit.
 - a. Provide multiple levels of detection sensitivity for each sensor.
- B. Duct Smoke Detectors: Photoelectric type complying with UL 268A.
1. Provide duct detection in supply and return ductwork of each existing air handling unit rated 2,000 cfm or greater.
 2. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 3. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
 4. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
 5. Each sensor shall have multiple levels of detection sensitivity.
 6. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
 7. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit. Provide work as necessary for unit shutdown.
 8. Provide remote LED indicator mounted in ceiling/wall to mimic detector status for detectors located above ceilings, or otherwise concealed from view.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72 for installation of fire-alarm equipment.
- B. Cable/Wiring/Infrastructure:
1. Reuse existing cables where feasible.
 2. Cable for Use in Plenums: Listed and labeled for plenum installation.
 3. All wiring work in walls, above gypsum ceilings or other inaccessible spaces shall be in conduit. Conduit shall be provided to accessible ceiling space.

4. All wiring to be hidden in walls except with Owner approval. Patch and repair walls to match adjacent surfaces where work is required in existing walls.
 5. Provide electrical boxes and conduit as required to support system devices where existing infrastructure is not existing in location where device is required to be installed, does not meet system manufacturer recommendations or is damaged preventing reuse in new work. Patch and repair walls/ceilings to match adjacent surfaces where work is required in existing walls/ceilings.
- C. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
 - D. Remote Status and Alarm Indicators: Install near each smoke detector that is not readily visible from normal viewing position.

3.2 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.3 EXISTING SYSTEMS

- A. Contractor shall coordinate work with Owner administrative personnel prior to commencing construction work.
- B. All existing fire alarm system wiring shall be reused where feasible. Blank coverplates shall be installed on all boxes not reused as part of this work.
- C. No Resident Rooms or other spaces shall be left without an operational fire alarm system during overnight hours without prior approval from Owner's Facility Administrator.
- D. Reprogramming of existing system shall be provided as required to prevent trouble signal initiation upon removal/replacement of existing system devices.

3.4 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 1. Manufacturer's Field Service: Engage a factory authorized service representative to inspect components, assemblies, and equipment installations, including connections and to assist in testing.
- D. Tests and Inspections:
 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
 - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

3. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- F. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- G. Prepare test and inspection reports.
- H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- I. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

END OF SECTION 283111

THIS PAGE INTENTIONALLY LEFT BLANK