

TABLE OF CONTENTS

SECTION 26 30 12

FIRE ALARM – ADDRESSABLE MODIFICATION

PART 1 - GENERAL	1
1.1 RELATED DOCUMENTS	1
1.2 SUMMARY	1
1.3 DEFINITIONS	1
1.4 ACTION SUBMITTALS	1
1.5 CLOSEOUT SUBMITTALS	2
1.6 QUALITY ASSURANCE	2
1.7 WARRANTY	2
1.8 COORDINATION	3
PART 2 - PRODUCTS	3
2.1 GENERAL	3
2.2 SEQUENCE OF OPERATION	3
2.3 CONTROL	3
2.4 INITIATING DEVICES AND ACCESSORIES	3
2.5 NOTIFICATION APPLIANCES	4
2.6 ACCESSORIES	4
PART 3 - EXECUTION	4
3.1 INSTALLATION	4
3.2 TESTING	5

SECTION 26 30 12

FIRE ALARM – ADDRESSABLE MODIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.
- B. All criteria establish within Specification 26 00 00 shall apply to this section unless specifically noted otherwise.

1.2 SUMMARY

- A. Section Includes:
 - 1. Initiating Devices
 - 2. Acceptance and Reacceptance Testing
- B. Related Sections include the following:
 - 1. Division 26 00 00 Electrical

1.3 DEFINITIONS

- A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 ACTION SUBMITTALS

- A. Product Data: For each required component provide manufacturer's standard cut sheet containing technical details, listings and general information illustrating compliance with these specification requirements.
- B. Provide the following detailed documentation for review and evaluation:
 - 1. Point to point wiring diagrams of the entire system including all conductor quantity and sizing, labeling (numerical and color coding) and interconnections.
 - 2. Floor plans illustrating each initiating device and notification appliance with an assigned unique identification. This identification and audible notification appliance tap settings shall be illustrated on the floor plans and submitted for approval with the wiring diagrams.
 - 3. Individual device interconnection diagrams. Panel layouts shall indicate module placement and spare capacity allowance for future expansion.
 - 4. Manufacturers catalog cut sheets of all components and devices.
 - 5. Battery capacity calculations clearly indicating required and spare capacity.

6. Power supply capacity calculations including each circuit load, voltage drop and spare capacity.
- C. Submission of certification records for qualifications of the technicians performing final connection and testing.
- D. Submit written test report in accordance with NFPA72 Chapter 14 for notification of successful completion of each required test and a system Record of Completion in accordance with NFPA72 Section 10.18. Provide floor plan illustrating ambient and alarm sound levels to document notification appliance testing.

1.5 CLOSEOUT SUBMITTALS

- A. Submit operations manual detailing all functions and operations of the system. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864.
- B. Submit maintenance manuals and recommended spare parts list required to conform to NFPA maintenance guidelines. Instructions shall include but not be limited to:
 1. Instructions for replacing any components of the system, including internal parts.
 2. Instructions for periodic cleaning and adjustment of equipment with a schedule of these functions.
 3. A complete list of all equipment and components with information as to the address and telephone number of both the manufacturer and local supplier of each item.
- C. As-built drawings shall include all device addresses, alphanumeric descriptors assigned in the control panel, and final notification appliance tap settings with modified spare power supply capacity illustrated.

1.6 QUALITY ASSURANCE

- A. The system design and installation shall conform to the following standards
 1. All equipment shall be UL listed for its intended purpose.
 2. All applicable NFPA standards, including but not limited to: 70, 72, 90A, 92A, and 101.
 3. State Building Code.
 4. The Americans with Disabilities Act (ADA)
 5. All requirements of the Authority Having Jurisdiction (AHJ)
- B. The equipment supplier and the Contractor shall demonstrate a minimum five (5) years' experience in the successful design and installation of addressable fire alarm systems similar in size and scope to that required for this project.

1.7 WARRANTY

- A. The installer and manufacturer's warranty shall be for a minimum period of one (1) year from the date of the final acceptance test approval.

- B. Include as part of their base bid the cost of a one-year test and inspection contract, to be held by the company which shall certify the completed installation. The contract shall provide for quarterly inspections in accordance with NFPA72 and local requirements. Any equipment found to be defective during the warranty period shall be replaced by the Contractor at no additional charge to the Owner.

1.8 COORDINATION

- A. Coordinate sizes and locations actual equipment provided.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide the illustrated changes to the existing addressable fire detection, alarm and control system with signaling devices in compliance with all applicable codes and authorities having jurisdiction.
- B. Provide automatic and manual, closed circuit, multiplex fire alarm communications according to the following Specifications and as shown on the Drawings, wired, connected and left in first class operating condition.
 - 1. System shall operate from 3 wire AC supply with emergency generator backup on failure of normal system and integral standby battery source backup on failure of the emergency generator.
 - 2. Equipment shall be UL listed for use with the existing FACP.

2.2 SEQUENCE OF OPERATION

- A. Refer to Sequence of Operation Matrix on the plans and the Fire Protection Narrative for the intended system operation.

2.3 CONTROL

- A. General Requirements
 - 1. Addressable loop wiring (Signaling Line Circuits - SLC) shall be wired in a Class Class A method. Each circuit shall allow for a minimum of 25% additional devices.

2.4 INITIATING DEVICES AND ACCESSORIES

- A. Provide addressable detectors as shown on the drawings. Detectors shall be connected to the addressable loop with two (2) wires. All detectors shall incorporate built-in identification for the system to automatically identify various types of sensors. Detectors shall utilize a flashing LED which denotes normal operation, and latched LED which indicates an alarm condition. All common types of analog detectors shall be interchangeable with common twist-lock bases. The standard base shall have a

supervised LED output and optional relay and isolator bases shall be available.

- B. Analog sensors shall provide indication to the control panel that a detector requires maintenance, and shall operate in stand-alone mode in the event of an addressable loop communications failure.
- C. Analog Photoelectric Smoke Detectors shall be continually monitored to measure any change in their sensitivity because of the environment (dirt, air temperature, humidity, etc.), and shall allow changes in sensitivity levels within the UL approved sensor's range. The photoelectric detector shall consist of a dust resistant, field cleanable photo chamber with microprocessor based solid state electronics.

2.5 NOTIFICATION APPLIANCES

- A. Remote Alarm Indicators shall be LED indicators on single gang plastic plates for smoke detectors as indicated on the plans.

2.6 ACCESSORIES

- A. Remote Alarm Indicators shall be LED indicators on single gang plastic plates for smoke detectors as indicated on the plans.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All interconnections shall be installed in accordance with the manufacturer's system wiring diagrams.
- B. Final connections, program editing, and testing shall be conducted by qualified personnel with one of the following qualifications:
 - 1. Factory trained and certified by the equipment manufacturer.
 - 2. National Institute of Certification in Engineering Technologies (NICET) or IMSA fire alarm certified.
 - 3. Trained and qualified by an organization listed by a national testing laboratory for the servicing of fire alarm systems.
- C. Labels
 - 1. All detectors shall be labeled with its assigned address on both the detector housing and the base with a black on clear typed label equal to Kroy 0.375 Industrial UV. The base address shall be legible without removal of the detector. The detector address shall be concealed when placed into the base.
- D. Wiring
 - 1. Wiring for the fire alarm system shall not be installed in conduits, junction boxes, or outlet boxes with conductors of lighting and power systems.
 - 2. Wiring for the fire alarm system shall be installed in conduit with limitations as outlined in 26 00 00. Exposed plenum rated wire/cable and/or fire alarm low

- energy cable will not be accepted.
3. Minimum wire sizes shall be as follows:
- a. Addressable loop wiring shall utilize minimum #16 AWG.
 - b. Notification appliance circuits shall utilize minimum #14 AWG.
 - c. All junction boxes shall be sprayed red and labeled "Fire Alarm". Conduit couplings shall be spray painted red prior to installation.
 - d. Connections and splices shall be made using screw terminal blocks. No more than one conductor shall be installed under any screw terminal. The uses of wire nut type connectors are prohibited in the system.
 - e. All circuit conductors entering or leaving any mounting box, outlet box enclosure or cabinet shall be labeled in accordance with the wiring diagram. Labeling and color coding shall be consistent throughout the conductor run.
 - f. Wiring within any enclosure shall be readily accessible without removing any component parts.
 - g. No more than half loudspeaker/strobes or horn/strobes serving any floor or zone shall be connected to same circuit. Adjacent devices shall be alternately wired between circuits.
 - h. The fire alarm equipment manufacturer's representative shall be present for the connection of wiring to the control panel.
4. Detectors
- a. Detectors placement shall be in accordance with NFPA 72 requirements and recommendations.
 - b. Detectors shall be at least twelve (12) inches from any part of any lighting fixture and at least three (3) feet from diffusers of air handling systems.
 - c. Each detector shall be provided with appropriate mounting hardware as required by its mounting location.
 - d. Smoke detectors shall not be installed until the building has been thoroughly cleaned. Dust covers shall be installed over all smoke detectors until final testing commences. All detectors, which indicate reduced sensitivity due to dirty condition, shall be cleaned prior to commencement of final testing.
 - e. Detectors shall be provided with wire guard cages where subjected to physical abuse, such as in gymnasiums.
5. Modify the system annunciator to indicate the added devices in accordance with the drawings.

3.2 TESTING

- A. Notify the Owner's Representative ten (10) business days before the tests are to be conducted. The tests shall be performed in accordance with the approved test procedures in the presence of the Owner's Representative. Furnish all instruments and personnel required for the tests.
- B. Preliminary Tests
- 1. Perform insulation testing (megger), continuity and loop resistance checks on all new system conductors to determine that the system is free from grounded, shorted, or open circuits. These tests shall be conducted prior to the installation of fire alarm equipment. Loop resistance measurement shall verify that the loop

- resistance does not exceed the manufacturer's specified limits. Corrections shall be made and the system shall be retested to assure if deficiencies are found.
2. Measure air flow with pressure sensor at each duct smoke detector sampling port, at the lowest design air flow of the duct system. Sampling air flow shall exceed smoke detector manufacturer's requirements.
 3. Perform complete functional and operational performance tests. Testing shall include verification that the circuits and components are electrically supervised and operate as intended. Coordinate functional testing with Elevator and HVAC Contractors where applicable to verify function of all control interfaces such as elevator recall and air handling unit shutdowns.
 4. Reacceptance testing shall be performed in accordance with NFPA 72 14.4.1.2 where applicable (testing of 10% of existing devices not affected by scope of work, etc.).
 5. A written report detailing the results of the preliminary tests shall accompany the request for Final Acceptance Test. The written Preliminary Test Report shall be submitted with:
 - a. Copy of FACP printer output verifying proper operation of each device in alarm or trouble, time stamped throughout the testing process.
 - b. The Operations and Maintenance Manual for the system.
 - c. The record (as-built) drawings.

C. Final Acceptance Test

1. The Fire Alarm System, other systems and equipment associated with the fire alarm system and accessory equipment shall be tested in accordance with NFPA 72. Verification of system completion shall be documented with a fully executed copy of the Record of Completion per NFPA 72 Figure 10.18.2.1.1. The listed tests in NFPA 72 Table 14.4.2.2 shall be conducted and documented with an executed copy of Figure 14.6.2.4 as well as manufacturer and job specific procedures to verify that the circuits and components are electrically supervised and operate as intended. The test shall include but shall not be limited to the following:
 - a. Visual inspection of all wiring connections.
 - b. Test of each function of the control panel.
 - c. Test of each circuit in both trouble and normal modes.
 - d. Tests of each alarm initiating device in both normal and trouble conditions. Remove each device from its base to test the supervisory feature.
 - e. Tests of each control circuit and device.
 - f. Tests of each alarm notification appliance. Open the wiring at the midpoint of the circuit to test the wiring supervisory feature. Provide copy of FACP printer output verifying proper operation. Verify each device's audible and visual output.
 - g. Tests of the primary and secondary power supplies and associated loss of each.
 - h. Complete operational tests under emergency power supply.
 - i. Ground fault monitoring circuit function.
 - j. Measurement of sound pressure levels throughout the protected space. Provide background and evacuation signal sound levels on the floor plan submitted with device address and tap settings.

END OF SECTION 26 30 12