

**SECTION 283100 – FIRE DETECTION AND ALARM**

**PART 1 – GENERAL**

- 1.1 Any deviation from the following instructions must be approved during design by WVU Facilities Management.
- 1.2 Adhere to current WV State Fire Code, Title 87, Series 1.
- 1.3 Plan review by the state fire marshal shall be scheduled through WVU’s EHS Department.
- 1.4 Training shall be conducted for all WVU Fire Control and Unit 35 personnel on all Fire and Life Safety Systems.
- 1.5 Sequencing and Scheduling
  - A. Existing Fire Alarm Equipment: Maintain fully operational until new equipment has been tested and accepted. As new equipment is installed, label it “NOT IN SERVICE” until it is accepted. Remove labels from new equipment when put into service and label existing fire alarm equipment “NOT IN SERVICE” until removed from the building.
- 1.6 Related Standards
  - A. Common Work Electrical. Section 260500
  - B. WV State Fire Marshal. Section 005006

**PART 2 – PRODUCTS**

- 2.1 General: Addressable fire alarm system with manual and automatic alarm initiation; automatic sensitivity control of smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.
- 2.2 Provide hardware/software and programming as necessary to interface with existing digital alarm communicators. Coordinate with system requirements and provide materials as necessary for complete installation and connection.
- 2.3 Coordinate the interconnection of the fire alarm system and the digital alarm communicator for all WVU buildings with the current monitoring service provider.
- 2.4 All buildings shall have a Knox Box mounted on the outside of the building. The location shall be coordinated with the Morgantown Fire Department. Generally this shall be the same entrance as the location of the Fire Department primary response point. The Knox Box form shall be obtained from the Morgantown Fire Department.

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2.5 Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- A. Edwards Signaling & Security Systems; Unit of General Electric Security
- B. SimplexGrinnel; Unit of Tyco International
- C. Notifier; Unit of Honeywell International
- D. FCI – Gamewell
- E. Siemens
- F. Non-proprietary systems and equipment shall be used when such equipment and systems performance is acceptable as required by design specifications and is acceptable to WVU and the project manager.

2.6 Submittals:

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
  - 1. Wiring Diagrams: Detail wiring and differentiate between manufacturer-installed and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified.
  - 2. Floor Plans: Indicate final device locations and wiring diagrams.
  - 3. Device Address List: As listed in final approved system programming.
  - 4. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
  - 5. Fire alarm control panel devices, wire, and supplementary equipment.
- C. Operating Instructions: For mounting at the FACP.
- D. Field Test Reports: Test results for compliance with performance requirements. Comply with NFPA 72.
- E. Operational Data: For fire alarm systems to include maintenance manuals, owner's manual, operational software, operational access codes, operations manual, and all technical data available pertaining to the system. Comply with NFPA 72 and WVU requirements.

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- F. Submissions to Authorities having Jurisdiction: Make an identical submission to authorities having jurisdiction. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Project Manager and Architect/Engineer for review.
- G. Certificate of completion: Comply with NFPA 72.

### 2.7 Extra Materials:

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Smoke Detectors, Fire Detectors, and Flame Detectors: Quantity equal to 10% of amount of each type installed, but not less than one unit of each type.
  - 2. Detector Bases: Quantity equal to 10% of amount of each type installed, but not less than one unit of each type.
  - 3. Keys and Tools: Four extra sets for access to locked and tamperproofed components.

### 2.8 Functional Description of System:

- A. Operating a heat detector in the elevator shaft or elevator equipment room shuts down elevator power by operating a shunt trip in a circuit breaker feeding the elevator.
  - 1. A field-mounted relay actuated by the heat detector or the FACP closes the shunt trip circuit and operates building notification appliances and annunciator.
- B. Remote Detector Sensitivity Adjustment: Manipulation of controls at the FACP causes the selection of specific addressable smoke detectors for adjustment, display of their current status and sensitivity settings, and control of changes in those settings. Same controls can be used to program repetitive, scheduled, automated changes in sensitivity of specific detectors. Sensitivity adjustments and sensitivity-adjustment schedule changes are recorded in system memory and are printed out by the system printer where applicable.
- C. FACP Alphanumeric Display: Plain-English-language descriptions of alarm, supervisory, and trouble events; and addresses and locations of alarm-initiating or supervisory devices originating the report. Display monitoring actions, system and component status, system commands, programming information, and data from the system's historical memory.

### 2.9 Smoke Detectors:

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- A. Sensitivity: Can be tested and adjusted in-place after installation.
  - B. Duct Detectors: Where duct detectors are located above ceilings or not accessible by a six-foot step ladder, a remote test switch shall be installed. The test switch shall be located directly below the duct detector at a height not more than six feet above the walking surface. When duct detectors are located above ceilings, the location of the duct detector shall be indicated by a red self-sticking decal that is approximately ½” in diameter.
- 2.10 Notification Appliances:
- A. WVU prefers horns/strobes and strobes over voice evacuation notification where allowed by code.
- 2.11 Central Fire Alarm Control Panel, (FACP):
- A. System controls shall include bypass switches for visual and audio devices.
  - B. Instructions: Typewritten instruction card mounted behind a plastic or glass cover in a stainless steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.
  - C. Monitoring any Alarm System: The FACP must have 3 form C relays either remote mounted or located on the control board. Relay one must be programmed for Alarm only, relay two must be programmed for Trouble only, and relay three must be programmed for Supervisory only. The relays must be clearly marked Alarm, Trouble and Supervisory. FACP provider must have a technician on site at the same time that contractor is installing monitoring equipment. It is the responsibility of the FACP equipment provider to test the alarm and trouble relays at the same time the monitor company is testing its equipment. It is the responsibility of WVU to provide a location of the monitoring equipment and provide the necessary phone lines to said location.
  - D. In student residence halls, the installed fire alarm control panel will have the capabilities to be field programmed for the following sequence of operations to be determined by the Owner.
    - 1. Option 1: The room sounder smoke detector, when in alarm condition, shall sound their individual sounder base as well as any other single station sounder base detectors that are in the room or suite only. The fire alarm condition will also register on the main fire alarm control panel as a “supervisory” condition, not an “alarm” condition. If the smoke or condition clears at the detector, the sounder stops, but the supervisory condition remains on the panel until reset is completed by a systems operator at the main control panel.
    - 2. Option 2: The room sounder smoke detector, when in alarm condition, shall sound their individual sounder base, as well as any other single station detectors

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that are in the room or suite only. The “fire alarm” condition is registered on the main fire alarm panel as a “priority 1” fire alarm condition. This alarm condition also starts an internal timer in the main fire alarm control panel. If emergency response personnel acknowledge or reset the condition the timer is reset. If no emergency response personnel respond to the panel within the predetermined time limit then the fire alarm panel goes into general alarm condition sounding all signaling devices as well as all room sounder devices.

2.12 Emergency Power Supply:

- A. The fire alarm system shall be connected to an emergency generator if available and appropriately sized. A generator shall not be supplied solely for use by the alarm system. All systems shall be provided with battery back-up adequate to provide power to the FACP as required by the West Virginia State Fire Code.

2.13 Digital Alarm Communicator Transmitter:

- A. WVU currently has all fire alarm systems monitored by an independent UL approved monitoring company. WVU will provide a communication panel or dialer to support this system.

2.14 Wire:

- A. Provide wires and cables that are listed and labeled for the intended use as defined in NFPA 70, article 100.

2.15 Smoke Evacuation Panels:

- A. Rooftop smoke evacuation panels shall be motor-closed and be remotely operated by a key switch from a location approved by the Project Manager.

**PART 3 – EXECUTION**

3.1 Equipment Installation:

- A. Types and quantities of fire alarm system components shall meet but not exceed the requirements of the WV State Fire Code, Title 87-1.

3.2 Wiring Installation:

- A. Color Coding: Color code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm circuit wiring and a different color code for supervisory circuits. Color code audible alarm indicating circuits differently from alarm initiating circuits. Use different colors for visible alarm indicating devices. Paint fire alarm system junction boxes and covers red.

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- B. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.
- C. Fire Alarm cable shall be installed in some type of wire management system or raceway. Acceptable systems include cable tray in main corridors and J-hooks and bridal rings above ceilings.
- D. Fire Alarm cable shall be in conduit behind or within wall cavities.
- E. Exposed Fire Alarm wiring is required to be in conduit to a height of 7 feet above the walking surface, or as required by NFPA 70 Article 760, unless otherwise directed by the University.

3.3 Cleaning and Adjusting:

- A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

3.4 Demonstration:

- A. Engage a factory authorized service representative to train Owner's maintenance personnel as specified below:
  - 1. Provide necessary on-site training for fire control, unit 35, building manager, and project manager. Allow needed time for training day shift and night shift personnel.
  - 2. Contractors/Equipment manufacturer to be on-site during all fire marshal site visits. Specifically during testing of systems to actuate and demonstrate system operation during testing. Provide technician on-site to make final adjustments/repairs as necessary. Provide ninety (90) days of error free operation of the system. The indicated ninety (90) day period shall begin from the time the WV State Fire Marshal approves the NFPA 72 record of completion documents. If a system error occurs within the given ninety (90) days the error shall be corrected at no cost to WVU and the ninety (90) day error free period shall start over. This cycle shall continue until an error free ninety day period has been achieved.
  - 3. Additional training/clarification shall be supplied by telephone/e-mail for a period of one year as frequent as necessary.

3.5 On-Site Assistance:

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A. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to six requested visits to Project Site for this purpose.

END OF SECTION 283100