

CHAPTER 3 ED – ELECTRICAL DESIGN STANDARDS

PART 3: FIRE ALARM, SAFETY, AND SECURITY SYSTEMS DESIGN:

Amended 09-15-2022, See underlined text

1. SCOPE:

- 1.1. This part outlines the minimum requirements for the design procedures for the fire alarm, safety, and security systems, for new buildings, and repair and alteration projects for existing buildings on the UMB campus.

2. FIRE ALARM SYSTEM:

- 2.1. The Authority Having Jurisdiction for fire safety at UMB is the UMB Fire Marshal in the Office of the Fire Marshal.
- 2.2. The University maintains a central fire alarm monitoring, and mass notification system with network monitoring stations at the following locations:
- a. Pine Street Annex,
 - b. Environmental Health and Safety Building,
 - c. Pearl Street Garage Electronics Shop
 - d. Pearl Street Garage Work Control
 - e. 620 West Lexington Street
- 2.3. The Communications Officer on duty at the Pine Street Annex summons Baltimore City Fire Department in the event of a fire emergency.
- 2.4. The central fire alarm system network command centers are manufactured by Notifier. All individual buildings on the campus are connected through the campus fiber optic network thru the communications duct banks except for the Community Engagement Center on S. Poppleton Street.
- 2.5. All buildings on the campus have a dedicated fire alarm control panel. Campus standard fire alarm control panels are either Notifier Model NFS2-640 or NFS2-3030. Communications to the Network Command Center shall be through the campus fiber optic Class A fiber loop dedicated to fire alarm system only. All work for the existing buildings shall be coordinated with UMB and the UMB Fire Marshal.
- 2.6. All buildings are equipped with backup dialers. For work that involves the backup dialer system, contact the UMB Fire Marshal and UMB O&M for direction.
- 2.7. For new buildings on the campus, provide a Notifier Model NFS2-3030 addressable fire alarm control panel with voice capability and mass notification. As directed by UMB, provide fiber optic cabling for interface connection to the Class A fiber loop. The fiber optic connection design shall maintain connectivity for the entire campus loop. The cables are typically routed in University-owned duct bank, though Baltimore city duct bank also has been used.
- 2.8. Provide distributed system architecture by employing transponder panels for each floor. The transponder panel will serve as the distribution point for dedicated signaling line circuits (SLC) and Notification Appliance Circuits (NAC) to each floor. Do not use centralized amplifier systems or local booster panels for the NAC's. Provide line isolation modules for each Class "A" SLC. Consult with UMB Facilities

CHAPTER 3 ED – ELECTRICAL DESIGN STANDARDS

and Fire Marshal to confirm system architecture for new buildings and specific requirements for special isolation areas.

- 2.9. Regardless of building height, provide a voice evacuation system with public address and selective paging capability. Beacons and horn notification appliances are required in spaces with high ambient noise levels that need to be overcome.
- 2.10. **High-Rise Building Fire Command Center (FCC) Requirements:** For those buildings defined as being high-rise, in addition to the fire alarm control panel (FACP) and fire alarm graphic annunciator panel (GAP) provide the following monitoring and control panels in the FCC:
- a. **Smoke Control Panel:** Provided and installed by the local building automation system vendor. The panel should depict the smoke control systems and stairwell pressurization systems in the building and the spaces they serve, along with their run status and an “on- off-auto” control switch for each piece of equipment.
 - b. **HVAC Monitoring Panel:** Provided and installed by the local building automation system vendor. The panel should depict the major heating, ventilating, and air conditioning (HVAC) systems in the building and the spaces they serve, along with their run status and an “auto-off” control switch (i.e. no hand position) for each HVAC system. This can be combined with the Smoke Control Panel.
 - c. **Generator Status and Alarm Monitoring Panel:** Provided by the building genset vendor.
 - d. **Building Elevator System Status Panels:** Provided by the building elevator system vendor. Panel should have selector switches for normal or generator power, fire recall, and recall to lobby.
 - e. **Additional Panels:** Panels designated for monitoring of the smoke dampers, fire curtain or shutter systems, or other related systems may be needed based on the project.
 - f. **Knox Box:** Provide a Knox-Box with hinged door to store building keys. Refer to UMB Master Specs for product number.
- 2.11. **Fire Alarm Initiating Devices:** With the exception of manual pull stations, all components of the fire alarm system shall be self-restoring type. Detectors shall not be single use type.
- 2.12. **Smoke Detectors:** Smoke detectors shall be photoelectric type
- 2.13. **Heat Detectors:** Heat detectors shall be specified based on anticipated temperatures in the space served.
- 2.14. **Building HVAC System Duct Smoke Detector Control via the Automatic Temperature Control (ATC) System:** The following requirements apply to all building HVAC systems:
- a. Provide duct smoke detectors as required by code. Do not provide redundant detectors at the unit itself if they are already being provided at the floor locations.

CHAPTER 3 ED – ELECTRICAL DESIGN STANDARDS

- b. For each duct smoke detector, provide a remote LED indicator for quick identification of the detectors' location. Where duct detectors are not located in a mechanical room, mount the remote LED at six (6) inches to twelve (12) inches below the ceiling in the wall in the nearest room and visible from the floor level in an accessible space. For detectors located in rooftop HVAC system units, mount the remote LED indicator just inside the units' mantrap door for quick identification. Do not include the test switch option with the remote LED indicator unless directed otherwise by the UMB Fire Marshal.
- c. The building's ATC system will coordinate the shutdown of an HVAC system and its associated smoke and fire dampers due to a duct smoke detector alarm from the fire alarm systems (FAS). Do not perform any direct interconnection between the duct smoke detector's contact outputs and the HVAC system starter(s) and any of its smoke and fire dampers and damper actuators.
- d. Provide a dedicated addressable relay for each HVAC system with duct smoke detectors regardless of the quantity of duct smoke detectors on the HVAC system. The output from the addressable relay will be used to represent a 'shutdown request' to the ATC system for the multiple duct smoke detectors on each HVAC system.
- e. For each HVAC system, coordinate with the ATC contractor and locate the dedicated addressable relay next to the ATC network panel that will be used to receive a 'shutdown request' from the FAS due to a duct smoke detector alarm.
- f. Buildings with multiple HVAC systems will require several dedicated addressable relays next to the ATC panel(s). Again, provide a dedicated addressable relay for each HVAC system with duct smoke detectors and locate them next to the ATC panel(s).
- g. Label each HVAC system's addressable relay to identify the HVAC system number and the device address of the relay.
- h. If the above requirements are properly met, when a duct smoke detector goes into alarm the following sequence of events should occur:
 - (1) The detector reports a 'supervisory' signal to the FAS which is relayed to the UMB central monitoring station as a 'supervisory' signal.
 - (2) The FAS will initiate a contact output from the addressable relay associated with the detector in alarm to the ATC system panel which in turn will execute shutting down the HVAC system and closing its associated smoke or fire dampers.

2.15. Building HVAC Systems Dedicated for Life Safety Purposes: The fire alarm system directly monitors and controls stairwell pressurization fans and smoke control systems. Provide the following:

- a. Provide a dedicated addressable relay for each fan motor. Using the addressable relay provide a control output to start and stop the fan motor

CHAPTER 3 ED – ELECTRICAL DESIGN STANDARDS

and derive a status input from the starter for remote monitoring at the GAP and Smoke Control Panel.

- 2.16. **Fire Alarm Graphic Annunciator Display Requirements:** Wall-mounted backlit panel indicating the varying floor plan layouts of the building. A typical plan can be used for those floors with identical layouts. The building graphic requirements are listed in the UMB Master Specifications.
 - 2.17. The fire alarm system shall be designed and constructed to meet or exceed ADA requirements, including those for application of audible and visual signals. Audible and visual signal concerns should be addressed separately in the design, so that code requirements may be met efficiently and effectively. It is not acceptable to simply place a combination audible/visual signal everywhere a visual or audible signal is needed. In high ambient noise and/or difficult visibility areas such as mechanical rooms, high output signals such as horns, sirens and rotating beacons shall be considered.
 - 2.18. All new fire alarm systems should be addressable with alarm and event history log, separate dot-matrix printer, and graphic annunciator. Alphanumeric displays must be provided at the control panel.
 - 2.19. Locate all pull stations and notification appliances in compliance with applicable codes and standards.
 - 2.20. All sprinkler valve supervisory switches should be connected to initiate a supervisory signal. All high-low pressure switches shall initiate a supervisory signal. All water flow detector and pressure switches should be connected to initiate an alarm signal.
 - 2.21. Provide firefighter's emergency operation in elevators in accordance with ANSI, NFPA and Elevator Codes.
 - 2.22. Alarm initiating devices shall recall all elevators to the main floor unless overridden by elevator lobby smoke detectors.
 - 2.23. Smoke detectors shall not be used in elevator lobbies where ambient conditions will subject them to false alarms. Heat detectors can be used where ambient conditions do not permit smoke detector usage.
 - 2.24. Elevator machine room smoke and heat detectors shall initiate alarm signals to the fire alarm system.
 - 2.25. Install smoke and heat detectors in elevator pits or shafts as required by code.
 - 2.26. **Roof Top Fire Alarm Devices:** Regardless of building type and height, provide horn-based weatherproof notification appliances and weatherproof rotating beacon lights indicating appliances on the roof of the building, connected to the building fire alarm system. In accessible packaged mechanical roof-top units, provide voice-activated speakers and strobes in a weatherproof enclosure inside the packaged mechanical equipment. Consult with UMB and the UMB Fire Marshal for exact requirements on HVAC size threshold where this applies.
3. **CCTV SYSTEM:**
 - 3.1. UMB's Office of Public Safety operates a centralized CCTV system for surveillance of the campus. Cameras on campus permit UMB Police Officers to view and record

CHAPTER 3 ED – ELECTRICAL DESIGN STANDARDS

campus activity. Video transmission and camera control are accomplished over UMB's optical fiber cable network.

- 3.2. Consult with UMB Office of Public Safety for CCTV requirements for interior spaces.
- 3.3. Consult with UMB and the electrical engineer for the product information on CCTV cameras, controllers, monitors, interface connections etc. for the UMB central CCTV system.
 - a. CCTV system components are being evaluated. Consultant shall request updated standards upon project initiation.

4. **ACCESS CONTROL, INTRUSION DETECTION, AND PANIC ALARM SYSTEMS:**

- 4.1. **University Building Entrance Security System:** The complete security system of the project shall be clearly indicated in the contract documents, including a written description of the function and sequence of operation for each location, set of doors or secure area. The operation shall be as determined during design by the A/E, UMB Public Safety, Office of Facilities Management and the user.
- 4.2. The A/E shall attend all necessary 'Security Design Meetings' with members of the University design committee regarding requirements and operation of the security system as requested.
- 4.3. The Office of Public Safety monitors and controls access to UMB facilities through the University card readers. Connections are made via hard wire twisted pair cabling only, i.e., no telephone lines.
- 4.4. Components of the building entrances security system shall include:
 - a. Consult the UMB assigned electrical engineer for product and manufacturer information on the required network panel, Card reader interface(s), card reader(s), contact condition monitors (CCM), etc applicable for the project.
 - b. For fail safe operation, mechanical panic bars should be used as the release mechanism on exit doors and with an internal switch to shunt the door monitoring alarm. Motion detectors are not acceptable as a door release or alarm shunt. For emergency exit only applications, coordinate with UMB for prop alarms or other security notification requirements.
 - c. Door status switches or alarm contacts are connected to access control system.
 - d. All additional access control equipment shall be compatible with the existing system.
- 4.5. **Panic Alarms:** Panic alarms shall be integrated with the campus security system. Panic alarms shall be included in the security system design of the project and shall be clearly indicated in the contract documents, including a written description of the function and sequence of operation for each location. The operation shall be as determined during design by the A/E, UMB Public Safety, Office of Facilities Management and the user.
- 4.6. Panic alarm components of the security system shall include:

CHAPTER 3 ED – ELECTRICAL DESIGN STANDARDS

- a. Consult the UMB assigned electrical engineer for product and manufacturer information.
- b. All panic alarm equipment shall be compatible with the existing security system.
- c. Panic alarm systems may be either wired or wireless. A/E must consult with UMB for final equipment selection.
- d. Building panic alarm controller must be hard wired to the communications link and on emergency power.

5. **INTERCOM SYSTEM:**

- 5.1. **Building Intercom System:** As directed by UMB, provide an intercom system to allow communication from outside the building when access is limited and someone inside the building must be notified of visitors. The operation shall be as determined during design by the A/E, UMB Public Safety, Office of Facilities Management and the user.
- 5.2. This is separate from the building communication system associated with the fire alarm.

6. **CAMPUS EMERGENCY PHONES:**

- 6.1. Emergency phones are installed at strategic locations throughout the UMB Campus to provide quick and easy access to communication links to the UMB Campus Police Department.
- 6.2. The requirement for the type of phone, mounting type, and location(s) shall be coordinated with UMB and with the UMB Campus Police Department during all design phases of the project.
- 6.3. Depending on the project requirements, and unless otherwise directed by UMB, the A/E shall include at least one (1) phone in the design:
 - a. Emergency Phone:
 - (1) Contact UMB for specific phone manufacturer and model number.
 - (2) Specific mounting type, either Wall Mounted or Pedestal Mounted based on the location.
 - (3) Provide one (1) inch EMT or Non-Metallic conduit (depending on site conditions) from phone to the Main Telecommunications Room with pull string for communications wiring.
 - (4) Provide one (1) inch EMT or Non-Metallic conduit (depending on site conditions) from phone location to nearest electrical closet for 120 volt power connection. Obtain 120 volt power source from emergency panel board.
 - b. The design for the installation and location of the phones shall be coordinated with all disciplines.

END OF **CHAPTER 3 - ED - PART 3**