

## DIRECTIVE 16-3

Issue date: May 2017

### FIRE ALARM, DETECTION AND EMERGENCY COMMUNICATIONS SYSTEMS

1. General: The purpose of this directive is to outline the minimum requirements for the design of fire alarm, detection and emergency communications systems.
2. Codes and Standards
  - a. New York State 2016 Uniform Code which includes the 2015 editions of the International Building Code (IBC) and the New York State 2016 Supplement.
  - b. NFPA 72, "National Fire Alarm and Signaling Code".
  - c. NFPA 70, "National Electrical Code".
  - d. Utilize the edition of the standards referenced by the New York State Uniform Code.
3. Fire Alarm and Detection Systems
  - a. General - Provide fire alarm and detection systems in accordance with the 2015 International Codes, the New York State 2016 Uniform Code Supplement and per this Directive which may exceed minimum code requirements.
  - b. New Building Construction
    - 1) Provide an automatic smoke detection system in non-sprinklered Group A occupancies.
    - 2) Provide a manual fire alarm system in Group A and B occupancies. Pull stations shall be located not more than 5' from the entrance to each exit and additional pull stations shall be provided so that travel distance to the nearest station does not exceed 200'.
    - 3) Provide area smoke detectors that are connected to the fire alarm system in mechanical equipment rooms, electrical and transformer rooms, generator rooms, telephone/data equipment rooms, elevator machine rooms and elevator lobbies in all buildings.
  - c. Existing Building Construction
    - 1) For projects that are classified as a Repair, Alteration Level 1 or Alteration Level 2, the fire alarm and detection system devices shall be provided in the work areas and shall maintain the existing level

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of fire protection. The existing level of fire protection can be reduced when in compliance with the International Building Code for new construction and with Campus approval.

- 2) For projects that are classified as an Alteration Level 3, Change of Occupancy or an Addition, the fire alarm and detection system devices shall be provided as required for new building construction.

d. Carbon Monoxide Detection Systems

- 1) Provide carbon monoxide detection as required by the New York State 2016 Uniform Code Supplement.
- 2) Carbon monoxide detectors shall be connected to the building's fire alarm system.
- 3) Provide audible alarm notification via the emergency voice/alarm communications system speakers.
- 4) Visible alarm notification is not required unless directed by the Campus. When required, visible notification shall be provided by the emergency voice/alarm communications system strobes.

e. Elevator Recall

- 1) Provide elevator recall in accordance with the International Building Code, NFPA 72 and ASME A17.1.
- 2) Elevator recall shall be initiated by the smoke detector located at the lobby served by the elevator; smoke detector in the elevator machine room, control space, or control room; smoke detector at the top of a sprinklered hoistway; smoke detector in the sprinklered elevator hoistway pit.

f. Elevator Shutdown

- 1) Provide provisions to automatically disconnect power (main or secondary) to the elevator, prior to the application of water from the sprinkler system installed in the elevator machine room, machinery space, control space, control room or hoistway, in accordance with the International Building Code, NFPA 72 and ASME A17.1.

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- 2) Elevator shutdown shall be initiated by heat detectors located within 24" of each sprinkler head.
  - 3) The heat detector shall have both a lower temperature rating and higher sensitivity as compared to the sprinkler.
  - 4) Upon activation of the heat detector, there shall be a delay in the activation of power shut down. This delay shall be the time that it takes the elevator cab to travel from the top of the hoistway to the lowest recall level and open its doors.
- g. Smoke Detection and Air Distribution Systems Control
- 1) Smoke detection for the air distribution system shall be designed in accordance with the International Mechanical Code and NFPA 72.
  - 2) Provide smoke detectors in return air systems greater than 2,000 cfm.
  - 3) Provide smoke detectors in common supply and return air systems having a combined capacity greater than 2,000 cfm.
  - 4) Provide smoke detectors in return air risers that serve two or more stories and have a capacity greater than 15,000 cfm.
  - 5) Upon activation of the smoke detector, all operational capabilities of the air distribution system serving the affected area(s) shall be shut down. This shall be performed with a relay listed for use and connected to the fire alarm system and be located within 3' of the motor controller. Shut down shall not be through the building management system or other similar systems.
  - 6) Combination fire/smoke dampers shall close upon activation of a listed duct type smoke detector and a fire alarm control module. Control modules are to be provided with auxiliary contacts for monitoring by the building management system.
4. Emergency Communications Systems
- a. In-Building Emergency Voice/Alarm Communications Systems

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- 1) All new fire alarm systems shall be provided with an emergency voice/alarm communications system and shall be designed in accordance with NFPA 72.
  - 2) Audible alarm notification shall be provided by speakers located throughout the building and have dedicated paging zones for each floor, elevator groups (speakers in elevator cabs and lobbies), interior exit stairways and areas of refuge. Speakers shall be located to meet the voice intelligibility requirements from NFPA 72.
  - 3) Visible alarm notification shall be provided by strobes located in public use areas and common use areas.
  - 4) Covers for the speakers and strobes shall have the word "ALERT" printed on them.
- b. In-Building and Wide-Area Mass Notification Systems
- 1) Mass notification systems shall be provided when required by the Campus and shall be designed in accordance with NFPA 72.
  - 2) The emergency voice/alarm communications system speakers and strobes shall be used for the in-building mass notification system.
- c. Areas of Refuge and Elevator Landings Two-Way Emergency Communications Systems
- 1) A two-way communication system shall be provided in the areas of refuge or at the landings of each public elevator that is one or more stories above or below the level of exit discharge per IBC Section 1009.8.
  - 2) The two-way communication system shall provide communication between each required location and the fire command center (if applicable) or at the building entrance that will be used by emergency responders.
  - 3) The two-way communication system shall be monitored by the Campus at a constantly attended location.
  - 4) Provide illuminated area of refuge signage at doors providing access to an area of refuge.

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5. Wiring and Raceway Methods
    - a. For new systems, signaling line circuits shall be Class A as defined in NFPA 72.
    - b. For new systems, initiating device circuits and notification appliance circuits shall be Class B as defined in NFPA 72.
    - c. When adding devices to an existing system, the wiring Class shall match existing.
    - d. Provide wiring in raceway as required per NFPA 70, NFPA 72 (pathway survivability) and SUCF Directive 16-4.
    - e. Provide U.L. Listed 2-hour fire rated cable or 2-hour fire rated enclosure where required by NFPA 72.
    - f. Fire alarm plenum rated red colored jacket metal clad cable Types MC-FPLP and MC-FPLR are acceptable for use, with Campus approval, except for the following locations:
      - 1) Where subject to physical damage by normal building use.
      - 2) Exposed in finished spaces, mechanical rooms, electrical rooms, elevator hoistways and elevator machine rooms.
      - 3) Passing through a floor or wall.
      - 4) All other locations as indicated in NFPA 70 and 72.
    - g. Fire alarm cable that is not metal clad, or not installed in raceway, is not permitted without SUCF approval.
  6. Acceptance Test and Completion
    - a. Upon completion of the installation, the fire alarm system and all fire alarm components shall be tested in accordance with NFPA 72.
    - b. The installing contractor shall provide a record of completion in accordance with NFPA 72 indicating that the fire alarm system has been installed and tested in accordance with the approved plans and specifications.
  7. Drawing and Specification Requirements

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- a. Drawings - Provide dedicated 1/8" scale building floor plans indicating the layout of the fire alarm, detection and emergency communications systems equipment. These plans shall not be used for other electrical systems, i.e. power distribution, lighting, data/telephone, audio/visual or security equipment.
  - b. Drawings – Provide a fire alarm system matrix indicating the fire alarm system inputs and their associated system outputs.
  - c. Drawings - Provide a fire alarm riser diagram indicating each type of fire alarm device and how they are wired to the protected premises control unit (building fire alarm control panel) and proprietary supervising station (campus head end).
  - d. Drawings – Provide wiring diagrams for smoke control equipment and fan shutdown.
  - e. Drawings – Indicate the location of all combination fire/smoke dampers and how they are powered.
  - f. Drawings - Provide typical details indicating the mounting height for the fire alarm, detection and emergency communications systems equipment.
  - g. Specifications - Work involving the installation of fire alarm system components shall be performed by firms and employees currently licensed by the NYS Department of State Division of Licensing Services.
  - h. Specifications - Coordinate the acceptable manufacturers of the fire alarm, detection and emergency communications systems with the Campus. These systems need to be UL Listed for use with existing systems.
  - i. Specifications – Include requirements for reprogramming the campus-wide proprietary supervising station (PSS).
  - j. Specifications – The fire alarm, detection and emergency communications systems shall be tested in accordance with NFPA 72.

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## Appendix I Project Checklist

Review the following items which may pertain to a particular project and include in design:

### **General Note:**

Projects that are primarily fire alarm system projects still have a significant architectural component. The project documents need to include existing conditions (based on a site assessment) and show ceiling types (coffers, suspended clouds, spline) as well as wall finishes and wall fire ratings. Room types should be shown as well (gyms, stages, balconies, atriums, lecture halls). Recommendations for patching, painting or refinishing wall and ceiling areas should be included, deteriorated or difficult to restore area should be recommended for replacement.

1. How is supervisory (PSS) reporting to be accomplished?
2. Does the campus have adequate phone lines, fiber optic lines etc. for the project? Is a survey of existing capacity required?
3. Are there spare conduits in the campus signal ducts for new cables?
4. On multiple building projects, guarantee period start date for each building may be based on completion of that building only; or on completion of the entire project. Determine with campus and Fund input how to proceed.
5. Consider software updates, programming revisions, usability, and accessibility of programming.
6. Can future floor plan revisions be programmed into the graphics display by the campus, or must it be by the fire alarm manufacturer?
7. Will installation of a new PSS require modification of the space designated for it? Will it require new cabinetry, lighting, ventilation, etc.?
8. What training does the campus need?
9. What work must be done during off-hours or in the summer?
10. What as-built documents are required by the campus?
11. What hazardous materials remediation is required?

12. What other related devices/functions/systems such as kitchen hoods, elevator recall and shutdown, door hold-open devices, sprinkler tamper and flow switches, server room fire suppression systems, and smoke/heat vents will require tie-in? Are existing devices compatible with the new system?
13. Note ceiling types and type of raceway to be used in each area.
14. Should the contractor provide all service or just repairs during the one-year guarantee period as part of the contract?
15. Should there be a retest at the end of the one-year guarantee period?
16. Should there be included in the project the reprogramming of any miscellaneous changes in point description (say 10% of the total points), by the contractor prior to the end of the one-year guarantee period?
17. Should the installer perform acceptance test or should it be by a third party?
18. Are all detectors and other system components accessible for testing and maintenance?
19. Are there existing smoke or heat vents?
20. Are there existing smoke or fire dampers?

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## Appendix II: Mounting Height and Spacing Guide

Provide a graphic detail of mounting heights and device spacing on drawings based on the International Building Code and NFPA 72 requirements. Indicate any necessary deviations required due to project conditions. Guide shall include, but not be limited to the following:

1. Manual Fire Alarm Boxes: Mounting height 42-48 inches to **handle**. Locate no more than 5 feet from the entrance to an exit. Locate on the latch side of door, if possible. Boxes are to be conspicuous, unobstructed, and accessible.
2. Spot Type Heat and Smoke Detectors: For smooth ceilings, all points on the ceiling shall have a detector within 0.7 times the detector spacing. Spacing is 30 feet for smoke detectors and 50 feet for heat detectors. Provide a spacing of 3 feet or more from supply and return diffusers. Coordinate trades by means of the reflected ceiling plan. (If design conditions other than smooth ceilings or ceiling heights over 12 feet are encountered, show conditions and give reasons for coverage design.)
3. Door Release: Smoke detection providing area coverage on either side of the doors may be used for door release. Smoke detectors, which are provided for door release only, shall be on the centerline of doorway and not more than 5 feet from door.
4. Elevator Recall: Elevator recall shall be by smoke detectors located in the lobby, machine room (machinery space, control space or control room), and at the top and bottom of the hoistway. Lobby detectors shall be no more than 21 feet from centerline of elevator door.
6. Visual and Combination Audible/Visual Notification Appliances: The **entire lens** shall be within 80 inches-96 inches above the floor. Depending on ceiling height, higher mounting is preferred. Visible appliances shall be located not more than 15 feet from end of the corridor, with a separation not greater than 100 feet between appliances in corridors. Locate an appliance opposite each access door to an exit stair so that it will be visible to persons entering the floor from the exit stair.
7. Audible Notification Appliances: **Top of device** not less than 90 inches above floor or not less than 6 inches below ceiling.
8. Fire Alarm Control Panels, Annunciator Panels, Node and Extender Panels.: Mount in accessible location approximately 5 feet in height to panel display readout. All panels shall have 36 inches of working clearance in front of panel.

9. Remote Test Stations for Duct Detectors and Beam Detectors: Mount approximately 5 feet high in an accessible and conspicuous location.
10. Addressable control devices shall be located within 3 feet of the controlled device, such as ventilation fan or elevator controller. Addressable monitor devices shall be located adjacent to monitored device.

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