

**FIRE ALARM SYSTEM STANDARDS & DESIGN GUIDELINES**  
**DIVISION OF FACILITIES DEVELOPMENT**  
Revised: 03-01-2021

**BID DOCUMENTS**

1. Building fire alarm systems and additions to such systems shall be designed in accordance with program requirements, latest industry standards, and applicable codes including NEC, NFPA, IBC, IFC, IMC, and these guidelines. All equipment shall be U.L. listed.
2. The audible and visual signal levels shall comply with the ADA requirements and these guidelines.
3. Locate an audio or audio/visual in stairwells at every other level starting at 1<sup>st</sup> floor.
4. Heat detectors shall be located in all storage areas, mechanical rooms, laboratories, and janitors' closets. Smoke detectors may be located in clean storage areas in lieu of heat detectors.
5. Smoke detectors shall be located in all corridors, computer rooms, fire alarm control panel area, electrical closets, communications closets and top of stairs (at 5<sup>th</sup> and 10<sup>th</sup> floors where applicable). Use the latest NFPA code for spacing requirements.
6. Smoke detectors shall be located in the elevator lobby, machine room and top of shaft if sprinkled for the recall functions
7. Carbon monoxide alarms (detectors) shall be installed where required by DSFS and IBC chapter 12.
8. All Fire Alarm Control Panels (FACPs), except for very small buildings, shall include voice communications systems.
9. The new FACP shall be located where directed by the building manager at the review meeting. The new Fire Alarm Annunciator Panel (FAAP) shall be located at the Fire Department's designated entrance.
10. In retrofit projects; new duct detectors shall be specified in lab and research facilities to meet current NFPA-90 standards. Selective fan shutdown shall be provided where applicable.
11. Class B shall be specified unless otherwise specifically directed by the State Engineer.
12. Manual pull stations shall be double action in dorms and single action everywhere else, and utilize a key to reset. Special installations will be considered when requested by Owner and determined justifiable.
13. Candela ratings of visual appliances shall be indicated on the drawings
14. Free air wiring may be specified if the Owner and DFD are in agreement. Architect/Engineer shall explore this option at the kick-off meeting.
15. Speakers shall be specified inside each resident room in all dormitory settings.
16. Central monitoring shall be included in the program statement.
17. Initiating and audio/visual fire alarm circuits shall have 10% spare capacity.
18. One way voice circuits in the fire alarm system shall have 10% spare wattage, and one spare amplifier in each group/location to automatically replace any failed active amplifier.
19. All speakers shall be set at 1 watt for amplifier sizing.
20. All strobes shall be synchronized.
21. Horn type Loudspeakers (102 dB rating) shall be specified in mechanical areas.

22. All FACP's shall include UL approved alarm verification features for the smoke detector circuits. Other initiating devices shall report alarms within 4 seconds from activation, regardless of system size.
23. Specify fire pump monitoring (3 points) and all tamper and flow switches.
24. Specify control and monitor modules for elevator recall as follows:
  - a) (3) Control modules for main level, alternate level and fireman hat.
  - b) (1) Control module for shunt-trip where applicable
  - c) (1) Control module for battery lowering circuit where applicable in hydraulic elevators
  - d) (1) Monitor module for shunt-trip where applicable.
25. Architect/Engineer shall include an edited version of the unit price list included hereafter in every project that involves fire alarm work.

## **INSTALLATION**

26. The Fire Alarm Control Panel (FACP) shall be connected to a 120 VAC, 20 AMP dedicated circuit from an emergency panel. The fire alarm branch circuit shall be secured in the "ON" position using a red circuit breaker handle clamp. Circuit shall be labeled as "FIRE ALARM". The FACP shall also include sufficient battery back-up power (see specifications for sizing) with an automatic float charger.
27. The operable part of the manual stations shall be installed not less than 3 ½ ft. (42") and not more than 4 ft. (46") to center above finished floor. All pull stations shall be installed at the same height throughout the facility.
28. Fire alarm visual (strobe) and audible (horn or speaker) signals shall be on separate circuits if the fire alarm control panel cannot control them separately.
29. Speakers shall be set at midrange tap and provide the specified dB sound level at 10 feet.
30. Fire alarm wiring shall be in ½" conduit minimum, unless otherwise specified. This conduit system shall be dedicated to the fire alarm system.
31. Speakers and exposed boxes installed in dorms shall have pinned "torx" head type tamper proof screws.
32. The bottom of wall mounted audio/visual devices shall be installed at not less than 6 2/3 ft. (80") and not more than 8 ft. (96") above finished floor. Ceiling mounted audio/visual devices shall comply with the latest NFPA 72 Standard. All audio/visual devices shall be installed at the same height throughout the facility.
33. Surface mounted devices shall be on factory supplied back or Wiremold boxes (no galvanized boxes).
34. Trim plates shall be used to cover imperfections around flush mounted devices.
35. Junctions and pull boxes in the fire alarm system conduit shall be identified by red covers with F.A. stenciled in black.
36. Smoke detectors located in ducts shall have test switches. Where duct detectors are in locations difficult to reach such switches shall be remotely mounted. Remote test switches shall be in centralized or grouped locations.
37. Wires shall be terminated at the device by the use of screws or wire nuts. No crimp type nuts or wire twisting/taping are allowed.

**UNIT PRICES** (listed below are for additions to or deductions from amount of work required under the contract. See Instructions to Bidders 'Article 19 Unit Prices' for detailed instructions.) (Applicable to Base Bid No. 5).

Unit prices shall include labor, material, bond, overhead & profit and any other cost associated with the unit to provide a functional unit integrated into the system being added to or deleted from.

<u>Item:</u>	<u>Existing Location</u>	<u>New Location</u>
U01. Addressable Pull Station (semi-flush)	(\$_____)	(\$_____)
U02. Addressable Pull Station (surface)	(\$_____)	(\$_____)
U03. Photoelectric Smoke Detector, including Base (surface back box)	(\$_____)	(\$_____)
U04. Photoelectric Smoke Detector, including Base (concealed back box in existing plaster or drywall ceiling)	(\$_____)	(\$_____)
U05. Photoelectric Duct Smoke Detector, including Housing and sample tubes	(\$_____)	(\$_____)
U06. Demo Existing Duct Smoke Detector	(\$_____)	
U07. Dwelling Unit Smoke Detector (surface raceway back box)	(\$_____)	(\$_____)
U08. Dwelling Unit Smoke Detector (concealed back box in existing plaster or drywall ceiling)	(\$_____)	(\$_____)
U09. Upgrade U07, or U08 to ADA-type Detector (with built-in Strobe)	(\$_____)	(\$_____)
U10. Intelligent / Addressable Heat Detector, Including Base (surface back box)	(\$_____)	(\$_____)
U11. Intelligent / Addressable Heat Detector, Including Base (concealed back box in existing plaster or drywall ceiling)	(\$_____)	(\$_____)
U12. Non-Addressable Fixed Temp Heat Detector, with Base and mini-monitor module	(\$_____)	(\$_____)
U13. Non-Addressable Fixed & Rate of Rise Heat Detector, with Base and mini-monitor module (surface back box)	(\$_____)	(\$_____)
U14. Non-Addressable Heat Detector, with Base and mini-monitor module (concealed back box in existing plaster or drywall ceiling)	(\$_____)	(\$_____)
U15. Non-Addressable Explosion-Proof Heat Detector, with Base and mini-monitor module	(\$_____)	(\$_____)
U16. Addressable Monitor Module surface mount	(\$_____)	(\$_____)

- U17. Addressable Mini-Monitor Module surface mount (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit
- U18. Addressable Control (Relay Output) (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
Module, surface mount
- U19. Addressable Control (Supervised Output) (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
Module surface mount
- U20. Remote Test Switch with Indicating LED (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
For Duct Smoke Detector
- U21. Visual-Only Notification Appliance - (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
surface-mount including surface back box
- U22. Visual-Only Notification Appliance (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
semi-Flush, wall mount (concealed back box in existing plaster or drywall wall or ceiling)
- U23. Audible-Only Notification Appliance - surface-mount (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit
- U24. Audible-Only Notification Appliance – semi-flush, (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
ceiling mount (Semi-Flush shall be interpreted as flush back box)
- U25. Combination Audible / Visual Notification (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
Appliance – (surface-mount, including surface back box)
- U26. Combination Audible / Visual Notification (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
Appliance – (concealed back box in existing plaster or drywall wall or ceiling)
- U27. Mini Horn Notification Appliance - surface-mount (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit
- U28. Mini Horn Notification Appliance - (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
semi-Flush (concealed back box in existing plaster or drywall wall or ceiling)
- U29. Access Panel for Plaster / Gypsum Ceilings (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit  
or Walls (1-foot by 1-foot size, installed complete and painted)
- U30. Door Hold Open Device (\$\_\_\_\_\_) (\$\_\_\_\_\_) per unit
- U31. Access Panel for Plaster / Gypsum Ceilings (\$\_\_\_\_\_) per unit  
or Walls (18-inch by 18-inch, installed complete and painted)
- U32. Access Panel for Plaster / Gypsum Ceilings (\$\_\_\_\_\_) per unit  
or Walls (2-foot by 2-foot size, installed complete and painted)
- U33. 10 linear feet of ¾ -inch raceway (non-painted), (\$\_\_\_\_\_) per unit  
including any needed wiring & fittings, installed complete
- U34. 10 linear feet of ¾ -inch raceway (painted to match) (\$\_\_\_\_\_) per unit  
including any needed wiring & fittings, installed complete
- U35. 10 linear feet of ½ inch raceway (non-painted), (\$\_\_\_\_\_) per unit  
including any needed wiring & fittings, installed complete

- U36. 10 linear feet of ½ -inch raceway (painted to match), including any needed wiring & fittings, installed complete (\$\_\_\_\_\_ ) per unit
- U37. 10 linear feet of ½ inch equivalent-size Surface raceway, including needed wiring & fittings, installed complete (\$\_\_\_\_\_ ) per unit
- U38. 10 linear feet of ¾ inch equivalent-size Surface raceway, including needed wiring & fittings, installed complete (\$\_\_\_\_\_ ) per unit
- U39. Notification Appliance Power Extender (\$\_\_\_\_\_ ) per unit

Allow a minimum of 50 feet of conduit or surface metal raceway and wire for each unit listed above that requires raceways. Unit prices shall include all required labor, back boxes, fittings, terminations and all other hardware and software modifications to perform the intend operations when added to the system or deleted from it as specified in Section 28 31 00.