Fire Alarm System

Plan Review Checklist

2010 OFC and 2007 NFPA 72

This checklist is for jurisdictions that permit the use of the 2007 NFPA 72 in lieu of IFC's referenced 2002 NFPA 72.

Date of Review: _____ Permit Number: _____

Business/Building Name: _____ Address of Project: _____

Designer Name: _____ Designer's Phone: _____

Contractor: _____ __Contractor's Phone: _____

FA Manufacturer: _____ FA Model: _____ Occupancy Classification: _____

Reference numbers following checklist statements represent an NFPA code section unless otherwise specified.

Checklist Legend: **v or OK** = acceptable **N** = need to provide **NA** = not applicable

1. ____ Three sets of drawings are provided.
2. ____ Equipment is listed for intended use and compatible with the system, specification data sheets are required, 4.3.1, 4.4.2.

Drawings shall detail the following items, OFC 907.1.2 and NFPA 72 4.5.1.1:

3. ____ Scale: a common scale is used and plan information is legible.
4. ____ Rooms are labeled and room dimensions are provided.
5. ____ Equipment symbol legend is provided.
6. ____ Class A or B system is declared, alarms zones do not exceed 22,500 sq. ft. (unless sprinklered then limit is set by NFPA 13, and each floor is a separate zone, OFC 907.7.3.
7. ____ When detectors are used, device locations, mounting heights, and building cross sectional details are shown on the plans.
8. ____ The type of devices used.
9. ____ Wiring for alarm initiating and alarm signaling indicating devices are detailed.
10. ____ The location of the Fire Alarm Control Unit (FACU) and when required, the Remote Annunciator panel are located near the main entrance or as approved by the AHJ, 4.4.6.3.
11. ____ If more than one building is served by a system, each building is indicated separately on the FACU or annunciator and it is noted as such on the plans, 4.4.6.6.2.
12. ____ Type and gauge(s) of conductors _____.
13. ____ Sectional views of structure, roof, and ceiling, and rooms with beam or solid joists and drop ceilings, etc unless plans declare them smooth ceiling.
14. ____ Riser diagram with shows quantity and type of devices per circuit, zone ID, 120 AC dedicated circuit, batteries, panel, generator, etc. It shall be noted on the plans that the 120 AC dedicated circuit is labeled *Fire Alarm Circuit* and accessible to only to authorized personnel, 4.4.1.4, 4.4.1.4.2.

Point to point system wiring diagram shall be provided and detail the following:

15. ____ Interconnection and wire routing of identified devices and controls per circuit.
16. ____ Indicate the number of conductors and wire gauge for each circuit run.
17. ____ Identify separate zones, circuits, and EOL locations.

Show alarm indicating circuit load consumption (voltage drop) on drawing with:

18. ____ Quantity of signaling devices, current consumption, EOL voltage for each circuit, and the lowest Nameplate operating voltage range for audible and visual notification devices.
19. ____ Approximate length of each circuit and resistance of wire, use National Electrical Code (NEC) conductor resistance criteria or provide manufacturer specification sheet.
20. ____ Show the formula and acceptable circuit limits on the drawing or on an attached sheet including:
    A. Standby power consumption of all current drawing devices times the hours required by NFPA (24 hours) including power consumption of the control panel modules.
    B. Power consumption of all devices on standby power; including door holders, relays, smoke detectors, etc.
    C. Alarm power consumption of all current drawing devices multiplied by the minutes required by NFPA (5minutes for fire alarms or 15 minutes for emergency voice/alarm communication service).
    D. Formula format for battery calculations.

Power requirements to be shown on the plans:

21. _____ Power: secondary power supply capacity for the type of system is identified as 24 hours and will alarm for 5 minutes, 4.4.1.5.3.1.
22. _____ Power: secondary power supply for voice/alarm system is provided with 24 hrs capacity and will alarm for 15 minutes, 4.4.1.5.3.1(A)
23. _____ Power: Primary batteries shall be sized to at least 100 percent of maximum normal load.

Performance Based Design

24. _____ Documents are provided outlining each performance objective, applicable scenarios, any calculations, modeling and other technical support in establishing the proposed fire design and life safety performance in accordance with 5.3. Readers should consult the Society of Fire Protection Engineers (SFPE) *Code Official's Guide to Performance-based Design Review*.

Initiating Devices; the following items are detailed on the plans:

25. _____ Smoke and heat detection device coverage is designed in accordance with total coverage (5.5.2.1), partial coverage (5.5.2.2), selective coverage (5.5.2.3), and non-required coverage (5.5.2.4).
26. _____ Detection devices: wiring details for devices are provided.
27. _____ Detection devices: type and location for the occupancy type is in accordance with OFC 907.
28. _____ Duct detector locations in air/heat ducts. The air flow rate per minute ratings are provided: including the manufacturer data sheet and a matrix or note detailing what size sampling tubes are to be used for each duct size, 5.16.5.
29. _____ Heat detectors: listing and spacing data sheets are provided.
30. _____ Heat detector spacing: provided is a list of rooms that indicate which ceilings are smooth, sloped, have solid joist or beam construction, 5.6.5
31. _____ Heat detector heat classification color is written at detector location on the plan, 5.6.2.
32. _____ Heat detector spacing for rooms with smooth ceilings shall not exceed listed spacing and be within 1/2 of the listed spacing at right angles to all walls or partitions extending within 18 in. of the ceiling or all points of a ceiling are within a distance that is .7 (70%) of its listed spacing, 5.6.5.1.
33. _____ Heat detector spacing for irregularly shaped areas spacing can exceed listing provided the maximum spacing from detector to farthest point of sidewall or corner within its zone does not exceed .7 (70%) of its listed spacing, 5.6.5.2.
35. _____ Heat detector spacing for ceilings 10 ft. to 30 ft. shall be reduced in accordance with Table 5.6.5.5.1. prior to reductions for sloped, joist, or beam construction and not less than .4 (40%) of the height of the ceiling, alternate designs can be in accordance with Annex B, 5.6.5.5.1.
36. _____ Heat detector spacing at right angles to solid joist construction is not greater than 50 percent of the smooth ceiling spacing, 5.6.5.2.
37. _____ Heat detector spacing at right angles to beams projecting greater than 4 in. below the ceiling do not exceed 66 percent of the smooth ceiling spacing noted in 5.6.5.1.1 and .2 or if beams project greater than 18 in. below the ceiling and are spaced greater than 8 ft. on center then each bay is a separate area, 5.6.5.3.
38. _____ Heat detector spacing for sloped ceilings: for peaked ceilings a row of detectors are spaced and located at or within 3 ft. of the ceiling peak and additional detectors, if any, shall be spaced based on the horizontal projection of the ceiling; for shed ceilings the sloped ceiling will have detectors located within 3 ft. of the high side of the ceiling measured horizontally and additional detectors, if any, shall be spaced based on the horizontal projection of the ceiling; for roof slopes less than 30 degrees, detectors shall be spaced using the height at the peak and slopes greater than 30 degrees use the average slope height for detectors other than those at the peak, 5.6.5.4.
39. _____ Unless listed for such use, smoke detectors shall not be installed in an environment where the temperature is below 32^0F, above 100^0F, relative humidity above 93 percent, and the air velocity exceeds 300 ft/min., 5.7.1.8
40. _____ Smoke detector spacing is in accordance with the listing data sheet.
41. _____ Smoke detector location and spacing shall be based on anticipated smoke flows due to the plume and ceiling jet produced by an anticipated fire, which should take into account: 1) ceiling shape and surface, 2) ceiling height, 3) configuration of contents, 4) combustion characteristics of fuel load, 5) compartment ventilation, 6) ambient pressure, pressure, altitude, and humidity. Provide document attesting that these items were applied, 5.7.3.1.2 AHJ may require supporting documentation.
42. _____ Smoke detectors in high air movement areas are not located in the supply vent airstream and shall be spaced in accordance with Table 5.7.5.3.3 and Figure 5.7.5.3.3.
43. _____ Smoke detectors, the designer has declared if the system will use two detectors to initiate the alarm. If designed as such, then the AHJ must approve the design, two detectors are required in each protected area, and alarm verification shall not be used, 6.8.5.4.3.

44. ____ Room cross sectional details are provided for smoke detector designs listed in checklist items 45 and 46.
45. ____ Smoke detector spacing for smooth ceiling will use 30 ft. spacing as a guide, manufacturer's data sheet listing criteria shall be followed. Other spacing is permitted depending on ceiling height, etc., for detecting flaming fires the guidelines of Annex B can be used, all points of a ceiling are within .7 (70%) of the selected spacing, 5.7.3.2.3.
46. ____ Smoke detector spacing for solid joist and beam construction: for level ceilings, 5.7.3.2.4.
_____ 1) beam depth less than 10 percent of ceiling height then use smooth ceiling spacing criteria,
_____ 2) beam depth 10 percent or greater than ceiling height and beam spacing is 40 percent or greater than ceiling height detectors are in each beam pocket,
_____ 3) waffle or pan-type ceiling with beams up to 24 in. and up to 12 ft. center-to-center spacing then use smooth ceiling spacing including spacing criteria for irregular areas and detectors can be placed on the ceiling or bottom of the beams,
_____ 4) corridors up to 15 ft. in width with beams perpendicular to the corridor length then use smooth ceiling spacing including spacing criteria for irregular areas and detectors can be placed on the ceiling or bottom of the beams,
_____ Just one detector required for rooms up to 900 sq. ft. of area
47. ____ Smoke detector spacing for solid joist and beam construction: for sloped ceilings, 5.7.3.2.4.3.
_____ 1) For beams running parallel to the slope use level beamed ceiling spacing criteria,
_____ 2) Ceiling height is determined as the average height over the length of the slope
_____ 3) No detector required at 50 percent spacing from the low end it slope does not exceed 10 degrees,
_____ 4) Spacing is based on the horizontal projection of the ceiling
48. ____ For beams running perpendicular to the sloped ceilings, the detectors are spaced the same as level beamed ceilings, 5.7.3.2.4.4.
49. ____ Detectors are on the bottom of the solid joists of sloped ceilings, 5.7.3.2.4.5.
50. ____ Air sampling smoke detector design calculations are within the maximum air sample transport time of 120 seconds, system calculations and a manufacturer design manual is provided, 5.7.3.3.2.
51. ____ Air sampling smoke detector sampling pipe network is detailed on the plans with pipe size and lengths, with calculations showing flow characteristics of the piping network and each sampling port, 5.7.3.3.4.
52. ____ Air sampling smoke system: provided are details of pipe mounting system and signage for each pipe at changes of direction or pipe branches, each side of wall penetration, and at least every 20 ft., 5.7.3.3.8
53. ____ Projected beam smoke detector locations are detailed on the plans and the manufacturer's design data sheets are provided, 5.7.3.4.1
54. ____ Projected beam smoke detectors: stratification for a high ceiling was considered in the beam detector's use and documentation is provided attesting that this evaluation was done, 5.7.3.4.2.
55. ____ Projected beam smoke detectors shall be equivalent to a row of spot-type detectors on level or slope ceilings, 5.7.3.4.5.
56. ____ Smoke detector spacing located on peaked ceilings shall be spaced and located within 3 ft. of the peak, measured horizontally, and additional detectors, if any, shall be based on the horizontal projection of the ceiling, shed ceilings shall have detectors located on the ceiling within 3 ft. of the high side of the ceiling measured horizontally, and additional detectors, if any, shall be based on the horizontal projection of the ceiling, and room cross sectional are provided, 5.7.3.5 and .6.
57. ____ Smoke detector spacing under raised floors or above suspended ceilings shall be treated as separate rooms and spacing is in accordance with 5.7.3.7.
58. ____ Smoke detector spacing: when partition distance to the ceiling is within 15 percent of the ceiling height, treat each partitioned area as a separate room, 5.7.3.8.
59. ____ Smoke detectors used in plenums are listed for anticipated environment and shall not be used in lieu of open area detectors, 5.7.4.
60. ____ Smoke detectors are not installed in areas less than 32^0F or greater than 100^0F or if humidity is above 93 percent, or the air movement is greater than 300 fpm (1.5 m/sec.), 5.7.1.8.
61. ____ Smoke detectors in high air movement areas are spaced in accordance with Table 5.7.5.3.3 and Figure 5.7.5.3.3, not located directly in the supply register airstream, and the design criteria is on the plans, 5.7.5.3.
62. ____ Smoke detection is provided in areas not continuously occupied where the FACU and other control units are located, 4.4.5. *Control Unit is a system component that monitors inputs and outputs.*
63. ____ Radiant energy-sensing fire detectors, detector device is detailed and the listing data sheets are provided.
64. ____ Radiant energy-sensing fire detector data sheets show the detector matches the spectral emissions of the fire or fires to be detected and how false alarms will be minimized, 5.8.2.2.

65. _____ Radiant energy-sensing fire detector spacing will be in accordance with its listing or inverse square law (fire size verses distance curve for the detector) and the quantity of detectors are based on complete unobstructed view coverage of the area, 5.8.3.
66. _____ Radiant energy-sensing flame detectors, location and spacing is based on a documented and submitted engineering evaluation to include fire size, fuel involved, detector sensitivity, detector field of view, distance from fire to detector, radiant energy absorption, extraneous radiant emissions, purpose of coverage, and the response time required, 5.8.3.2.
67. _____ Radiant energy-sensing spark/ember detector location and spacing is based on a documented and submitted engineering evaluation to include fire size, fuel involved, detector sensitivity, detector field of view, distance from fire to detector, radiant energy absorption, extraneous radiant emissions, purpose of coverage, and the response time required, 5.8.3.3.
68. _____ Video image flame, combination, multi-criteria, and multi-sensor detectors are in compliance with 5.8.5 and 5.9.
69. _____ Other fire detectors not previously covered are installed in accordance with listing requirements, an engineering survey which includes structural features, occupancy and use, ceiling height, ceiling configuration, ventilation, ambient conditions, fuel load and content configuration, 5.10.
70. _____ Smoke detectors used for elevator recall: detectors in the elevator lobby, elevator machine room, hoistways, and control room are connected to the facility fire alarm system, 6.16.3.1.
71. _____ Smoke detectors for elevators, in non-fire alarmed buildings, shall be connected to a dedicated fire control unit and labeled as such, all of which is detailed on the plans, 6.16.3.2.
72. _____ Smoke detectors for elevators shall initiate the fire alarm and have a distinct visual indicator at the FACU and annunciator, the activation of fire alarm indicating devices are not required if the signal transmits to a constantly attended location 6.15.3.8 and .9.
73. _____ For elevator recall the primary and alternate floors for recall are noted on the plans.
74. _____ Smoke detectors for elevators, a lobby detector is located within 21 ft. of the centerline of each elevator door within the elevator bank controlled by the detector, 6.16.3.5.
75. _____ Sprinkler waterflow alarm device is shown on the plan as part of an initiation circuit, 5.11 and OFC 907.6.2.
76. _____ Other automatic extinguishing systems are shown on the plan as part of an initiation circuit, 5.11 and OFC 907.4.
77. _____ Smoke detectors used in air duct systems are listed for such use and are appropriate for air velocities, temperatures, and humidity expected, 5.16.5.6.
78. _____ Smoke detectors used in smoke control systems: duct detectors for preventing recirculation of smoke beyond a room or space from which the smoke is generated have their location detailed and are in the return air duct or plenum upstream of any filters of the air-handling system when the air system exceeds 2,000 cfm, Exception: detectors are not required in the return air if all portions of the building that are served by the air system are protected by area smoke detection, 5.16.4.2 and IMC 606.2.
79. _____ Smoke detectors used for smoke control systems: multi-air systems that share common supply or return air ducts or plenums with a capacity exceeding 2,000 cfm the return air system shall be provided with smoke detectors in accordance with item 78. above, consult the list of exceptions, IMC 606.2.2.
80. _____ Smoke detectors used for smoke control systems: return air risers serving 2 or more stories and serve any portion of a return air system exceeding 15,000 cfm has smoke detectors at each story, IMC 606.2.3.
81. _____ Smoke detectors used for smoke control systems, access to detectors is detailed, IMC 606.3 and OFC 907.13.
82. _____ Smoke detectors used for smoke control systems, detectors are connected to fire alarm system and the visual/audible supervisory signals are shown located at a constantly attended location, Exceptions: 1) supervisory signal not required at constantly attended location if the duct smoke detectors activate the fire alarm system, 2) building without a fire alarm, the plans show the detector activates a visual/audible signal in an approved location (front entry) and the same for showing detector trouble conditions and it is shown to be signed/lettered as an air duct detector trouble, IMC 606.4.1 and OFC 907.4.1.
83. _____ Positive Alarm Sequence if used is approved by AHJ, and must comply with 6.8.1.3.
84. _____ Fire safety control functions: door release smoke detector locations are detailed and in compliance with 5.16.6 and 6.16.6.
85. _____ Fire safety control functions: exit door unlocking devices are connected to the fire alarm system and release on alarm activation, 6.16.7 and OFC 907.4 and meet the criteria listed in OFC 1008.1.4.4.
86. _____ Fire safety control functions: fan controls or door controls are interconnected with fire alarm system and detailed; any listed relays that initiate control are within 3 ft. of the control circuit or appliance and the relay data sheet is provided, and wiring is monitored for integrity, 6.16.2.

87. ____ Fire safety control functions: fire pump is supervised by fire alarm system, 6.8.5.9.
88. ____ Combination system design (fire alarm with non-fire alarm systems) complies with 6.8.4.
89. ____ Notification zones and circuits coincide with building outer walls, fire or smoke compartment boundaries, and floor separations, 6.8.6.3.
90. ____ Zones: each floor will be zoned separately, not to exceed 22,500 sq. ft. nor exceed 300 ft. in length in any direction and each zone is clearly identified on the plans. Zones in sprinklered buildings shall not exceed the area limits set in NFPA 13, OFC 907.7.3.
91. ____ Zones: each floor is considered a zone and if fire or smoke barriers are used for relocating occupants from one zone to another on the same floor, then each zone shall be annunciated separately and all zones are clearly identified on the plans, 4.4.6.
92. ____ Zones: a zone indication panel and controls are provided and the panel location is approved, OFC 907.7.3.1.
94. ____ Zones: each floor of a high-rise building is separately zoned and each zone includes smoke detectors, sprinkler water flow devices, manual pull boxes, and other approved automatic detection devices or suppression systems on that floor, OFC 907.7.3.2.
95. ____ Emergency voice/alarm communication system complies with 6.9, and a code study is provided, which details how compliance is met. For high-rise buildings refer to the informational document in the fire alarm section of this book.
96. ____ Emergency voice/alarm communication system used for partial evacuation or relocation of occupants has its circuits provided with 2-hour protection by rated cable or a rated enclosure or an alternate approved by the AHJ, 6.9.10.4.2 and .3.
97. ____ Emergency voice/alarm communication system: Fire Command Center complies with 6.9.6 and 15 items in IBC 911.1, and OFC 508.
98. ____ Manual fire alarm boxes: cross sectional detail shows mounting is not less than 42 in. and not greater than 48 in. from the floor, OFC 907.5.2.2.
99. ____ Manual fire alarm boxes are noted on the plans as being red in color, OFC 907.5.2.3.
100. ____ Manual fire alarm boxes: shall be on each floor level, within 5 ft. of each exit door, at every floor exit, on both sides of grouped openings exceeding 40 ft. in width and within 5 ft. of the opening, and within 200 ft. of travel, 5.13 and OFC 907.5.2.1.
101. ____ Manual pull boxes are not required for A, B, E, F, M, R-1 and R-4 (must have one box at an approved location), R-2 occupancies that are sprinklered throughout and the fire alarm is initiated by the sprinkler water flow an by a manual means located in a normally occupied location,OFC 907.2.1 – 2.10.
102. ____ 24 hour monitoring is required, the type of supervisory service and the service company name is noted on the plans, OFC 907.7.5 and NFPA 72 Chapter 8.
103. ____ 24 hour monitoring: sprinkler alarm, supervisory, and trouble signals are distinctly different, 4.4.3.3.
104. ____ 24 hour monitoring: sprinkler alarm, supervisory, and trouble signals are transmitted to supervisory station, 4.4.3.2, 4.4.3.5, and Chapter 8, IFC 907.7.5.
105. ____ 24 hour monitoring service: transmitting device is detailed and its listing data sheet is provided.
106. ____ 24 hour monitoring: important, for digital alarm communicator transmission (DACT), dual monitoring control is required in case the primary transmission method fails, 8.5.3.2.1.5.

Notification Appliances; the following items are detailed on the plans:

107. ____ Fire alarm audible device design in public mode shall provide at least a minimum sound pressure level of 15 dBA above the average ambient sound pressure level or 5 dBA above maximum sound pressure level that lasts for 60 seconds, whichever is greater, in every occupied space, (it will be verified during the field test), and the sound pressure level rating of each audible device is noted adjacent each audible device on the plans, 7.4.2 and OFC 907.6.2.1.1.
108. ____ Fire alarm audible device design in private mode shall provide at least a minimum sound pressure level of 15 dBA above the average ambient sound pressure level or 5 dBA above maximum sound pressure level that lasts for 60 seconds, whichever is greater, (it will be verified during the field test), and the sound pressure level rating of each audible device is noted adjacent each audible device on the plans, 7.4.3 and OFC 907.6.2.1.1.
109. ____ Audible design: the device sound pressure level rating shall be not less than 75 dBA in R and I-1 occupancies, 90 dBA in mechanical rooms, 60 dBA in other occupancies and not more than 110 dBA, OFC 907.6.2.1.1 and 907.6.2.1.2.
110. ____ Audible design: in areas where average ambient noise level is greater than 95 dBA, visible signals are provided, OFC 907.6.2.1.2.
111. ____ Audible design: sleeping areas shall provide at least a minimum sound pressure level of 15 dBA above the average ambient sound pressure level or 5 dBA above maximum sound pressure level that lasts for 60 seconds or a sound pressure level of at least 75 dBA, whichever is greater, at the pillow, 7.4.4.1.

112. ____ For narrow band tone signaling the calculations, noise data, documentation and sound pressure design is in compliance with 7.4.5.
113. ____ The design for exit marking audible notification appliances is in compliance with 7.4.6.
114. ____ Exit marking audible notification appliances are located at each area of refuge and exit entrance such as exterior doors, exit discharge, interior stairs, exit passageway, fire escapes, horizontal exits, etc., 7.4.6.4.
115. ____ Audible design: visuals are permitted lieu of audible devices when approved by the AHJ and in accordance with 7.4.3.2.
116. ____ Audible design: devices are not less than 90 in. above the floor and are greater than 6 in. from the ceiling unless listed for ceiling mount, 7.4.6.1. Use mounting height criteria from 7.5.4 for audible/visible appliances, 7.4.7.3.
117. ____ Audible design: mounting heights different than noted in checklist item 116 is permitted if the sound pressure level requirements are met, 7.4.6.5.
118. ____ Audible design: the notification signal device is noted to be a three-pulse temporal pattern, 4.4.3.1, 6.8.6.5.1, and A.6.8.6.5.1.
119. ____ Audible design: speakers listed for notification use shall not be used for non-emergency use, consult the two exceptions, 6.8.4.5.
120. ____ Visual alarm notification appliances are provided in public and common areas, e.g. restrooms, meeting rooms and classrooms, hallways, and lobbies, OFC 907.6.2.3.1.
121. ____ Visual alarm notification appliances: when employee work areas are provided audible fire alarms then the fire alarm system is designed with at least an additional 20 percent capacity to permit the addition of visual alarm notification appliances in the future, OFC 907.6.2.3.2.
122. ____ Visual alarm notification appliances: listing data sheet indicates the flash rate does nor exceed 2 flashes per second, 7.5.2.1.
123. ____ Visual alarm notification appliances: details are provided that show wall mounting is between 80 in. and 96 in. above the floor level, 7.5.4 and ceiling mounting is in accordance with Table 7.5.4.3.1(b).
124. ____ Visual alarm notification appliances: device spacing and effective intensity (cd) for an area are in compliance with Fig. 7.5.4.3.1, Tables 7.5.4.3.1 (a, b), 7.5.4.3.1 and .2.
125. ____ Visual alarm notification appliances: for corridors with 2 or more devices that are in the field of view the devices shall be synchronized, 7.5.4.4.7.
126. ____ Visual alarm notification appliances: for corridors greater than 20 ft. wide, device spacing is in accordance with Tables 7.5.4.3.1 (a, b) and Figure 7.5.4.3.1, 7.5.4.4.4.
127. ____ Visual alarm notification appliances: devices in corridors are within 15 ft. of the ends of corridor and do not exceed 100 ft. separation, 7.5.4.4.5.
128. ____ Visual alarm notification appliances: sleeping area pillows are within 16 ft. of a device and devices mounted less than 24 in. from ceiling is 177 cd or for devices mounted greater than 24 in. from the ceiling are 117 cd, see Table 7.5.4.6.3, 7.5.4.4.
129. ____ Visual alarm notification appliances: in rooms with ceilings exceeding 30 ft. in height, ceiling visual devices will be suspended below 30 ft. or wall mounting and spacing shall be per Table 7.5.4.3.1(a). Center of room ceiling mounted visual device complies with Table 7.5.4.3.1(b), 7.5.4.3.6 and .7.
130. ____ A performance based design that provides at least 0.4036 lumens and is in compliance with 7.5.4.5 is permitted.
131. ____ Textual audible appliances meet the sound pressure level as required in 7.4.2, 7.4.3, and OFC 907.6.2.1.1, NFPA 7.8

Other requirements to be detailed on the plans:

130. ____ Miscellaneous: speaker amplifier, tone generating equipment, and emergency phone circuit integrity are monitored, 4.4.7.2.
131. ____ Miscellaneous: class A circuit wiring, out and back, is not routed in same conduit or raceway, 6.4.2.2.2.
132. ____ Miscellaneous: the sprinkler supervisory switch is connected to the fire alarm system; the audible signals shall be different between tamper switch and flow alarm, show how that is accomplished, 4.4.3.3 and 4.4.3.6.
133. ____ Voice alarm systems: a written sample of the evacuation message is submitted for approval, A.6.9.
134. ____ Voice alarm systems: speakers are listed for fire system use, 4.3.1.
135. ____ Voice alarm systems: speakers are located in compliance with Chapter 7, 6.9.7.
136. ____ Telephone communications: equipment is listed for two-way communication, 4.3.1., 6.10.1.1.
137. ____ Telephone communications: the design is in compliance with 6.10.1.1 through 6.10.1.16. Manufacturing data sheets are provided to verify the design and operational features.

138. ____ Telephone communications: the number of handsets provided for telephone jack systems are provided.
139. ____ Telephone communications: fire alarm fire emergency phone jack locations are shown on the plans.
140. ____ Telephone communications: the system can permit up to 5 phones to operate simultaneously, 6.10.1.6.
141. ____ Telephone communications: 2 or more phone handsets are in the command room for fire department use, 6.10.1.15.
142. ____ Wireless systems (low power radio) are listed for use and meet the requirements of 6.16.
143. ____ Relays or appliances used to initiate other fire safety functions are listed and within 3 ft. of the controlled circuit or appliance, 6.16.2.2.
144. ____ The wiring between the relay or appliance and FACU is supervised for integrity, 6.16.2.4.

Elevator Recall

145. ____ Elevator recall for firefighters is designed in accordance with 6.16.3.1 through 6.16.3.12.
_____ Smoke detectors in elevator lobbies, machine rooms, and shafts are connected to the FACU.
_____ Building without a fire alarm system: Smoke detectors in elevator lobbies, machine rooms, and shafts are provided a dedicated FACU, which is identified as the elevator recall control and supervisory control unit.
_____ Smoke detectors in elevator lobbies, machine rooms, and shafts initiate elevator recall unless otherwise permitted by the AHJ.
_____ Smoke detectors in elevator lobbies, machine rooms, and shafts shall annunciate at the FACU and anunnciator.
_____ Smoke detectors in machine rooms and shafts have distinct visual annunciation at the FACU.
_____ The designated and alternate recall levels are provided.

Additional Comments:

Review Date: _____ Approved or Disapproved FD Reviewer: _____

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Review Date: _____ Approved or Disapproved FD Reviewer: _____

Voltage Drop Calculations for Notification Appliance Circuit (NAC): _____

Each NAC shall have its voltage drop determined. This sheet shall be used for one NAC but every NAC should have a sheet completed and submitted with each permit application.

STEP 1: complete the following to provide data for determining the resistance of the conductor in Step 2

Wire length is from fire alarm control panel to the end of the fire alarm circuit = _____ ft. X 2 = _____ ft.

Wire Size = # _____ AWG (American Wire Gauge)

Resistance (R) = _____ OHMS for a given 1,000 ft. of the conductor specified

Step 2: complete the following to determine the total resistance (OHMS) for a NAC

(R) = Total Wire Resistance

From Step 1 divide the OHMS by 1,000, which will convert the conductor resistance to OHMS in each linear foot of wire

Determine OHMS per foot = $\frac{_____}{1,000}$ ft. = _____ OHMS/ft.

Take the total feet of wire from Step 1 and OHMS/ft. from the line above and put both in the equation below

Circuit resistance = _____ ft. X ____ OHMS/ per ft. = _____ (R) Total OHMS

Step 3: complete the following to determine the total alarm notification device amperage and devices may be rated in milliamps

(I) = Alarm Appliance Amperage

A. No. of Alarm Appliances = _____ B. Current amperage each_____ = A x B _____ (I)

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Total _____ (I)

Step 4: complete the following to determine the total voltage drop for the branch circuit

Voltage (E) = (I) X (R) from totals in Steps 2 and 3 above

(E) = _____ (I) X _____ (R)

= _____ (E) (shall not exceed 4.4)

Step 5: complete the following to determine if enough voltage is available to operate fire alarm notification devices

Maximum allowable voltage drop: notification devices cannot drop below their Nameplate Operating Voltage (NOV) range. As of 5/1/2004 UL required indicating devices to operate within their NOV. The UL NOV standard is 16VDC to 33VDC, consult the 2002 NFPA 72 Handbook 7.3 for more information. Fire Alarm Control Units (FACU) are tested to UL 864 and are required to operate at the end of useful battery life, 20.4 V.

Allowable voltage drop is 20.4 V (FACU) - 16 VDC (NOV) = 4.4 V

If (E) from Step 4 exceeds 4.4 V then the NAC is not compliant with NFPA 72

Take (E) from Step 4 and put in the equation below

Voltage Drop = 20.4 V - (E) = V (shall not be less than 16V)

Fire Alarm System Acceptance Inspection

2010 OFC and 2007 NFPA 72

This checklist is for jurisdictions that permit the use of the 2007 NFPA 72 in lieu of IFC's referenced 2002 NFPA 72.

Date of Inspection: _____ Permit Number: _____

Business/Building Name: _____ Address of Project: _____

Contractor: _____ __Contractor's Phone: _____

Reference numbers following checklist statements represent an NFPA code section unless otherwise specified.

Pass	Fail	NA	General
1.____	____	____	Obtained a copy of the fire alarm installation certification and a Record of Completion from installer, 4.5.2.1.
2.____	____	____	Approved plans are on site.
3.____	____	____	Fire alarm control unit (FACU) and remote annunciator (RA) are installed consistent with approved plans, 4.4.6.1.1. and 7.10.
4.____	____	____	A zone and legend map is provided at the RA or an approved location.
5.____	____	____	Fire alarm zones are properly identified on the FACU and RA panels.
6.____	____	____	The fire alarm system power supply is a dedicated 120 AC branch circuit, which is labeled, 4.4.1.4.2.2.
7.____	____	____	Type and gauge of wire or cable(s) for each circuit are consistent with the plans.
8.____	____	____	Device location and installation are consistent with the plans.
9.____	____	____	Pull stations are installed at the proper height and location, 42 in. to 48 in. and within the 200 ft. maximum travel distance, 5.13 and OFC 907.5.2.1, .2.
10.____	____	____	A Contractor Sound Pressure Level (dBA) Pretest Room Log is provided and verified with the use of a sound meter during a sound pressure test.
Operational			
11.____	____	____	Fire alarm audible notification devices sound throughout the occupancy providing a sound pressure level at least a minimum of 15 dBA above the average ambient noise level or 5 dBA above the maximum noise level. For bedrooms with closed door provide at least 75 dBA at the pillow, 7.4.4.1,OFC 907.6.2.1.1.
12.____	____	____	Fire alarm audibles are a three-pulse temporal pattern unless they were permitted to match existing audible devices, 6.8.6.5.1.
13.____	____	____	Fire alarm visual notification device intensity (cd) ratings and settings, mounting height (80 in. to 96 in.), and location, are consistent with the plans, 7.5.4.1. Audible devices mounted at least 90 in. and combination audible/visual devices 80 in. to 96 in., 7.4.7.
14.____	____	____	Fire alarm voice notification is tested and documentation provided to verify it is distinguishable and understandable, Table 10.4.2.2.15(b).
15.____	____	____	Fire alarm notification devices will activate by operation of the sprinkler flow alarm.
16. ___	____	____	HVAC duct detectors are supervised by the fire alarm system, detectors are all tested to verify if it can sample the air stream, and that fans shutdown and visual and audible status alarm functions, Table 10.4.2.2.14(g).
16.____	____	____	24 hour monitoring service agency received various signals during system tests.
17.____	____	____	Verify that the correct and distinctive signals are received (alarm, trouble, and supervisory alarms), 4.4.3.3, 10.4.1.1
18.____	____	____	Two monitoring circuits are provided, both circuits send correct signals to monitoring company within 90 seconds, Table 10.4.2.2.16.
19.____	____	____	Verify proper operation of magnetic door-releasing hardware and/or ventilation shutdown.
20.____	____	____	Sprinkler tamper switch causes trouble light and buzzer indication at the annunciator panel only (tamper and flow alarm are different type signals).
21.____	____	____	Fire alarm emergency phone jacks, if provided, are operational.
22.____	____	____	For air sampling and flame detectors, test the device in accordance with the manufacturer instructions.
23.____	____	____	Resettable heat and smoke detectors, and pull stations are tested (5 to 10 percent sample of the total).
24.____	____	____	Trouble condition is created for each circuit and the FACU responses appropriately.
25.____	____	____	Remote annunciator receives the correct information.

26. ____ | ____ |____ Battery load test: the system is switched to battery operation 24 hours before the test and in the presence of the inspector the notification devices are activated and operate for 5 to 8 minutes or 15 minutes for emergency voice alarms.
27. ____ | ____ |____ Check battery charger, measure load voltage, and open circuit voltage.
28. ____ | ____ |____ Test ground-fault monitoring circuit, if provided.
29. ____ | ____ |____ Under primary and secondary power, perform these tests:
____ | ____ |____ A. power light on and in normal condition, trouble signal when on secondary power
____ | ____ |____ B. supervisory signals: fire pump power loss or phase reversal, water level/temp, pressure switches, control valves, etc.
____ | ____ |____ C. silence switch functions
____ | ____ |____ D. a 2nd alarm initiating zone overrides silence switch
____ | ____ |____ E. trouble signals and FACU panel lights operate for each circuit tested; disconnect wires from devices and primary power supply to simulate trouble conditions
____ _____ ____ F. on secondary power, measure standby and alarm current demand
____ | ____ |____ G. trouble and alarm reset switches operate
____ | ____ |____ H. emergency voice alarms: the message is clear and distinct
____ | ____ |____ I. initiating devices tested, audible sound pressure levels, and visuals operate
____ | ____ |____ J. panel lamp test switch operates: if provided
____ | ____ |____ K. field zones and device address signals corresponded with panel zones and addresses
____ | ____ |____ L. elevator(s) recall to designated floor and alternate floor in accordance with the Elevator Code
30. ____ | ____ |____ Other systems activate fire alarm: kitchen hood suppression system, clean agent, HVAC duct detectors, etc.
31. ____ | ____ |____ As-builts are required when system installation is not consistent with the plans.
32. ____ | ____ |____ Circuit loop resistance is within specifications and a test may be required if the system wiring has changed from the plans.
33. ___ | ____ |____ Time from activating an initiating device to activation of a safety function or notification shall not exceed 10 seconds.
34. ___ | ____ |____ Heat and spot smoke detectors are not within 4 in. of the sidewall, or if on the sidewall, the detector is 4 in. to 12 in. from the ceiling, 5.6.3.1, 5.7.3.2.1.
35. ___ | ____ |____ Visual devices in a room or adjacent space with more than 2 devices within the field of view the flash are synchronized, 7.5.4.1.2(3). Devices in a corridor with more than 2 devices within the field of view and a maximum spacing of 100 ft., are synchronized, 7.5.4.2.5 and 7.5.4.2.7.
36. ___ | ____ |____ Visual devices are wall mounted 80 in. to 96 in. above the floor level unless otherwise permitted by the approved plans and AHJ, 7.5.4.1.
37. ___ | ____ |____ Supplemental (extra) visual devices are permitted to be mounted less than 80 in. above the floor, 7.7.2.
38. ___ | ____ |____ Ceiling mounted devices are listed for use and spaced in accordance with Table 7.5.4.1.1(b) and the approved plans.

*Note: additional testing criteria is found in NFPA 72: Chapter 10.

Additional Comments

Inspection Date: _____ Approved or Disapproved FD Inspector: _____

Inspection Date: _____ Approved or Disapproved FD Inspector: _____