

Overview of Fire Alarm Provisions – Based on the 2012 IBC, IFC and NFPA 72, 2013 Edition

Primarily based on Section 907
Portions of Section 903 and 909 are included.
Portions of Chapter 10 are included.
Portions of Chapter 11, Section 1103.7 are included.

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Accreditation

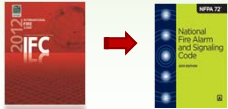


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Objectives

- Upon completion of this fire alarm seminar, participants will gain knowledge of the background and intent of Section 907, Fire Alarm and Detection Systems.
- Participants will also be provided with references from the IFC to NFPA 72.



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Housekeeping

- Know how to exit the building. You got in, you should be able to get out.
- If the fire alarm should operate; get out now.
- Electronic gizmos and gadgets – turn them off or put them on vibrate.
- No video or audible recording is allowed.
- Be comfortable. Short breaks on the hour.
- PARTICIPATE – Ask Questions.

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Section 907 – Fire Alarm and Detection Systems

- 907.1 General requirements including: “The requirements of Section 907.9 are applicable to existing buildings and structures”. (New section 907.9 in 2012 IFC). Refers to Chapter 11 for existing buildings and structures. *

*You'll see the Chapter 11 requirements later in the presentation.

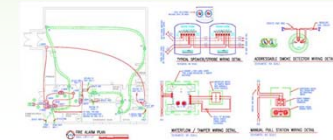


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Section 907 – Fire Alarm and Detection Systems

- 907.1.1 Construction documents.
- 907.1.2 Fire alarm shop drawings.
 - Shop drawings for fire alarm systems shall be submitted for review and approval prior to system installation, and shall include, but not be limited to, all of the following:



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Section 907 – Fire Alarm and Detection Systems

- A floor plan that indicates the use of all rooms.
- Locations of alarm-initiating devices.
- Locations of alarm notification appliances, including candela ratings for visible alarm notification appliances.
- Location of fire alarm control unit, transponders and notification power supplies.



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Section 907 – Fire Alarm and Detection Systems

- Annunciators.
- Power Connection.
- Battery calculations.
- Conductor type and sizes.
- Voltage drop calculations.
- Manufacturers' data sheets indicating model numbers and listing information for equipment, devices and materials.

SPECIFICATIONS	
Primary AC	120VAC @ 1.0 Amps @ 60 Hz or Primary @ 1 Amps @ 50 Hz
Control AC	240VAC @ 1.0 Amps @ 60 Hz or 240VAC @ 1.0 Amps @ 50 Hz
Power Supply	120V AC, 1.0 Amps @ 60 Hz or 240V AC, 1.0 Amps @ 50 Hz
Charge Control	1.0 Amps @ 60 Hz or 1.0 Amps @ 50 Hz
Connections	1/2" or 3/4" or 1" or 1 1/2"
Wiring	1/2" or 3/4" or 1" or 1 1/2"
Color	Red (signal/transfer)
Material	Approved materials
Quantity	As shown on drawings (100' standard length)
Notes	1. All wiring shall be in accordance with the applicable code.
Notes	2. All wiring shall be in accordance with the applicable code.
Notes	3. All wiring shall be in accordance with the applicable code.
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Section 907 – Fire Alarm and Detection Systems

- 11. Details of ceiling height and construction.
- 12. The interface of fire safety control functions.
- 13. Classification of the supervising station.



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Section 907 – Fire Alarm and Detection Systems

- **907.1.3 Equipment.** Systems and components shall be listed and approved for the purpose for which they are installed.



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Section 907 – Fire Alarm and Detection Systems

- **907.2 Where Required – new buildings and structures.**
 - In accordance with 907.2.1 through 907.2.23.
 - Occupant notification per Section 907.5.
 - At least one manual fire alarm box.
 - Two Exceptions for the one manual box.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.1 Group A.**
 - Manual system for occupancy of 300 or more.
 - Occupant notification includes both audible and visible, but is non-voice.
 - Proper separation = separate occupancies. New. (See IBC Section 707.3.9 next slide.)
 - Portions of Group E used for assembly shall be provided with the required Group E system.
 - Exception to manual boxes.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.1 Group A.

- IBC 707.3.9 Separation
 - The fire barrier separating mixed occupancies shall have a fire-resistance rating not less than that shown in Table 508.4.
- 508.4.4.1 Construction.
 - Fire barrier separations per IBC 707 or horizontal assemblies in accordance with IBC 711, or both.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.1.1 Group A

- Manual system for occupancy of 1000 or more. Occupant notification includes visibles, but audible is Emergency (EVAC) per 907.5.2.2.
- Exception for deactivation of prerecorded message
- **907.2.1.2 EVAC captions. New.**
 - Stadiums, arenas, and grandstands required to caption audible announcements per 907.5.2.2.4.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.1.1 Group A

- 907.5.2.2.4. Emergency voice/alarm communications captions.
- Where 1108.2.7.3 applies, the EVAC system shall also provide captioning.
- 1108.2.7.3. Where the venue has 15,000 or more fixed seats, and provide audible p.a. announcements, they shall also provide prerecorded or real-time captions of those audible public announcements.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.2 Group B

- Manual system required when one of the following conditions exist:
 1. Combined occupant load; all floors = 500 or >
 2. Occupant load > than 100 above or below the lowest level of exit discharge.
 3. Fire area contains an ambulatory care facility.Exception for manual boxes when sprinkled.
New.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.2.1 Ambulatory care facilities.**
 - Fire areas containing ambulatory care facilities require a smoke detection system with the facility and in public use areas outside of tenant spaces, including public corridors and elevator lobbies.
 - Exception to smoke detection if sprinkled.



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Section 907 – Fire Alarm and Detection Systems

- **202 General Definitions. [B] FIRE AREA.**
 - The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or horizontal assemblies of a building. Areas of the building not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor next above.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.3 Group E**
 - Manual fire alarm system
 - Occupant notification is EVAC meeting 907.5.2.2.
 - When automatic sprinkler systems or smoke detectors are installed, they shall be connected to the building fire alarm system. New and rewritten.
 - 3 Exceptions for manual boxes as follows:



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Section 907 – Fire Alarm and Detection Systems

1. Manual system is exempt when 30 or < occupants.
2. Manual boxes not required when 2.1 – 2.3 apply.
 - 2.1 Interior corridors have smoke detectors.
 - 2.2 Auditoriums, cafeterias, gymnasiums and similar areas have heat detectors or other approved detection devices.
 - 2.3 Shops and laboratories with dusts or vapors have heat detectors or other approved detection devices.



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Section 907 – Fire Alarm and Detection Systems

3. Manual boxes are not required (*throughout) the building when equipped with a sprinkler system, the EVAC system (NEW) will activate on sprinkler flow and manual activation is provided from a normally occupied location.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.4 Group F.**
- Manual system for occupant notification required when both of the following conditions exist:
 1. The occupancy is two or more stories; and
 2. Combined occupant load of 500 or more above or below the lowest level of exit discharge.
- Exception: Manual boxes when sprinkled and the Occupant notification appliances will activate upon water flow.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.5 Group H**
 - Manual system with occupant notification in H-5 and occupancies manufacturing organic coatings. *See Chapter 29, Section 2903.11; Organic Coatings. Smoke detection system shall be installed for highly toxic gases, organic peroxides and oxidizers per Chapter 60, 62 and 63 respectively.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.6 Group I (*General)**
 - Manual system with occupant notification.
 - Smoke detection system with occupant notification per 907.2.6.1, 907.2.6.2 and 907.2.6.3.3.
 - Exceptions:
 1. Manual boxes in sleeping units of I-1 and I-2 shall not be required at exits if located at all care providers' control stations or other constantly attended staff locations.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.6 Group I

- Exceptions: (con't)
 1. Stations shall be visible and accessible and travel distances shall not be exceeded. (200 ft.)
 2. Occupant notification is not required to be activated where private mode signaling per NFPA 72 is approved by the fire code official.



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Chapter 18 Notification Appliances



- 18.4.1.4.1 Designated audible areas
- 18.4.2.1 Temporal III used for more than evacuation
- **18.4.4 Private Mode Audible Requirements**
- 18.5.5.2 Strobe mounting alternatives
- 18.9 Textual and Graphical Visible Appliances



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.6.1 Group I-1

- Automatic smoke detection is required:
 - In corridors;
 - In waiting areas open to corridors;
 - Habitable spaces other than sleeping units; and kitchens.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.6.1 Group I-1

- Automatic smoke detection is required.
 - Exceptions:
 1. Where the facility is sprinkled throughout
 2. Exterior balconies
- **907.2.6.1.1 Smoke alarms.**
 - Single- and multiple-station smoke alarms installed Per 907.2.11.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.6.2 Group I-2**
- Automatic smoke detection is required:
 - In corridors in nursing homes;
 - In long-term care facilities;
 - Detoxification facilities;
 - Spaces open to the corridors (per IBC 407.2).
- Hospitals shall be equipped with smoke detection as required in IBC Section 407.



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Section 907 – Fire Alarm and Detection Systems

- **IBC Section 407**
- Some of the smoke detection requirements in 407.
 - Waiting and similar areas
 - Psychiatric treatment areas
 - General reference to 907.2.6.2



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Section 907 – Fire Alarm and Detection Systems

- Exceptions (to smoke detection):
 1. Total coverage corridor smoke detection is not required when sleeping units are provided with UL 268 (system connected) smoke detectors and, detection provides a visible indication on the corridor side of each sleeping room and provide audible and visible at the appropriate nurse (care provider) station.



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Section 907 – Fire Alarm and Detection Systems

- Exceptions (to smoke detection):
 2. Total coverage corridor smoke detection is not required when sleeping units are provided with combination smoke detector and door holder/closer on the patient side of the door and, detection provides the required alerting function(s).



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Section 907 – Fire Alarm and Detection Systems

- **907.2.6.3 Group I-3 occupancies.**
 - Manual fire alarm system
 - Automatic smoke detection system
- **907.2.6.3.1 System initiation.**
 - Automatically notify staff from actuation of:
 - Automatic fire-extinguishing system
 - Automatic sprinkler system
 - Manual fire alarm box
 - Fire detector



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Section 907 – Fire Alarm and Detection Systems

- **907.2.6.3.2 Manual fire alarm boxes.**
 - Box locations are not required per Section 907.4.2 if staff attended locations have direct supervision over areas the boxes have been omitted.
- **907.2.6.3.2.1 Manual fire alarm boxes in detainee areas.**
 - Boxes are allowed to be locked in these areas, provided staff are present in the area and have keys readily available to operate the boxes.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.6.3.3 Automatic smoke detection system.**
 - Installed throughout resident housing areas
 - Installed in sleeping units and contiguous day rooms
 - Installed in group activity spaces
 - Installed in other common spaces accessible to the residents



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Section 907 – Fire Alarm and Detection Systems

- Exceptions: (to smoke detection locations)
 1. Other...equivalent protection such as placing detectors in exhaust ducts from cells or behind protective (listed) guards to prevent damage or tampering.
 2. Sleeping units in Use conditions 2 and 3 per IBC Section 308.
 3. Sleeping units with 4 or fewer in smoke compartments sprinklered throughout.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.7 Group M.**
- Manual system is required where one of the following conditions exists:
 1. The combined occupant load of all floors is 500 or more persons.
 2. The occupant load is more than 100 persons above or below the lowest level of exit discharge.



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Section 907 – Fire Alarm and Detection Systems

- Exceptions:
 1. Manual is not required in covered or open mall buildings complying with IBC Section 402 which require sprinklers throughout and Emergency Voice/Communications.
 2. Manual boxes are not required where the Group F is sprinklered throughout and automatically activates occupant notification.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.7.1 Occupant Notification.**
 - When occupied, initiation from a manual box or from a waterflow switch is not required to activate alarm notification appliances; when an alarm signal is provided at a constantly attended location from which evacuation instructions from an EVAC system shall be initiated, per 907.5.2.2.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.8 Group R-1. Requires a fire alarm system and smoke alarms.**
- 907.2.8.1. Manual fire alarm activates occupant notification. Two exceptions for manual initiation.
- 907.2.8.2. Automatic smoke detection system. Install in interior corridors serving sleeping units and activate occupant notification. One exception in corridors.
- 907.2.8.3. Requires single- or multiple-station smoke alarms per 907.2.11.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.9 Group R-2.** Requires a fire alarm system and smoke alarms.
- **907.2.9.1.** Manual fire alarm activates occupant notification where:
 1. Any unit is three or more stories above the lowest level of exit discharge.
 2. Any unit is more than one story below the highest level of exit discharge of exits serving the unit; or
 3. The building contains more than 16 dwelling or sleeping units.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.9.1 Manual System**
- Exceptions:
 1. Buildings not more than 2 stories, with at least one hour separation and exiting from each unit.
 2. Manual boxes not required when sprinklered throughout with waterflow initiated notification.
 3. System not required if no interior corridors and sprinklered, with proper exiting per Section 1026.6, Exception 4.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.9.2 Smoke alarms.** Requires single- and multiple-station smoke alarms per 907.2.11.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.9.3 Group R-2 college and university buildings. (NEW)**
 - Smoke detection system activating notification installed in the following locations:
 1. Common spaces outside dwelling and sleeping units.
 2. Laundry, mechanical equipment and storage rooms.
 3. Interior corridors serving dwelling and sleeping units.
- Smoke alarms in units shall be interconnected with the fire alarm system in accordance with NFPA 72.



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Chapter 29



- **29.8.2.2 (5)** When Alarms of different types are interconnected, all interconnection alarms shall produce the appropriate audible response for the phenomena being detected or remain silent.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.9.3 (New) Exception:**
- Smoke detection system is not required if there are no interior corridors serving sleeping or dwelling units and where each unit has proper exiting components.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.10 Group R-4.**
 - A fire alarm system providing occupant notification and smoke alarms are required.
- **907.2.10.1 Manual fire alarm system.**
 - Exceptions:
 1. Not required when less than three stories and 1-hour separation and proper exiting is provided.
 2. Omit boxes when sprinklered activating notification and at least one box is installed.



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- **Exceptions:**
 3. Omit manual boxes in resident and patient sleeping areas located at exits where a box is located at all nurses' control stations or other constantly attended staff locations. Stations shall be visible and continuously accessible. Travel distance to a box shall not exceed 200 (horz) feet.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.10.2 Automatic smoke detection system.**
- Activates occupant notification
- Installed in corridors, waiting areas open to corridors
- Installed in habitable spaces other than sleeping units and kitchens.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.10.2 Automatic smoke detection system.**
 - Exceptions:
 1. Detection in habitable spaces where sprinklers are installed throughout.
 2. Detection is not required in buildings without interior corridors serving sleeping units with proper exiting components.
- **907.2.10.3 Smoke Alarms.** Single- and multiple-station alarms installed per Section 907.2.11.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.11 Single- and multiple-station smoke alarms.**
 - Comply with UL 217 and NFPA 72
 - 907.2.11.1 Group R-1.
 - 907.2.11.2 Groups R-2, R-3, R-4 and I-1.



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Single- and Multiple-Station Alarms & Household Fire Alarm Systems – Chapter 29



- 29.1.1 The performance, selection, installation, operation and use of single- and multiple-station alarms and household fire alarm systems shall comply with the requirements of this chapter.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.11.3 Interconnection.

- Where more than one smoke alarm is required within the unit, the smoke alarms shall be interconnected in such a manner that activation of any one, shall activate all alarms in the individual unit. Wireless interconnection is acceptable providing all alarms operate upon activation of any one alarm. The alarm shall be clearly audible in all bedrooms over ambient noise with intervening doors closed.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.11.4 Power source.

- In new construction, alarms shall receive primary power from building wiring served from a commercial source and shall include battery backup. Alarms with strobes and without battery back-up shall be connected to an emergency electrical system. A low battery signal is required. No disconnect switch other than overcurrent protection (circuit breaker). (Wall switches).
- **Exception:** No battery backup when connected to an emergency electrical system.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.12 Special amusement buildings.

- Smoke detection system required. Activation of any smoke detector, sprinkler flow switch or other automatic device shall immediately activate an audible and visible alarm at that building at a constantly attended location from which action can be initiated either automatically or manually in accordance with Section 907.2.12.2.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.12.2 System response.

- Activation of two or more smoke detectors, or one detector with alarm verification feature, the sprinkler system, or other approved fire detection device shall automatically: (provide the following):



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Section 907 – Fire Alarm and Detection Systems

1. Illumination of the means of egress; not less than 1 footcandle;
2. Stop conflicting or confusing sounds and visual distractions;
3. Activate directional *exit* marking; and
4. Activate a prerecorded message, audible throughout the building, instructing patrons to proceed to the nearest exit. Produce a sound which is distinctive from sounds used during the performance.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.12.3 Emergency voice/alarm communications.**
- An EVAC system, which is allowed to be used as a public address system, shall be installed and be audible (and intelligible) throughout the special amusement building.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.13 High-rise buildings.**
- High-rise buildings shall include:
 - Smoke Detection System – 907.2.13.1
 - Fire Department Communication System 907.2.13.2
 - Emergency Voice/Communication System 907.5.2.2



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Section 907 – Fire Alarm and Detection Systems

- Exceptions:
 1. Air traffic control towers; 907.2.22, IBC 412
 2. Open parking garages; IBC 406.5
 3. Buildings containing A-5; IBC 303.1
 4. Low-hazard spcl. occupancies; IBC 503.1.1
 5. Buildings containing H-1, H-2, H-3; IBC 415
 6. Group I-1 and I-2 shall sound at a constantly attended location. Occupant notification shall be by the EV/AC system.



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Section 907 – Fire Alarm and Detection Systems

▪ 907.2.13.1.1 Area smoke detection.

- Smoke detectors shall be connected to an automatic fire alarm system.
- Operation shall activate the EV/AC system in accordance with Section 907.5.2.2.
- In addition to “other” smoke detectors required by Sections 907.2.1 through 907.2.10, detectors shall be located as follows:



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1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room which is not sprinkled.
2. In each elevator machine room and in elevator lobbies.



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Section 907 – Fire Alarm and Detection Systems

▪ [M] 907.2.13.1.2 Duct smoke detection.

- **Note:** The following text is not verbatim from the IMC. Duct smoke detectors complying with Section 907.3.1 shall be located as follows:
 1. In the main return and exhaust air plenum of each air-conditioning system having greater than 2,000 cubic feet per minute (cfm). The detectors shall be located for service in an area downstream of the last duct inlet.



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Section 907 – Fire Alarm and Detection Systems

2. At each connection to a vertical duct or riser serving two or more stories from a return air duct or plenum or an air-conditioning system.
In Group R-1 and R-2 occupancies, a smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm and serving not more than 10 air-inlet openings.



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907.2.13.2 Fire department communication system.

Where a wireless system is installed, it shall be designed and installed per NFPA 72 and operated between a *fire command center*, elevators, elevator lobbies, emergency and standby power rooms, areas of refuge and inside enclosed *exit stairways*. The communication device shall be provided at each floor level within the enclosed *exit stairway*.



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Chapter 27 - Public Emergency Alarm Reporting Systems



- 27.5.5 Wireless Network
 - 27.5.5.1. System Arrangements and Operation.
 - 27.5.5.2. Power.
 - 27.5.5.3. Monitoring for Integrity.
 - 27.5.5.4. Physical Protection of Transmission Line.



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Section 907 – Fire Alarm and Detection Systems

907.2.14 Atriums connecting more than two stories.

- A smoke detection fire alarm system shall be installed throughout the atrium. Occupant notification shall be activated per 907.5. In Group A, E or M, notification shall be by an emergency voice/alarm communication system per 907.5.2.2.



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Section 907 – Fire Alarm and Detection Systems

- 907.2.15 High-piled combustible storage areas.
 - Smoke detection in accordance with Table 3206.2.
- 907.2.16 Aerosol storage uses.
 - Manual system in storage rooms and general-purpose warehouses. *Ref. Chapter 51.
 - Fire doors or gates opening into segregated areas shall be self-closing or auto-closing by sprinkler water flow or an approved fire detection system. See 5104.6.3.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.17 Lumber, wood structural panel and veneer mills.** Provide a manual fire alarm system.
 - **2804.2 Fire alarms.** A means for transmitting an alarm to the fire department shall be provided in timber and lumber production mills, plywood and veneer mills.
 - **2804.2.1 Manual fire alarms.** ...install in areas of timber and lumber production mills, plywood and veneer mills that contain product dryers.
 - Exception: Where dryers are protected by a supervised sprinkler system complying with Section 903.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.18 Underground buildings with smoke control systems.** Smoke detection provided in accordance with Section 907.2.18.1.
 - **907.2.18.1 Smoke detectors.**
 - A minimum of one smoke detector shall be installed in:
 1. Mechanical equipment, electrical, transformer, telephone equipment, elevator machine or similar rooms.
 2. Elevator lobbies
 3. Main return and exhaust air plenum of each system serving more than one story; downstream of last duct inlet.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.18 Underground buildings with smoke control systems.** Smoke detection provided in accordance with Section 907.2.18.1. (cont')
 - **907.2.18.1 Smoke detectors.**
 - A minimum of one smoke detector shall be installed in:
 4. Each connection to a vertical duct or riser serving two or more floors from return air ducts or plenums of HVAC systems.
 - Exception for Group R occupancies less than 5,000 cfm and serving not more than 10 air inlet openings.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.18 Underground buildings with smoke control systems.** Smoke detection provided in accordance with Section 907.2.18.1.
 - **907.2.18.2 Alarm required.**
 - Smoke control system activation shall operate an audible alarm at a constantly attended location.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.19 Deep underground buildings.**
 - Where the lowest level of the structure is more than 60 feet below the finished floor of the lowest level of exit discharge, the structure shall be equipped throughout with a manual fire alarm system, including an emergency voice/alarm communication system installed in accordance with 907.5.2.2.
 - *But, no smoke detection and no smoke control.
 - ***Does anyone have one of these?



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Section 907 – Fire Alarm and Detection Systems

- **907.2.20 Covered and open mall buildings. (New)**
 - Where total floor area exceeds 50,000 sq. ft. within either a covered mall building or within the perimeter line of an open mall building, an EV/AC system shall be provided in accordance with 907.5.2.2. EV/AC systems serving a mall, required or otherwise, shall be accessible to the fire department.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.21 Residential aircraft hangers.**
 - A minimum of one single-station smoke alarm shall be installed within a residential hanger as defined in the International Building Code and be interconnected to the residential smoke alarm to provide an audible alarm in all sleeping areas of the dwelling.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.22 Airport traffic control towers.**
 - A smoke detection system that activates occupant notification shall be provided in all occupiable and equipment spaces.
 - Exception: Audible appliances shall not be installed in the control tower cab.



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Section 907 – Fire Alarm and Detection Systems

- **907.2.23 Battery rooms.**
 - An automatic smoke detection system is required in areas containing storage battery systems with more than 50 gallons liquid capacity. *There is no reference to occupant notification.



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Section 907 – Fire Alarm and Detection Systems

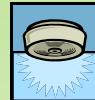
- **907.3 Fire safety functions.**
 - Automatic fire detectors shall be connected to any 907.2 installed building fire alarm system and perform the initiation of the intended function(s) including occupant notification or operate an audible and visible supervisory signal at a constantly attended location. Detectors shall be located in accordance with NFPA 72.



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Initiating Devices Heat-Sensing Fire Detectors



17.6.3. Location and Spacing

- 17.6.3.1. Smooth Ceiling
- 17.6.3.2. Solid Joist Construction
- 17.6.3.3. Beam Construction
- 17.6.3.4. Sloping Ceilings



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Section 907 – Fire Alarm and Detection Systems

- 907.3 Fire safety functions.
 - 907.3.1 Duct smoke detectors.
 - 907.3.2 Delayed egress locks.
 - 907.3.3 Elevator emergency operation.
 - 907.3.4 Wiring.



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Section 907 – Fire Alarm and Detection Systems

- **907.3.1 Duct smoke detectors.**
 - Listed for air velocity, temperature and humidity in the duct.
 - Connected to a 907.2 building fire alarm control unit when required.
 - Provide a visible and audible supervisory signal at a constantly attended location.
 - Perform required function(s) IAW this code and the International Mechanical Code.



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Section 907 – Fire Alarm and Detection Systems

- **907.3.1 Duct smoke detectors.**
 - Exceptions:
 1. A supervisory signal is not required where duct detectors activate occupant notification appliances.
 2. In buildings without a fire alarm system, the smoke detectors will activate an audible and visible signal in an approved location as well as a smoke detector trouble condition identified as air duct detector trouble.



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Section 907 – Fire Alarm and Detection Systems

- **907.3.1 Duct smoke detectors.**
 - Other relevance:
 - Access per 2012 NFPA 90A – 4.3.5.1
 - Access per 2013 NFPA 72 – 21.7.4, 21.7.4.1, 21.7.4.2 and 17.7.5.5.3
 - Where located per 2013 NFPA 72 – 17.7.5.3.1 and 17.7.5.4.2.2
 - Shutdown per 2012 IMC – Section 606



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Section 907 – Fire Alarm and Detection Systems

- **907.3.2 Delayed egress locks.** Where installed, automatic smoke or heat detectors shall be installed as required by Section [B] 1008.1.9.7.
- **[B] 1008.1.9.7** ...permitted in buildings equipped with an automatic sprinkler system or an approved automatic smoke or heat detection system... Unlock in accordance with Items 1 through 6.



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Section 907 – Fire Alarm and Detection Systems

- **[B] 1008.1.9.7 (continued)**
 1. ...actuation of the automatic detection system.
 2. ...upon loss of power to the lock or mechanism.
 3. ...doors can be unlocked from the fire command center.
 4. ...15 second retard for release. Exc. for 30 secs.
 5. Placard required to read, "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.
 6. Emergency lighting provided at the door.



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Section 907 – Fire Alarm and Detection Systems

- **907.3.3 Elevator emergency operation.**
 - Automatic fire detectors shall be installed in accordance with A17.1 and NFPA 72.
- **907.3.4 Wiring.**
 - Wiring to accomplish the above fire safety functions shall be monitored for integrity in accordance with NFPA 72.



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Chapter 21



- **21.3.7 Elevator pit sprinklers trigger detection**

When sprinklers are installed in elevator pits, automatic fire detection shall be installed to initiate elevator recall.



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Section 907 – Fire Alarm and Detection Systems

- **907.4 Initiating devices.** Install as follows:
 - **907.4.1 Protection of fire alarm control unit.** Detector.
 - **907.4.2 Manual fire alarm boxes.** Per 907.4.2.1 – 907.4.2.5
 - **907.4.2.1 Location.** Within 5 feet from the entrance to each exit. (72-17.14.8.4) ...on each floor. Horizontal travel not to exceed 200 feet. (72-17.14.8.5)
 - **907.4.2.2 Height.** 42 to 48 inches to the operating mechanism above finished floor. (72-17.14.8.6)
 - **907.4.3 Color.** Manual boxes shall be red.



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Section 907 – Fire Alarm and Detection Systems

- **907.4.2.4 Signs.** Systems not monitored off-premises shall be permanently placarded: WHEN ALARM SOUNDS – CALL FIRE DEPARTMENT. Exception to signage.
- **907.4.2.5 Protective covers.** Intended to avoid malicious alarms and physical damage. Transparent cover to allow visibility of the manual box. A protective cover that emits a local alarm signal shall be approved prior to installation. Covers shall not project more than permitted by Section 1003.3.3.



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Section 907 – Fire Alarm and Detection Systems

- **1003.3.3 Horizontal projections.**
Structural elements, fixtures or furnishings shall not project horizontally from either side in the means of egress more than 4 inches.



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- **907.4.2.6 Unobstructed and unobscured.** Manual boxes shall be accessible and visible at all times.



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Section 907 – Fire Alarm and Detection Systems

- **907.4.3 Automatic smoke detection.**
 - Ambient conditions may require heat detectors.
- **907.4.3.1 Automatic sprinkler system.**
 - Under the above condition, a sprinkler system that activates the fire alarm system shall be approved as an alternate to the required heat detectors.



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Section 907 – Fire Alarm and Detection Systems

- **907.5 Occupant notification systems.**
 - Shall annunciate at the F.A. Control unit
 - Shall initiate occupant notification in accordance with 907.5.1 – 907.5.2.3.4.
- Activated by:
 1. Automatic fire detectors
 2. Waterflow switches [(vane type) & (pressure switches)]
 3. Manual boxes
 4. Automatic fire-extinguishing systems
 - Exception: annunciation at constantly attended location



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Section 907 – Fire Alarm and Detection Systems

- **907.5.1 Presignal feature.**
 - “Only when approved ... at a constantly attended location.” *Ref: 2013 NFPA 72 – 23.8.1.2.2 Allows a one-minute delay.



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Section 907 – Fire Alarm and Detection Systems

- **907.5.2 Alarm notification appliances.**
- **907.5.2.1 Audible alarms.** Distinctive sound (pattern) used for fire alarm only.
 - Exceptions:
 1. Visible appliances in lieu of audible in Group I-2 critical care areas.
 2. Audible (speaker) in each elevator lobby required per [IBC] 3008.10.1 connected to a separate notification zone for manual paging only.



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Section 907 – Fire Alarm and Detection Systems

- **3008.10.1 Notification appliances.** No fewer than one audible and one visible appliance shall be installed in each occupant evacuation elevator lobby.
- **3008.10 Emergency voice/alarm communication system.** The building shall contain an EV/AC system accessible to the fire department installed to meet [IFC] Section 907.5.2.2.
- **3008 OCCUPANT EVACUATION ELEVATORS**
Comply with 3008.1 through 3008.11



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Comply with 3008.7.6



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Section 907 – Fire Alarm and Detection Systems

- **907.5.2.1.1 Average sound pressure.**
 - Typically, 15 decibels (dBA) over the ambient sound level ... in every occupiable space within the building. *Public mode operation.
 - NFPA 72 removed the minimum 75 dBA for both public and private mode operations.



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Section 907 – Fire Alarm and Detection Systems

- **907.5.2.1.2 Maximum sound pressure.**
- Not to exceed 110 dBA. Where average ambient is greater than 95 dBA visible appliances in accordance with NFPA 72 shall be required, and audible notification appliances shall not be required.



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Chapter 18



- 18.5. Visible Characteristics
 - 18.5.1. Visible Signaling
 - 18.5.2. Area of Coverage
 - 18.5.3. Light, Color and Pulse Characteristics
 - 18.5.4. Appliance Photometrics
 - 18.5.5. Appliance Location
 - 18.5.6. Location of Visible Notification Appliances for Wide Area Signaling



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Section 907 – Fire Alarm and Detection Systems

- **907.5.2.2 EV/AC systems.**
 - In high-rise buildings, minimum operation is the alarming floor, the floor above and the floor below. Speakers provided to establish paging zones as follows:
 1. Elevator Groups
 2. Exit Stairways
 3. Each floor
 4. Areas of refuge as defined in Chapter 2
 - Exception for I-1 and I-2



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Section 907 – Fire Alarm and Detection Systems

- 907.5.2.2 EV/AC systems.
- 907.5.2.2.1 Manual override.
- 907.5.2.2.2 Live voice messages.
- 907.5.2.2.3 Alternate messages
- 907.5.2.2.4 EV/AC captions. **(New 2012)**
Captioning in accordance with 1108.2.7.3 [IBC].
- 907.5.2.2.5 Emergency power.
...shall be provided.



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Section 907 – Fire Alarm and Detection Systems

- 907.5.2.3 Visible alarms. Install per 3.1 – 3.4 with 3 Exceptions.
- 907.5.2.3.1 Public and common areas. Defined.
- 907.5.2.3.2 Employee work areas. Design the NAC to accommodate 20% spare capacity in the future.
- 907.5.2.3.3 Groups I-1 and R-1. Visible appliances in accordance with Table 907.5.2.3.3 and activated by both the in-room smoke alarm and the building fire alarm system.



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Section 907 – Fire Alarm and Detection Systems

- 907.5.2.3.4 Group R-2.
- All dwelling and sleeping units shall be capable of supporting visible notification appliances.



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Section 907 – Fire Alarm and Detection Systems

- **907.6 Installation** in accordance with 907.6.1 through 907.6.5.2 and NFPA 72. (13-29.5.1)
- **907.6.1 Wiring.** Meet NFPA 70 and 72. (13-29.6)
- **907.6.2 Power supply.** Primary and secondary supplies in accordance with NFPA 72. (13-29.6)
- **907.6.3 Zones.** Each floor not to exceed 22,500 square feet or 300 ft in length in any direction.



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Section 907 – Fire Alarm and Detection Systems

- 907.6.3.1 Zoning indicator panel. Display:
 - Located in an approved location.
 - Visual zone lock until system reset.
 - Incapable of cancelling by operation of the audible alarm silencing switch.



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Section 907 – Fire Alarm and Detection Systems

- **907.6.3.2 High-rise buildings.** Display.
 - Separate zone by floor for each of the following initiating devices:
 1. Smoke detectors
 2. Sprinkler water-flow devices
 3. Manual fire alarm boxes
 4. Other approved automatic fire detection devices or suppression systems.



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Section 907 – Fire Alarm and Detection Systems

- **607.6.4 Access.**
 - Access shall be provided for periodic inspection, maintenance and testing. Reference 2010 NFPA 72 definitions for; 3.3.1* Accessible (as applied to equipment). 3.3.2* Accessible (as applied to wiring methods) 3.3.3* Accessible, Readily (Readily Accessible).
 - *Extracted references from 2011 NFPA 70 (NEC)



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Section 907 – Fire Alarm and Detection Systems



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Section 907 – Fire Alarm and Detection Systems

- **907.6.5 Monitoring.**
- Fire alarm systems required by this chapter or by the IBC shall be monitored in accordance with NFPA (2010-Section 12.6) *This reference includes:
 - Remote Station
 - Proprietary Station
 - Central Station



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Section 907 – Fire Alarm and Detection Systems

- **907.6.5 Monitoring.** (continued)
- **Exception:** Monitoring is not required for:
 1. Single- and Multiple-station smoke alarms required by Section 907.2.11.
 2. Smoke detectors in Group I-3 occupancies.
 3. Sprinkler systems in one- and two-family dwellings



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Section 907 – Fire Alarm and Detection Systems

- **907.6.5.1 Automatic telephone-dialing devices.**
 - Antiquated magnetic tape type dialers. Don't do this. Obscure technology, high failure rate, possible runaway – locks up the telco line.
- **907.6.5.2 Termination of monitoring service.**
 - Ref: 901.9. Notice to the AHJ of the cancellation and reason for termination of service.



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Section 907 – Fire Alarm and Detection Systems

- **907.7 Acceptance tests and completion.**
- In accordance with NFPA 72.
 - 907.7.1 Single- and multiple-station alarm devices.
 - 907.7.2 Record of Completion
 - 907.7.3 Instructions



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Section 907 – Fire Alarm and Detection Systems

- **907.8 Inspection, testing and maintenance.**
- Separate document provided. Follow 907.8.1 thru 907.8.5 and (Chapter 14 - 2010 edition of NFPA 72).



Section 907 – Fire Alarm and Detection Systems

- **907.8.1 Maintenance required.**
- **907.8.2 Testing.**
- **907.8.3 Smoke detector sensitivity.**
- **907.8.4 Method (of sensitivity testing).**
- **907.8.4.1 Testing device**



Section 907 – Fire Alarm and Detection Systems

- **907.8.5 Maintenance, inspection and testing**
 - Building owner is responsible to maintain the system operable at all times.
 - Service personnel shall meet qualifications of NFPA 72.
 - Written documentation shall be maintained and provided to the fire code official.



Inspection, Testing, and Maintenance - Chapter 14

- Includes Emergency Communications Systems.
- Revised requirements for the testing of intelligible voice communications.
- New allowance for automated testing.
- New requirements for the testing of gas detectors.



Inspection, Testing, and Maintenance - Chapter 14

- New requirement for the replacement of combination smoke/carbon monoxide alarms after ten years.
- New requirements for the commissioning and testing of in-building emergency radio communication systems.



Chapter 14 ITM

- 14.2.2.2 Impairments/Deficiencies
- 14.2.3.2 Delegation of Responsibility
- 14.2.10 Test Plan
- Table 14.4.3.2 Format
- 14.4.11 Voice Intelligibility



Inspection, Testing, and Maintenance - Chapter 14

- **14.2.7 Automated Testing.**
- **14.2.7.1** Automated testing arrangements that provide equivalent means of testing devices to those specified in Table 14.4.2.2 at a frequency at least equivalent to those specified in Table 14.4.5 shall be permitted to be used to comply with the requirements of this chapter.
- **14.2.7.2** Failure of a device on an automated test shall result in an audible and visual trouble signal.



Inspection, Testing, and Maintenance - Chapter 14

- **14.2.8 Performance-Based Inspection and Testing.** As an alternate means of compliance, subject to the authority having jurisdiction, components and systems shall be permitted to be inspected and tested under a performance-based program.



Inspection, Testing, and Maintenance - Chapter 14

- **14.4.4** Gas detectors shall be inspected, tested, and maintained in accordance with the manufacturers' published instructions.
- Correlates with the addition of gas detection in Chapter 17.



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Inspection, Testing, and Maintenance - Chapter 14

- **14.4.7 Household Fire Alarm Systems.**
- **14.4.8 Replacement of Smoke Alarms in One- and Two-Family Dwellings.**
- **14.4.8.2** Combination smoke/carbon monoxide alarms shall be replaced when the end-of-life signal activates or 10 years from the date of manufacture, whichever comes first.
 - *The Code now recognizes that these type of alarms are being used.*



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▪ **14.4.12 In-Building Emergency Radio Communication Systems.**

This section was expanded from 2007 to cover:

- *Signal level testing.*
- *System commissioning testing.*
- *Test procedures*
- *Measurement parameters*
- *Acceptance test*
- *Annual tests*



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- Record of Inspection and Testing
- Has been expanded to 12 pages
- Includes mass notification system interface



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Section 907 – Fire Alarm and Detection Systems

- **907.9 Where required in existing buildings and structures.**
- An approved fire alarm system shall be provided in existing buildings where required by Chapter 11. (New - 2012)



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