



ABOUT CODE CORNER

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Your local codes or ordinances may vary.

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Campus Fire Safety

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SECTION 907

FIRE ALARM AND DETECTION SYSTEMS PART 2

907.2.1.1 System initiation in Group A occupancies with an occupant load of 1,000 or more.

Activation of the fire alarm in Group A occupancies with an occupant load of 1,000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.5.2.2.

Exception: Where approved, the prerecorded announcement is allowed to be manually deactivated for a period of time, not to exceed 3 minutes, for the sole purpose of allowing a live voice announcement from an approved, constantly attended location.

- In order to afford authorized personnel the ability to selectively evacuate or manage occupant relocation in large assembly venues, this section requires the fire alarm system to operate through an emergency voice/alarm communications system. The exception allows the automatic alarm signals to be overridden for live voice instructions if the live voice instructions do not exceed 3 minutes.

The location from which the live voice announcement originates must be constantly attended and approved by the fire code official (see also commentary, Section 907.5.2.2). In terms of the applicability of this section, it is not as specific as Section 907.2.1. More specifically, the concept of fire areas does not apply. Credit is not given to reduce the occupant load through the use of the fire area concept (see commentary, Section 907.2).

907.2.1.2 Emergency voice/alarm communication system captions. Stadiums, arenas and grandstands required to caption audible public announcements shall be in accordance with Section 907.5.2.2.4.

- A 2008 U.S. Federal Court case prompted a change to the code and the IBC. The court ruled that persons with hearing impairments who attend events at stadiums, grandstands and arenas require a means of equivalent communications in lieu of the public address system. Providing occupant notification in these

structures is challenging because of the building area and the number and diversity of occupants. Provisions were added in the code to require captioned messages in these buildings and grandstands when public address (PA) systems are prescribed by the accessibility requirements.

IBC Section 1108.2.7.3 sets forth requirements for audible PA systems in stadiums, arenas and grandstands. It requires that equivalent text information be provided to the audience and that the delivery time for these messages be the same as those broadcast from the PA system.

These requirements apply to pre-recorded and real-time messages. Section 1108.2.7.3 of the 2012 edition of the IBC also requires captioning of messages in stadiums, arenas and grandstands that have more than 15,000 fixed seats.

Because messages being broadcast can include instructions to building or site occupants explaining the actions they need to take in the event of an emergency, the require-

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ments of NFPA 72 are applicable for captioning systems. Such a system falls within the scope of Chapter 24 of NFPA 72, of "Emergency Communication Systems." NFPA 72 defines an emergency communications system (ECS) as a system designed for life safety that indicates the existence of an emergency and communicates the appropriate response and action. The ECS is required to be classified as either a one- or two-way path system. It can be within a building or over a wide area or can be targeted to a particular group of recipients. The messages that will be broadcast are based on an emergency response plan developed during a risk analysis by the project stakeholders and is approved by the fire code official.

The NFPA 72 ECS requirements are based on in-building or wide-area occupant notification. Wide-area systems could include the entire area of a jurisdiction. For a stadium, arena or grandstand captioning, NFPA 72 defines these as mass notification systems (MNS). In the context of the NFPA 72 requirements, this particular

code change requires a one-way MNS where instructions are broadcast by personnel authorized to distribute messages. This could include firefighters during a fire event; the system could be used by law enforcement officers during a domestic terrorism incident or a weather event like a tornado warning.

The design of the compliant MNS in Chapter 24 of NFPA 72 is not prescriptive—a MNS is a performance-based design. Accordingly, fire code officials should require their design to be sealed by a registered professional engineer. Section 24.7 of the standard requires the preparation of a risk analysis based on the nature and anticipated risks of the facility. The risk analysis is part of the design brief, which will serve as the basis of the system design and is a required design document. NFPA 72 requires the following elements included in the risk analysis:

- The number of persons within the building, area, space, campus or region;
- The character of the occupancy, such as unique hazards and the

rate at which the hazard can develop;

- The anticipated threats, including natural, technological and intentional events;
- The reliability and performance of the MNS;
- Security of the MNS and its components;
- How the building or staff implement the risk analysis, including the use of the MNS; and
- How emergency services, such as the fire service and law enforcement agencies, can employ the MNS.

In a stadium or arena, the captioning system is required to be a component of the emergency voice/communication alarm system (EV/ACS). Such a system is required by Section 907.2.1.1 in Group A occupancies with an occupant load of 1,000 or more.

The requirement in Section 907.5.2.2.4 specifies the captioning system would be connected to the EV/ACS. The fire alarm control unit will require a listed interface unit capable of displaying text messages. Textual visible appliances are allowed by NFPA 72 when used in conjunction with



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audible, visual or both types of notification appliances. In the public mode, textual visible appliances are located to ensure readability by the building occupants. Such a system can display messages using televisions or light-emitting diode (LED) marquee signs.

The design concept of MNS is relatively new in the design community. Captioning systems might utilize components that are not listed for fire alarm service so the design will be required to comply with Section 24.2.2.21 of NFPA 72 for textual visible notification appliances. Emergency textual messages take precedence over any nonemergency text messages. Under NFPA 72, these devices require a primary and secondary power supply. If the devices are not monitored for integrity or loss of communications by an autonomous control or a fire alarm control unit, the appliance must clearly display its status. The size of characters displayed must comply with the requirements in NFPA 72. The NFPA 72 size, character and font requirements are based on the location of the display in relation to the

height and distance from the persons viewing it.

907.2.2 Group B. A manual fire alarm system shall be installed in Group B occupancies where one of the following conditions exists:

1. The combined Group B occupant load of all floors is 500 or more.
2. The Group B occupant load is more than 100 persons above or below the lowest level of exit discharge.
3. The fire area contains an ambulatory care facility.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

▫ *Group B occupancies generally involve individuals or groups of people in separate office areas. As a result, the occupants are not necessarily aware of what is going on in other parts of the building. Group B buildings with large occupant loads, even in single-*

story buildings, or where a substantial number of occupants are above or below the level of exit discharge, increase the difficulty of alerting the occupants of a fire. This is especially true in non-sprinklered buildings with given occupant load thresholds. Group B occupancies include a specific use called ambulatory care facilities which present a higher level of life hazard than the typical Group B occupancy. The fact that the care recipients of such facilities may be rendered incapable of self-preservation for limited periods of time makes the need for a fire alarm system critical. Section 907.2.2 requires a manual alarm system any time a fire area contains an ambulatory care facility. See the commentary to Section 202, definition of "Ambulatory care facility" and Section 907.2.2.1.

The exception does not eliminate the fire alarm system, but rather permits it to be initiated automatically by the sprinkler waterflow switch(es) instead of by the manual fire alarm boxes.

907.2.2.1 Ambulatory care facilities. Fire areas

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containing ambulatory care facilities shall be provided with an electronically supervised automatic smoke detection system installed within the ambulatory care facility and in public use areas outside of tenant spaces, including public corridors and elevator lobbies.

Exception: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 provided the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

□ Years ago, few surgical procedures were performed outside of a hospital. Today, complex outpatient surgeries conducted outside of a hospital are commonplace. They are performed in facilities often called "day surgery centers" or "ambulatory surgical centers" because patients are able to walk in and walk out the same day. Procedures render care recipients temporarily incapable of self-preservation by application of nerve blocks, sedation or anesthesia; however, they do typically recover quickly.

The IBC identifies health care Group I occupancies as including a 24-hour stay. Without a 24-hour stay, these surgery centers were classified as Group B, which allowed the care providers to render an unlimited number of people incapable of self-preservation with no more protection than a business office. Since these types of facilities contain distinctly different hazards to life safety than other Group B occupancies, they are now required to have a higher level of life safety and fire protection as evidenced by the requirements of this section, as well as Section 903.2.2 and the construction provisions of the code.

This section more specifically states that any time a fire area contains an ambulatory care facility, the fire area should be provided with a supervised smoke detection system in the ambulatory care facility and in public use areas outside of tenant spaces. Therefore, in a medical office building, for example, the ambulatory care facility contained within would have a full coverage system. The other offices in the

building would not require smoke detection in the individual tenant spaces but instead in the public areas, such as lobby or lounge areas.

The exception does not eliminate the fire alarm system, but rather permits it to be initiated automatically by the sprinkler water flow switch(es) instead of by manual fire alarm boxes.

907.2.3 Group E. A manual fire alarm system that initiates the occupant notification signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall be installed in Group E occupancies. When automatic sprinkler systems or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.

Exceptions:

1. A manual fire alarm system is not required in Group E occupancies with an occupant load of 30 or less.
2. Manual fire alarm boxes are not required in Group E occupancies where all of the following apply:

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- 2.1. Interior corridors are protected by smoke detectors.
- 2.2. Auditoriums, cafeterias, gymnasiums and similar areas are protected by heat detectors or other approved detection devices.
- 2.3. Shops and laboratories involving dusts or vapors are protected by heat detectors or other approved detection devices.
3. Manual fire alarm boxes shall not be required in Group E occupancies where the building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, the emergency voice/alarm communication system will activate on sprinkler water flow and manual activation is provided from a normally occupied location.
 - Section 404.3.3 addresses the development and implementation of lockdown plans. These requirements were developed to ensure that the level of life safety inside of the building is not reduced or compromised during a lockdown. In order for a building to safely function in a lock-

down condition, the code requires a means of communication between the established central location and each secured area. Section 404.3.3.1 does not prescribe the means of communication, which could include the use of text messages to cell phones/mobile devices, e-mail messages or the use of pre-established audio or visual signals. The provisions in Section 404.3.3 are not specific to Group E occupancies—they are applicable to all occupancies that develop and implement lockdown plans.

Because of concerns of school campus safety serving kindergarten through 12th grade students, specific requirements were put into the 2012 edition of the IBC and the code for enhanced communication between the school administrators, teachers and students when a lockdown plan is activated in Group E occupancies. As a result, emergency voice/alarm communication systems (EV/ACS) are prescribed in Group E occupancies. Previously the code would have permitted the manual fire alarm system to use audible and visible alarm notifi-

cation appliances and did not require the added capabilities that an EV/ACS provides.

Section 907.2.3 sets forth the requirements for automatic fire alarm and detection system requirements in Group E occupancies. Section 907.2.3 prescribes the installation of an EV/ACS as opposed to a traditional horn/strobe occupant notification system.

Exception 1 exempts Group E occupancies from requiring a fire alarm system when the occupant load is less than 30. This would exempt small day care centers that serve children older than 2 1 / 2 years of age or a small Sunday school classroom at a place of religious worship.

Exception 2 exempts manual fire alarm boxes in interior corridors, laboratories, auditoriums, cafeterias, gymnasiums and similar spaces based on the installation of heat/smoke detectors. This is not an exception from the EV/ACS but simply an exemption of locations requiring manual fire alarm boxes. The applicability of Exception 2 is independent of whether an automatic sprinkler system is in-

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stalled. If an automatic smoke detection system is installed, it must be connected to the building fire alarm system.

Exception 3 allows the omission of the manual fire alarm boxes in Group E occupancies equipped throughout with an automatic sprinkler system if the actuation of the sprinkler system will activate the EV/ ACS. See Section 903.2.3 for sprinkler requirements in Group E buildings.

907.2.4 Group F. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group F occupancies where both of the following conditions exist:

1. The Group F occupancy is two or more stories in height; and
2. The Group F occupancy has a combined occupant load of 500 or more above or below the lowest level of exit discharge.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Sec-

tion 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

□ *This section is intended to apply to large multistory manufacturing facilities. For this reason, a manual fire alarm system would be required only if the building were at least two stories in height and had 500 or more occupants above or below the level of exit discharge. An unlimited area, two-story Group F occupancy complying with Section 507.3 of the IBC would be indicative of an occupancy requiring a manual fire alarm system.*

Buildings in compliance with Section 507.3 of the IBC, and large manufacturing facilities in general, however, must be fully sprinklered and would thus be eligible for the exception. The exception does not eliminate the fire alarm system but rather permits it to be initiated automatically by the sprinkler system waterflow switch(es) instead of by the manual fire alarm boxes.

907.2.5 Group H. A manual fire alarm system that

activates the occupant notification system in accordance with Section 907.5 shall be installed in Group H-5 occupancies and in occupancies used for the manufacture of organic coatings. An automatic smoke detection system shall be installed for highly toxic gases, organic peroxides and oxidizers in accordance with Chapters 60, 62 and 63, respectively.

□ *Because of the nature and potential quantity of hazardous materials in Group H-5 occupancies, a manual means of activating an occupant notification system is essential for the safety of the occupants. In accordance with Section 2703.11, the activation of the alarm system must initiate a local alarm and transmit a signal to the emergency control station. The manual fire alarm system requirement for the building is in addition to the emergency alarm requirements in Section 2703.12 (see Section 908.2).*

Occupancies involved in the manufacture of organic coatings present special hazardous conditions because of the unstable character of the materials, such as nitrocellulose. Good house-

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keeping and control of ignition sources is critical. Chapter 29 contains additional requirements for organic coating manufacturing processes.

This section also requires an automatic smoke detection system in certain occupancy conditions involving either highly toxic gases or organic peroxides and oxidizers. The need for the automatic smoke detection system may depend on the class of materials and additional levels of fire protection provided. This requirement also assumes the quantity of materials is in excess of the maximum allowable quantities shown in Tables 5003.1.1(1) and 5003.1.1(2).

907.2.6 Group I. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group I occupancies. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be provided in accordance with Sections 907.2.6.1, 907.2.6.2 and 907.2.6.3.3.

Exceptions:

1. Manual fire alarm boxes in sleeping units of Group I-1 and I-2 occupancies shall not be required at exits if located at all care providers' control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible and that travel distances required in Section 907.4.2.1 are not exceeded.

2. Occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 is approved by the fire code official.

□ *Because the protection and possible evacuation of the occupants in Group I occupancies are most often dependent on the response by care providers, occupancies in Group I must be protected with a manual fire alarm system and in certain instances, as described in Sections 907.2.6.1, 907.2.6.2 and 907.2.6.3, an automatic smoke detection system. In Group I-1, smoke alarms are also required in accordance with Section 907.6.1.1.*

It is not the intent of this

section to require a smoke detection system throughout all Group I occupancies. Smoke detectors are only generally required in the corridors and in waiting rooms that are open to corridors, unless noted otherwise. IFC Committee Interpretation No. 36-03 makes it clear that the Group I provisions only require a manual fire alarm system with smoke detectors in selected areas.

To reduce the potential for unwanted alarms, manual fire alarm boxes may be located at the care providers' control stations or another constantly attended location.

Exception 1 reduces the likelihood of accidental or malicious false alarm system activations by manual means by allowing the pull stations to be located in a more controlled area. It assumes the approved location is always accessible by care providers and within 200 feet (60 960 mm) of travel distance. Exception 2 allows the common practice in Group I occupancies of only notifying the care providers instead of all building occupants in the event of a fire, subject to the approval of the fire code official.

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907.2.6.1 Group I-1. An automatic smoke detection system shall be

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