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907.5.2 Alarm notification appliances.

Alarm notification appliances shall be provided and shall be listed for their purpose.

◆The code requires that fire alarm systems be equipped with approved alarm notification appliances so that in an emergency, the fire alarm system will notify the occupants of the need for evacuation or implementation of the fire emergency plan. Alarm notification devices required by the code are of two general types: visible and audible. Except for voice/ alarm signaling systems, once the system has been activated, all visible and audible alarms are required to activate.

Voice/alarm signaling systems are special signaling systems that are activated selectively in response to specific emergency conditions.

907.5.2.1 Audible alarms. Audible alarm notification appliances shall be provided and emit a distinctive sound that is not to be used for any purpose other than that of a fire alarm.

Exceptions:
1. Visible alarm notification appliances shall be allowed in lieu of audible alarm notification appliances in critical care areas of Group I-2 occupancies.

2. Where provided, audible notification appliances located in each occupant evacuation elevator lobby in accordance with Section 3008.10.1 of the International Building Code shall be connected to a separate notification zone for manual paging only.

◆To attract the attention of building occupants, audible alarms must be distinctive, using a sound that is unique to the fire alarm system and used for no other purpose than alerting occupants to a fire emergency. Other emergencies, such as tornados, etc., must be signaled by another sound different from the fire signal.



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Exception 1 recognizes that the occupants in critical care areas of Group I-2 occupancies are usually incapacitated. The audible alarms may have the effect of unnecessarily disrupting the care recipients who are most likely not capable of self-Preservation.

Likewise, audible alarms in operating theaters of hospitals could be hazardous because an alarm activation could startle a surgeon during a delicate procedure. Critical care areas are also assumed to be adequately staffed at all times and ready to respond upon activation of a visible alarm device. Exception 2 is intended to address the concern that automatic emergency

voice/alarm messages do not interfere with operation of the two-way communication associated with the occupant evacuation elevators. Live voice messages would be appropriate in the lobbies.

907.5.2.1.1 Average sound pressure. The audible alarm notification appliances shall provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level or 5 dBA above the maximum sound level having a duration of at least 60 seconds, whichever is greater, in every occupiable space within the building.

◆ To attract the attention of building occupants, this section requires that the distinctive audible alarms

must be capable of being heard above the ambient noise level in a space. The indicated levels are considered the minimum pressure differential that will be perceivable by most people. It prescribes that the sound pressure level (SPL) for notification appliances shall be a minimum of 15 decibels measured in the A scale (dBA) above the ambient SPL or 5 dBA above the maximum SPL in every space that can be occupied in a building. These SPLs are based on a minimum 1-minute measurement period. SPLs for Group R and I-1 occupancies, mechanical rooms and other occupancies are no longer stipulated as they had been in previous editions of the IBC.



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The values mandated in Section 907.5.2.1.1 in previous editions of the code were not consistent with the notification appliance SPL requirements in NFPA 72. NFPA 72 requirements for the audible notification appliances are based on if the devices emit alert or evacuation tones, voice messages or audible notifications for exit markings. The provisions in Section

907.5.2.1.1 would apply to all notification appliances designed to operate in either public- or private-mode.

In sleeping areas, the minimum SPL is no longer specified in Section 907.5.2.1.1; however, for smoke alarms, Section 907.2.11 and NFPA 72

require a minimum 75 dBA SPL at the pillow.

Also note that the 2010 American with Disabilities Act Standard for Accessible Design has an exception for medical care facilities following industry practice that will allow a dependence upon staff. The activation of either audible or visible alarms could be detrimental to the care recipients in locations like operating rooms and intensive or critical care units.

907.5.2.1.2 Maximum sound pressure. The maximum sound pressure level for audible alarm notification appliances shall be 110 dBA at the minimum hearing distance from the audible appliance. Where the average ambient noise is

greater than 95 dBA, visible alarm notification appliances shall be

provided in accordance with NFPA 72 and audible alarm notification appliances shall not be required.

◆ In no case may the sound pressure level exceed 110 dBA at the minimum hearing distance from the audible appliance. This is consistent with Americans with Disabilities Act (ADA) requirements. Sound pressures above that level can cause pain or even permanent hearing loss. In such cases, audible alarms are not required to be installed but visual alarms would be necessary to compensate for the lack of audibility.

It should also be noted that in certain work



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areas, the Occupational Safety and Health Administration

(OSHA) requires employees to wear hearing protection, possibly preventing them from hearing an audible alarm. Additionally, the noise factor in these areas is high enough that an audible alarm may not be discernible.

In these areas, as well as in others, the primary method of indicating a fire can be by a visible signal. Employees must be capable of identifying such a signal as indicating a fire.

907.5.2.2 Emergency voice/alarm communication systems.

Emergency voice/alarm communication systems required by this code shall

be designed and installed in accordance with NFPA 72. The operation of any automatic fire

detector, sprinkler waterflow device or manual fire alarm box shall automatically sound an alert tone followed by voice instructions giving approved information and directions for a general or staged evacuation in accordance with the building's fire safety and evacuation plans required by Section 404. In high-rise buildings, the system shall operate on a minimum of the alarming floor, the floor above and the floor below. Speakers shall be provided throughout the building by

paging zones. At a minimum, paging zones shall be provided as follows:

1. Elevator groups.
2. Exit stairways .
3. Each floor.
4. Areas of refuge as defined in Chapter 2.

Exception: In Group I-1 and I-2 occupancies, the alarm shall sound in a constantly attended area and a general occupant notification shall be broadcast over the overhead page.

◆ The primary purpose of an EV/ACS is to provide dedicated manual and automatic facilities for the origination, control and transmission of information and instructions pertaining to a fire alarm emergency to the occupants of a building. This section identifies that notification speakers are required throughout the building



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with a minimum of one speaker in each paging zone when an EV/ACS is required. The system may sound a general alarm or be a selective system in which only selected areas of the building receive the alarm indication for staged evacuation. See Chapter 4 for evacuation plan requirements. The intent is to provide the capability to send out selective messages to individual areas; however, it does not prohibit the same message to be sent to all areas. In high-rise buildings, a minimum area of notification must include the alarming floor and the floors above and below it.

This section also identifies the minimum paging zone arrangement. This does

not preclude further zone divisions for logical staged evacuation in accordance with an approved evacuation plan.

This section also indicates that the emergency voice/alarm system is to be initiated as all other fire alarm systems are initiated. The functional operation of the system begins with an alert tone (usually 3 to 10 seconds in duration) followed by the evacuation signal (message). It is important to remember that the voice alarm system is not an “audible alarm.” It has its own specific criteria for installation and approval according to NFPA 72. Consequently, the sound pressure requirements for audible alarms do not apply to voice alarm systems. For

voice alarm systems, the intent is communication and an understanding of what is being said, not volume.

The exception is similar to the one to Section 907.6.2.1 and recognizes the supervised environment typical of institutional uses and the reliance placed on staff to act appropriately in an emergency.

As is the case for most voice alarms, the key is in being able to deliver specific information to the people who can affect a safe egress—whether this is the public or employees, or both.

907.5.2.2.1 Manual override. A manual override for emergency voice communication shall be provided on a selective



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and all-call basis for all paging zones.

◆ The intent of this section is to provide the ability to transmit live voice instructions over any previously initiated signals or pre-recorded messages for all zones. This would include the ability to override the voice message at once throughout the building or to be able to select individual paging zones for the message override.

907.5.2.2.2 Live voice messages. The emergency voice/ alarm communication system shall also have the capability to broadcast live voice messages by paging zones on a selective and all-call basis.

◆ This would include the ability to provide the live

voice message at once throughout the building or to be able to select individual paging zones to receive the message. Speakers used for background music must not be used unless specifically listed for fire alarm system use. NFPA 72 has additional requirements for the placement, location and audibility of speakers used as part of an emergency voice/ alarm communication system.

907.5.2.2.3 Alternate uses. The emergency voice/ alarm communication system shall be allowed to be used for other announcements, provided the manual fire alarm use takes precedence over any other use.

◆ In certain circumstances which should be approved by the fire code officials, the emergency voice/ alarm communications system could be used to convey information other than fire alarm-related items. This could include severe weather warnings that might require evacuation or relocation, lockdown instructions (see commentary, Section 404.3.4) and similar approved messages. In the event of such usage, the system must respond immediately to manual fire alarm box activations.

907.5.2.2.4 Emergency voice/ alarm communication captions.

Where stadiums, arenas and grandstands are required to caption audible public



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announcements in accordance with Section 1108.2.7.3 of the International Building Code, the emergency/voice alarm communication system shall also be captioned. Prerecorded or live emergency captions shall be from an approved location constantly attended by personnel trained to respond to an emergency.

◆ This provision links the EV/ACS with the requirements for captioning in Section 1108.2.7.3 of the IBC.

Section 1108.2.7.3 of the IBC requires that stadiums, arenas and grandstands have 15,000 fixed seats to provide captioning for audible announcements (see

commentary, Section 907.2.1.2).

907.5.2.2.5 Emergency power. Emergency voice/ alarm communications systems shall be provided with an approved emergency power source.

◆ Because the EV/ACS is a critical aid in evacuating the building, the system must be connected to an approved emergency power source complying with Section 604.

907.5.2.3 Visible alarms. Visible alarm notification appliances shall be provided in accordance with Sections

907.5.2.3.1 through 907.5.2.3.4.

Exceptions:

1. Visible alarm notification appliances are not required in

alterations, except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed.

2. Visible alarm notification appliances shall not be required in exits as defined in Chapter 2.

3. Visible alarm notification appliances shall not be required in elevator cars.

◆ This section contains alarm system requirements for occupants who are hearing impaired. Visible alarm notification appliances are to be installed in conjunction with the audible devices and located and oriented so that they will display alarm signals throughout a



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space. It is not the intent of the code to offer visible alarm signals as an option to audible alarm signals.

Both are required. However, the code acknowledges conditions when audible alarms may be of little or no value, such as when the ambient sound level exceeds 105 dBA. In such cases, Section 907.6.2.1, similar to NFPA 72, allows for visible alarm notification appliances in the area.

Exception 1 states that visible alarm devices are not required in previously approved existing fire alarm systems or as part of minor alterations to existing fire alarm systems. Extensive modifications to an existing fire alarm system

such as an upgrade or replacement would require the installation of visible alarm devices even if the previous existing system neither had them

nor required them. The main reason is a combination of simple economics and practical application. Many existing systems that do not have visible signal devices do not have the wiring capability to include such devices in their small alterations. To make the necessary changes to the existing system virtually a total replacement of the existing system may need to take place. In many cases this is cost prohibitive.

Thus, if the alteration is small, the system can be left as is, without the usual devices. The second

consideration is scope. If the alternation involves only a limited area, it could be confusing to have part of the area equipped with visual devices and part without.

This is not good practice, as the alarm could be confusing. If an entire floor is being altered, then it becomes subject to consideration for an upgrade to an alarm system with visual devices. If only an office is being remodeled, then the implication is that the upgrade to visual devices may not be warranted. This determination will be subjective in many cases and should be applied based on the life safety benefit and financial expenses involved and whether adequate audible devices are present for full coverage.



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In Exception 2, visible alarm devices are not required in exit elements because of the potential distraction during evacuation. Exits, as defined in Chapter 2, could include interior exit stairways or exit passageways but not exit access corridors. In tall buildings, exiting may be phased based on alarm zone. If the alarm floor and adjacent floors are notified of the emergency but the remainder of the building is not, then a visual device in the stairway would be confusing to those people who may not be coming from the alarm floor.

Previously, some jurisdictions were requiring visible alarm notification appliances to be installed in elevator

cars since there was no exception in the code or NFPA 72 to allow omission of this type of notification appliance in elevator cars. Exception 3 will eliminate any confusion regarding the need to install visible notification appliances in elevator cars. The rationale for not installing visible notification appliances in elevator cars is the same as for interior exit stairways; high light intensity from these notification appliances may cause confusion and disorientation.

Also, elevator passengers are “captive” in that they cannot respond to such devices until the elevator arrives at its destination or is recalled by the Phase I emergency operation feature, which could lead to passenger panic.

907.5.2.3.1 Public and common areas. Visible alarm notification appliances shall be provided in public areas and common areas.

◆ Visible alarm notification appliances must provide coverage in all areas open to the public, as well as all shared or common areas (e.g., corridors, public restrooms, shared offices, classrooms, medical exam rooms, etc.). Areas where visible alarm notification appliances are not required include private offices, mechanical rooms or similar spaces. The intent with this section is to replicate the provisions included in the Americans With Disabilities Act Accessibility

Guidelines for Buildings and Facilities (ADAAG).



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907.5.2.3.2 Employee work areas. Where employee work areas have audible alarm coverage, the notification appliance circuits serving the employee work areas shall be initially designed with a minimum of 20-percent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing impaired employee(s).

◆ This section provides for spare capacity on notification circuits to allow for those with hearing impairments

to be accommodated as necessary. This spare capacity is intended to eliminate the potential for overloading notification circuits when a hearing impaired person is hired and needs to be accommodated, but reduces the initial construction cost as such alarms may not be necessary in every situation.

This section is intended to apply to employee work areas that are not common areas.

Next Month: 907.5.2.3.3 Groups I-1 and R-1. (page 399)



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The Center for Campus Fire Safety

978.961.0410

SupportTeam@campusfiresafety.org