

4.4.1.8.3.3 Upon attaining a fully charged condition, the charge rate shall not be so excessive as to result in battery damage.

4.4.1.8.3.4* Batteries shall be either trickle- or float-charged.

4.4.1.8.3.5 Supervising stations shall maintain spare parts or units available, which shall be used to restore failed charging capacity prior to the consumption of one-half of the capacity of the batteries for the supervising station equipment.

4.4.1.8.4 Overcurrent Protection.

4.4.1.8.4.1 The batteries shall be protected against excessive load current by overcurrent devices.

4.4.1.8.4.2 The batteries shall be protected from excessive charging current by overcurrent devices or by automatic current-limiting design of the charging source.

4.4.1.8.5 Metering. The charging equipment shall provide either integral meters or readily accessible terminal facilities for the connection of portable meters by which the battery voltage and charging current can be determined.

4.4.1.8.6 Charger Supervision. Supervision means appropriate for the batteries and charger employed shall be provided to detect a failure of battery charging and initiate a trouble signal in accordance with 4.4.3.5.

4.4.1.9 Engine-Driven Generators.

4.4.1.9.1 Application and Installation. The application and installation of engine-driven generators shall be as specified in 4.4.1.9.2 through 4.4.1.9.7.

4.4.1.9.2 Primary Power Supply. Engine-driven generators arranged as the primary supply shall be designed and installed in an approved manner.

4.4.1.9.3 Secondary Power Supplies.

4.4.1.9.3.1 Protected Premises.

(A) Engine-driven generators used to provide secondary power for a protected premises fire alarm system shall comply with NFPA 110, *Standard for Emergency and Standby Power Systems*, Chapter 4, requirements for a Type 10, Class 24, Level 1 System. Installation shall be in accordance with NFPA 70, *National Electrical Code*, Article 700.

(B) Where survivability of circuits is required by Chapter 6, equal protection shall be provided for power supply circuits.

4.4.1.9.3.2 Supervising Station.

(A) Automatic-starting, engine-driven generators used to provide secondary power for a supervising station shall comply with NFPA 110, *Standard for Emergency and Standby Power Systems*, Chapter 4, requirements for a Type 60, Class 24, Level 2 system. Installation shall be in accordance with NFPA 70, *National Electrical Code*, Article 701.

(B) Manual-starting, engine-driven generators used to provide secondary power for a supervising station shall comply with NFPA 110, *Standard for Emergency and Standby Power Systems*, Chapter 4, requirements for a Type M, Class 24, Level 2 system. Installation shall be in accordance with NFPA 70, *National Electrical Code*, Article 702.

4.4.1.9.4 Performance, Operation, Testing, and Maintenance. The requirements for performance, operation, testing, and maintenance of engine-driven generators shall conform to the

applicable provisions of NFPA 110, *Standard for Emergency and Standby Power Systems*.

4.4.1.9.5 Capacity. The unit shall be of a capacity that is sufficient to operate the system under the maximum normal load conditions in addition to all other demands placed upon the unit.

4.4.1.9.6 Fuel. Unless otherwise required or permitted in 4.4.1.9.6.1 through 4.4.1.9.6.3, fuel shall be available in storage sufficient for 6 months of testing plus the capacity specified in 4.4.1.5.

4.4.1.9.6.1 For public fire alarm reporting systems, the requirements of Chapter 9 shall apply.

4.4.1.9.6.2 If a reliable source of supply is available at any time on a 2-hour notice, it shall be permitted to have fuel in storage sufficient for 12 hours of operation at full load.

4.4.1.9.6.3 Fuel systems using natural or manufactured gas supplied through reliable utility mains shall not be required to have fuel storage tanks unless located in seismic risk zone 3 or greater as defined in ANSI A-58.1, *Building Code Requirements for Minimum Design Loads in Buildings and Other Structures*.

4.4.1.9.7 Battery and Charger. A separate storage battery and separate automatic charger shall be provided for starting the engine-driven generator and shall not be used for any other purpose.

4.4.2 Compatibility. All detection devices that receive their power from the initiating device circuit or signaling line circuit of a control unit shall be listed for use with the control unit.

4.4.3 System Functions.

4.4.3.1* Alarm Signals. A coded alarm signal shall consist of not less than three complete rounds of the number transmitted. Each round shall consist of not less than three impulses.

4.4.3.2 Supervisory Signals.

4.4.3.2.1 Coded Supervisory Signal. A coded supervisory signal shall be permitted to consist of two rounds of the number transmitted to indicate a supervisory off-normal condition, and one round of the number transmitted to indicate the restoration of the supervisory condition to normal.

4.4.3.2.2 Combined Coded Alarm and Supervisory Signal Circuits. Where both coded sprinkler supervisory signals and coded fire or waterflow alarm signals are transmitted over the same signaling line circuit, provision shall be made to obtain either alarm signal precedence or sufficient repetition of the alarm signal to prevent the loss of an alarm signal.

4.4.3.2.3 Self-Restoring Supervisory Signal Indication. Visible and audible indication of self-restoring supervisory signals and visible indication of their restoration to normal shall be automatically indicated within 90 seconds at the following locations:

- (1) Fire alarm control unit for local fire alarm systems
- (2) Building fire command center for emergency voice/alarm communications systems
- (3) Supervising station location for systems installed in compliance with Chapter 8

4.4.3.2.4 Latching Supervisory Signal Indication. Visible and audible indication of latching supervisory signals shall be indicated within 90 seconds at the locations specified in 4.4.3.2.3.

- (4) Each receiver/control shall automatically repeat alarm transmission at intervals not exceeding 60 seconds or until confirmation that the output appliance has received the alarm signal.
- (5) The appliances shall continue to operate (latch-in) until manually reset at the receiver/control.

6.18 Mass Notification Systems. See Annex E.

Chapter 7 Notification Appliances for Fire Alarm Systems

7.1* Application.

7.1.1 The requirements of this chapter shall apply where required by the authority having jurisdiction or other governing codes or standards.

7.1.2 The requirements of this chapter shall address the reception of a notification signal and not the signal's information content.

7.1.3 The performance, location, and mounting of notification appliances used to initiate or direct evacuation or relocation of the occupants, or for providing information to occupants or staff, shall comply with this chapter.

7.1.4 The performance, location, and mounting of annunciators, displays, and printers used to display or record information for use by occupants, staff, responding emergency personnel, or supervising station personnel shall comply with this chapter.

7.1.5* The requirements of this chapter shall apply to the areas, spaces, or system functions where required by other parts of this Code, the authority having jurisdiction, or other codes and standards requiring compliance with this chapter.

7.1.6 The requirements of Chapter 4 and Chapter 6 shall apply to the interconnection of notification appliances, the control configurations, the power supplies, and the use of the information provided by notification appliances.

7.1.7 Notification appliances shall be permitted to be used within buildings or outdoors and to target the general building, area, or space, or only specific parts of a building, area, or space designated in specific zones and sub-zones.

7.2 Purpose. Notification appliances shall provide stimuli for initiating emergency action and provide information to users, emergency response personnel, and occupants.

7.3 General.

7.3.1 Listing. All notification appliances installed in conformity with Chapter 7 shall be listed for the purpose for which they are used.

7.3.2 Nameplates.

7.3.2.1 Notification appliances shall include on their nameplates reference to electrical requirements and rated audible or visible performance, or both, as defined by the listing authority.

7.3.2.2 Audible appliances shall include on their nameplates reference to their parameters or reference to installation documents (supplied with the appliance) that include the parameters in accordance with 7.4.2 or 7.4.3.

7.3.2.3 Visible appliances shall include on their nameplates reference to their parameters or reference to installation

documents (supplied with the appliance) that include the parameters in accordance with 7.5.2.1 or Section 7.6.

7.3.3 Physical Construction.

7.3.3.1 Appliances intended for use in special environments, such as outdoors versus indoors, high or low temperatures, high humidity, dusty conditions, and hazardous locations, or where subject to tampering, shall be listed for the intended application.

7.3.3.2* Notification appliances used for signaling other than fire shall not have the word FIRE, or any fire symbol, in any form (i.e., stamped, imprinted, etc.) on the appliance visible to the public. Notification appliances with multiple visible elements shall be permitted to have fire markings only on those visible elements used for fire signaling.

7.3.4* Mechanical Protection.

7.3.4.1 Appliances subject to mechanical damage shall be suitably protected.

7.3.4.2 If guards, covers, or lenses are employed, they shall be listed for use with the appliance.

7.3.4.3 The effect of guards, covers, or lenses on the appliance's field performance shall be in accordance with the listing requirements.

7.3.5 Mounting.

7.3.5.1 Appliances shall be supported independently of their attachments to the circuit conductors.

7.3.5.2 Appliances shall be mounted in accordance with the manufacturer's published instructions.

7.3.6* Connections. Terminals, leads, or addressable communication, which provide for monitoring the integrity of the notification appliance connections, shall be provided.

7.4 Audible Characteristics.

7.4.1 General Requirements.

7.4.1.1* An average ambient sound level greater than 105 dBA shall require the use of a visible notification appliance(s) in accordance with Section 7.5 where the application is public mode or Section 7.6 where the application is private mode.

7.4.1.2* The total sound pressure level produced by combining the ambient sound pressure level with all audible notification appliances operating shall not exceed 110 dBA at the minimum hearing distance.

7.4.1.3* Sound from normal or permanent sources, having a duration greater than 60 seconds, shall be included when measuring maximum ambient sound level. Sound from temporary or abnormal sources shall not be required to be included when measuring maximum ambient sound level.

7.4.1.4* Where required, voice communications systems shall be capable of the reproduction of prerecorded, synthesized, or live (e.g., microphone, telephone handset, and radio) messages with voice intelligibility.

7.4.1.5 Audible notification appliances for alert and evacuation signal tones shall meet the requirements of 7.4.2 (Public Mode Audible Requirements), 7.4.3 (Private Mode Audible Requirements), 7.4.4 (Sleeping Area Requirements), or 7.4.5 (Narrow Band Tone Signaling for Exceeding Masked Thresholds), as applicable.

7.4.1.6* Voice messages shall not be required to meet the audibility requirements of 7.4.2 (Public Mode Audible Requirements), 7.4.3 (Private Mode Audible Requirements), 7.4.4 (Sleeping Area Requirements), or 7.4.5 (Narrow Band Tone Signaling for Exceeding Masked Thresholds), but shall meet the intelligibility requirements of 7.4.1.4 where voice intelligibility is required.

7.4.1.7 Audible notification appliances used for exit marking shall not be required to meet the audibility requirements of 7.4.2 (Public Mode Audible Requirements), 7.4.3 (Private Mode Audible Requirements), 7.4.4 (Sleeping Area Requirements), or 7.4.5 (Narrow Band Tone Signaling for Exceeding Masked Thresholds), except as required by 7.4.6 (Exit Marking Audible Appliance Requirements).

7.4.2* Public Mode Audible Requirements.

7.4.2.1* To ensure that audible public mode signals are clearly heard, unless otherwise permitted by 7.4.2.2 through 7.4.2.5, they shall have a sound level at least 15 dB above the average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds, whichever is greater, measured 1.5 m (5 ft) above the floor in the area required to be served by the system using the A-weighted scale (dBA).

7.4.2.2 Where approved by the authority having jurisdiction or other governing codes or standards, the requirements for audible signaling shall be permitted to be reduced or eliminated when visible signaling is provided in accordance with Section 7.5.

7.4.2.3 Audible alarm notification appliances installed in elevator cars shall be permitted to use the audibility criteria for private mode appliances detailed in 7.4.3.1.

7.4.2.4 If approved by the authority having jurisdiction, audible alarm notification appliances installed in restrooms shall be permitted to use the audibility criteria for private mode appliances detailed in 7.4.3.1.

7.4.2.5 A fire alarm system arranged to stop or reduce ambient noise, when approved by the authority having jurisdiction, shall comply with 7.4.2.5.1 through 7.4.2.5.3.

7.4.2.5.1 A fire alarm system arranged to stop or reduce ambient noise shall produce a sound level at least 15 dB above the reduced average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds after reduction of the ambient noise level, whichever is greater, measured 1.5 m (5 ft) above the floor in the area required to be served by the system using the A-weighted scale (dBA).

7.4.2.5.2 Visible notification appliances shall be installed in the affected areas in accordance with Section 7.5 or Section 7.6.

7.4.2.5.3 Relays, circuits, or interfaces necessary to stop or reduce ambient noise shall meet the requirements of Chapter 4 and Chapter 6.

7.4.3 Private Mode Audible Requirements.

7.4.3.1* To ensure that audible private mode signals are clearly heard, they shall have a sound level at least 10 dB above the average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds, whichever is greater, measured 1.5 m (5 ft) above the floor in the area required to be served by the system using the A-weighted scale (dBA).

7.4.3.2* Where approved by the authority having jurisdiction or other governing codes or standards, the requirements for audible signaling shall be permitted to be reduced or eliminated when visible signaling is provided in accordance with Section 7.5.

7.4.3.3 A system arranged to stop or reduce ambient noise, when approved by the authority having jurisdiction, shall comply with 7.4.3.3.1 through 7.4.3.3.3.

7.4.3.3.1 If approved by the authority having jurisdiction, a system arranged to stop or reduce ambient noise shall be permitted to produce a sound level at least 10 dB above the reduced average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds after reduction of the ambient noise level, whichever is greater, measured 1.5 m (5 ft) above the floor, using the A-weighted scale (dBA).

7.4.3.3.2 Visible notification appliances shall be installed in the affected areas in accordance with Section 7.5 or Section 7.6.

7.4.3.3.3 Relays, circuits, or interfaces necessary to stop or reduce ambient noise shall meet the requirements of Chapter 4 and Chapter 6.

7.4.4 Sleeping Area Requirements.

7.4.4.1* Where audible appliances are installed to provide signals for sleeping areas, they shall have a sound level of at least 15 dB above the average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds or a sound level of at least 75 dBA, whichever is greater, measured at the pillow level in the area required to be served by the system using the A-weighted scale (dBA).

7.4.4.2 If any barrier, such as a door, curtain, or retractable partition, is located between the notification appliance and the pillow, the sound pressure level shall be measured with the barrier placed between the appliance and the pillow.

7.4.5* Narrow Band Tone Signaling for Exceeding Masked Thresholds.

7.4.5.1 Masked Threshold Allowance. Audible tone signaling shall be permitted to comply with the masked threshold requirements in this subsection in lieu of the A-weighted signaling requirements in 7.4.2 and 7.4.3.

7.4.5.2* Calculation Method. The effective masked threshold shall be calculated in accordance with ISO 7731, *Danger signals for work places — Auditory danger signals*.

7.4.5.3 Noise Data. Noise data for calculating the effective masked threshold shall be the peak value of noise lasting 60 seconds or more for each octave or one-third octave band.

7.4.5.4 Documentation. Analysis and design documentation shall be submitted to the authority having jurisdiction and shall contain the following information:

- (1) Frequency data for the ambient noise, including the date, time, and location where measurements were taken for existing environments, or projected data for environments not yet constructed
- (2) Frequency data of the audible notification appliance
- (3) Calculations of the effective masked threshold for each set of noise data