Summary. Chapter 27 was Chapter 9 in NFPA 72-2007. The word “fire” is replaced by the word “emergency”. The term “public fire service communications center” is replaced by “communications center”. The term “coded radio box” is replaced by “wireless box”.

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27.1 Application.
27.1.1 The provisions of this chapter apply to the proper configuration, performance, installation, and operation of public emergency alarm reporting systems and auxiliary alarm systems.

Public emergency alarm reporting systems shall consist of alarm boxes and alarm processing equipment that communicate on a wired or wireless network(s), one-way or two-way, meeting the requirements of this chapter. This shall include systems that use a communications infrastructure that is publicly owned, operated, and controlled.

27.1.2 The installation and use of public fire emergency alarm reporting systems and auxiliary fire alarm systems shall comply with the requirements of this chapter.

27.1.3 The requirements of this chapter shall apply to systems and equipment for the transmission and reception of fire alarm and other emergency signals, including those from auxiliary fire alarm systems, connected to the public fire emergency alarm reporting system.

27.1.6 The application of public fire emergency alarm reporting systems and auxiliary fire alarm systems to provide defined reporting functions from or within private premises shall be permitted where approved by the authority having jurisdiction.

27.1.7* Where a protected premises fire alarm system or other emergency system at the protected premises has its signals sent to a communications center via public emergency alarm reporting system, the protected premises system shall become an auxiliary alarm system.

A.27.1.7 Auxiliary alarm systems include the equipment at the protected premises as well as the equipment connecting it to the public emergency alarm reporting system. While the operational requirements relating to the signals sent off premises fall under the scope of Chapter 27, the requirements of Chapter 23 also apply.

27.2 General Fundamentals.
27.2.1* Public fire emergency alarm reporting systems shall be designed, installed, operated, and maintained in accordance with this chapter to provide reliable transmission and receipt of fire alarms in a manner acceptable to the authority having jurisdiction.
A.27.2.1 When choosing from available options to implement a public fire emergency alarm reporting system, the operating agency should consider which of the choices would facilitate the maximum reliability of the system, where such a choice is not cost prohibitive.

27.2.2 A public fire emergency alarm reporting system, as described herein, shall be permitted to be used for the transmission of other signals or calls of a public emergency nature, provided that such transmission does not interfere with the transmission and receipt of fire alarms.

27.2.3* All devices shall be designed to function satisfactorily under the climatic and environmental conditions to which they may be exposed.

A.27.2.3 Consideration should be given to the fact that devices could be installed in areas that are exposed to higher or lower temperatures, moisture, or other environmental conditions that could be more severe than ambient conditions found in a typical building. As an example, equipment could be installed inside a building in a boiler room, basement, attic, and so forth, where temperatures actually exceed ambient conditions outside the building. It is recommended that the authority having jurisdiction consider all possible installation locations and environmental conditions and that the equipment selected be designed to operate within the most extreme conditions to which it could be exposed.

27.2.3.1 All devices shall be identified as suitable for the location and conditions for which they are installed.

27.3.3 Where maintenance is provided by an organization or person(s) other than the jurisdiction or its employees, complete written records of the installation, maintenance, test, and extension of the system shall be forwarded to the designated employee as soon as possible in a time period and manner approved by the authority having jurisdiction.

27.3.4 All equipment shall be installed in locations accessible to the authority having jurisdiction for the purpose of maintenance and inspection.

27.3.5 Records of wired public fire emergency alarm reporting system circuits shall include the following:

(1) Outline plans showing terminals and box sequence
(2) Diagrams of applicable office wiring
(3) List of materials used, including trade name, manufacturer, and year of purchase or installation

27.3.6 Public fire emergency alarm reporting systems as defined in this chapter shall, in their entirety, be subject to a complete operational acceptance test upon completion of system installation.

27.3.6.1 This test(s) required by 27.3.6 shall be made in accordance with the requirements of the authority having jurisdiction; however, in no case shall the operational functions tested be less than those stipulated in Chapter 14.

27.3.6.2 Operational acceptance tests shall also be performed on any alarm-reporting devices, as identified covered in this chapter that are added, installed or modified subsequent to the installation of the initial system test required by 27.3.6.
27.3.7 Personnel Qualification.

27.3.7.1 System Designer.

27.3.7.1.1 Public fire emergency alarm reporting system plans and specifications shall be developed in accordance with this Code by persons who are qualified in the proper design, application, installation, and testing of public fire emergency alarm reporting systems.

27.3.7.1.2 The system designer design documents shall be identified on system design documents include the name and contact information of the system designer.

27.3.7.2 System Installer. Installation personnel shall be qualified in the installation, inspection, and testing of public fire emergency alarm reporting systems.

27.3.7.3 Service Personnel. Service personnel shall be qualified in the service, inspection, maintenance, and testing of public fire emergency alarm reporting systems.

27.3.7.4 Qualification.

27.3.7.4.1 Personnel shall demonstrate qualification by being trained and certified in public fire emergency alarm reporting system design, installation, or service (as appropriate) by one or more of the following:

(1) Certified by the manufacturer of the system or equipment
(2) *Certified by an organization acceptable to the authority having jurisdiction

A.27.3.7.4.1(2) An example of an organization providing public fire emergency alarm reporting system certification is the International Municipal Signal Association. Note that this reference is for information purposes only. Information concerning the product or service has been provided by the manufacturer or other outside sources, and the information concerning the product or service has not been independently verified, nor has the product or service been endorsed or certified by NFPA or any of its technical committees.

(3) Licensed or certified by a state or local authority

27.4 Communications Methods.

27.4.1 Application.

27.4.1.1 A public emergency alarm reporting system shall include wired or wireless network(s), for one-way signaling or two-way command and control communications between alarm boxes, alarm processing equipment, and the communications center.

27.4.1.2 A public emergency alarm reporting system shall be permitted to be used with emergency communications systems covered under Chapter 24.

27.4.2 Wired Network(s). The terms wired network and public cable plant shall be considered the same and interchangeable throughout this chapter.

27.4.2.1 All wired networks or public cable plants shall meet the requirements of Section 27.7.

27.4.2.2 Alarm processing equipment at the communications center shall meet the requirements of 27.5.2 and 27.5.4.
27.4.2.3 Alarm processing equipment at a remote communications center shall meet the requirements of 27.4.2.2 and 27.5.3.

27.4.2.4 Alarm boxes shall meet the following requirements:

1. Publicly accessible boxes shall meet the requirements of 27.6.1 through 27.6.2 and 27.6.5.
2. Auxiliary boxes shall meet the requirements of 27.6.1, 27.6.3, and 27.6.5.
3. Master boxes shall meet the requirements of 27.6.1 through 27.6.3 and 27.6.5.

27.4.3 Wireless Network(s). The terms wireless network and radio system shall be considered the same and interchangeable throughout this chapter.

27.4.3.1 All wireless networks shall meet the requirements of 27.4.3.2 through 27.4.3.3.

27.4.3.2 In addition to the requirements of this Code, coded radio boxes all wireless equipment shall be designed and operated in compliance with all applicable rules and regulations of the Federal Communications Commission (FCC) or, where required, the National Telecommunications and Information Administration (NTIA).

27.4.3.3 Radio Box Channel (Frequency). The number of alarm boxes permitted on a single frequency shall be governed by the following:

1. For systems that use one-way transmission in which the individual alarm box automatically initiates the required message (see 27.5.5.3.3) using circuitry integral to the alarm boxes, not more than 500 boxes shall be permitted on a single frequency.
2. For systems that use a two-way concept in which interrogation signals (see 27.5.5.3.3) are transmitted to the individual alarm boxes from the public fire service communications center on the same frequency used for receipt of alarms, not more than 250 alarm boxes shall be permitted on a single frequency. Where interrogation signals are transmitted on a frequency that differs from that used for receipt of alarms, not more than 500 alarm boxes shall be permitted on a single frequency.
3. A specific frequency shall be designated for both fire and other fire-related or public safety alarm signals and for monitoring for integrity signals.

27.4.3.4 Alarm processing equipment at the communications center shall meet the requirements of 27.5.2 and 27.5.5.

27.4.3.5 Alarm processing equipment at a remote communications center shall meet the requirements of 27.4.3.4 and 27.5.3.

27.4.3.6 Alarm boxes shall meet the following requirements:

1. Publicly accessible boxes shall meet the requirements of 27.6.1 through 27.6.2 and 27.6.6.
2. Auxiliary boxes shall meet the requirements of 27.6.1, 27.6.3, and 27.6.6.
3. Master boxes shall meet the requirements of 27.6.1 through 27.6.3 and 27.6.6.

27.5 Alarm Processing Equipment. The alarm processing equipment required to receive and control the public emergency alarm reporting system shall be installed in the communications center or remote communications center used by emergency
response agencies as defined in NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*.

27.5.1 General. The requirements of 27.5.2 shall apply to all processing equipment, wired or wireless, for a public emergency alarm reporting network.

27.5.2 Alarm Receiving Processing Equipment at Public Fire Service a Communications Center.

27.5.2.2 Visual Recording Devices.

27.5.2.2.1 Alarms from alarm boxes shall be automatically received and recorded at the public fire service communications center.

27.5.2.2.2 A device for producing a permanent graphic recording of all alarm, supervisory, trouble, and test signals received or retransmitted, or both, shall be provided at each public fire service communications center for each alarm circuit and tie circuit.

27.5.2.2.4 In a Type B wired system, one such recording device shall be installed in each fire station, and at least one shall be installed in the public fire service communications center.

27.5.2.2.6 The audible signal device shall be permitted to be common to two or more box circuits and arranged so that the fire emergency alarm operator is able to manually silence the signal temporarily by a self-restoring switch.

27.5.2.5 Power Supply. The forms and arrangements for public fire emergency alarm reporting systems power supplies shall comply with 27.5.2.5.1 through 27.5.2.5.8.

27.5.2.5.1 Each box circuit or coded radio wireless receiving system shall be served by the following:

(1) *Form 4A, which is an inverter, powered from a common rectifier, receiving power by a single source of alternating current with a floating storage battery having a 24-hour standby capacity*

A.27.5.2.5.1(1) Figure A.27.5.2.5.1(1) illustrates a Form 4A arrangement.

(2) *Form 4B, which is an inverter, powered from a common rectifier, receiving power from two sources of alternating current with a floating storage battery having a 4-hour standby capacity*

A.27.5.2.5.1(2) Figure A.27.5.2.5.1(2) illustrates a Form 4B arrangement.

(3) *Form 4C, which is a rectifier, converter, or motor generator receiving power from two sources of alternating current with transfer facilities to apply power from the secondary source to the system within 30 seconds*

A.27.5.2.5.1(3) Figure A.27.5.2.5.1(3) illustrates a Form 4C arrangement. Refer to NFPA1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*.

27.5.2.5.3 The capacity of batteries, motor generators, or rectifiers, or other permitted power supplies shall be able to supply exceed the calculated load of all connected circuits, without exceeding the capacity of any battery or overloading any generator or
rectifier, so that circuits developing grounds or crosses with other circuits each shall be able to be supplied by an independent source to the extent required by 27.5.2.5.1.

27.5.2.5.4 Provision shall be made for supplying to connect any circuit from to any battery, generator, or rectifier, or other permitted power supply.

27.5.2.5.5 Enclosed fuses shall be provided at points where supplies for individual circuits are taken from common leads. Individual circuits supplied from common leads shall be protected by the installation of enclosed fuses located at the point where the circuit conductors receive their supply.

27.5.2.5.6 Local circuits at public fire service communications centers shall be supplied in accordance with 27.5.2.5.6.1 and 27.5.2.5.6.2.

27.5.2.5.6.2 Local circuits at public fire service communications centers shall be supplied either in common permitted to be connected to the same power source with as box circuits, or coded radio wireless receiving system circuits, or by a separate power source.

27.5.2.6.1 Rectifiers shall be supplied through from the secondary of an isolating transformer that takes energy from a circuit not to exceed 250 volts.

27.5.2.6.1.1 The primary of the isolating transformer shall be connected to a circuit not to exceed 250 volts.

27.5.2.6.4 Leads from rectifiers or motor generators, with a storage float-charged battery floating, shall have been protected by fuses rated at not less than a minimum of 1 ampere and not more than a maximum of 200 percent of maximum connected load at nominal circuit voltage. Where not provided with battery floating a float-charged battery, the fuses shall be not less than rated at a minimum of 3 amperes.

27.5.2.8 Float-Charged Batteries.

27.5.2.8.1 Float-charged batteries shall be of the storage type. Primary batteries (dry cells) shall not be used. Lead-acid batteries shall be in jars of glass or other identified or approved transparent materials; other types of batteries shall be in containers identified or approved for the purpose.

27.5.2.8.2 Float-charged batteries shall be above ground building grade level.

27.5.2.8.3 Float-charged batteries shall be located on the same floor of the building as the operating equipment.

27.5.2.8.4 Float-charged batteries shall be available accessible for maintenance and inspection.

27.5.2.8.5 Float-charged batteries shall be ventilated to prevent accumulation of explosive gas mixtures; special ventilation shall be required only for unsealed cells installed in accordance with Article 480 of NFPA 70, National Electrical Code.

27.5.2.8.6 Batteries shall be mounted to provide effective insulation from the ground or working platform and from other batteries. Battery Mounting equipment shall be protected against deterioration and shall provide stability, especially in geographic areas subject to seismic disturbance listed and identified for the location. It shall be
permissible for the authority having jurisdiction to waive this requirement to allow the use of alternative mounting equipment where it is assured that equivalent objectives can be achieved.

27.5.3 Remote Receiving Equipment Alarm Facilities for Receipt of Box Alarms Processing Equipment at a Remote Communications Center. Where the alarm-receiving equipment is located at a location other than where the box circuit protection, controls, and power supplies are located, the requirements of 27.5.3.1 through 27.5.3.8, in addition to all of the requirements of Section 27.5, shall apply.

27.5.3.3 Monitoring for integrity of all power supplies shall be provided with visual and audible means to indicate a loss of primary or standby power supplies at both the public fire service communications center and remote communications center.

27.5.3.4 A minimum of two separate means of interconnection shall be provided between the public fire service communications center and remote communications center receiving equipment. This interconnection shall be dedicated and shall not be used for any other purpose.

27.5.3.8.1 A separate tie circuit shall be provided from the public fire service communications center to each subsidiary communications center.

27.5.3.8.2 The tie circuit between the public fire service communications center and the subsidiary public fire service communications center shall not be used for any other purpose.

27.5.4 Coded Wired Reporting Network Systems.

27.5.4.1.2 The disablement of any A metallic box open circuit condition shall cause a warning signal in all other circuits, and, thereafter, the circuit or circuit(s) not otherwise broken in the open circuit condition shall be automatically restored to operative condition.

27.5.4.1.6.1 A common sounding device for more than one circuit shall be permitted to be used in a Type A system and shall be installed at the public fire service communications center.

27.5.4.1.6.2 In a Type B system, a sounding device shall be installed in each fire station at the same location as the recording device for that circuit, unless installed at the public fire service communications center, where a common sounding device shall be permitted.

27.5.4.3.1 Where common-current source systems are grounded, the resistance of the ground shall not exceed 10 percent of resistance of any connected circuit and shall be located at one side of the battery.

27.5.4.3.2 Visual and audible indicating devices shall be provided for each box and dispatch circuit to give immediate warning of ground leakage endangering operability current that will have a detrimental effect on circuit operation.

27.5.4.4.1.1 A permanent visual recording device installed in the communications center shall be provided to record all incoming box signals.

27.5.5 Coded Radio Wireless Reporting Systems Network.
27.5.5.1.1.2 Both receiving networks shall be installed at the public fire service communications center.

27.5.5.1.1.3 The failure of either one receiving network shall not affect the receipt of messages from boxes.

27.5.5.1.2.1 For each frequency used, a single, complete receiving network shall be permitted in each fire station, provided that the public fire service communications center conforms to 27.5.5.1.1.1 through 27.5.5.1.1.3. Where the jurisdiction maintains two or more alarm reception points in operation, one receiving network shall be permitted to be at each alarm reception point.

27.5.5.1.2.2 Where alarm signals are transmitted to a fire station from the public fire service communications center using the coded radio wireless-type receiving equipment in the fire station to receive and record the alarm message, a second receiving network conforming to 27.5.5.1.2.1 shall be provided at each fire station, and that receiving network shall employ a frequency other than that used for the receipt of box messages.

27.5.5.1.3 A device for producing a permanent graphic recording of all alarm, supervisory, trouble, and test signals received or retransmitted, or both, shall be provided at the public fire service communications center.

27.5.5.1.4 Where box message signals to the public fire service communications center or acknowledgment of message receipt signals from the public fire service communications center to the box are repeated, associated repeating facilities shall conform to the requirements indicated in 7.1.1.4(d) of NFPA1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.

27.5.5.3 Monitoring for Integrity.

27.5.5.3.1 All coded radio wireless box systems shall provide constant monitoring of the frequency in use. Both an audible and a visual indication of any sustained carrier signal, where in excess of a 15-second duration, shall be provided for each receiving system at the public fire service communications center.

27.5.5.3.3* Each coded radio wireless box shall automatically transmit a test message at least once in each 24-hour period.

A.27.5.5.3.3 See A.27.6.6.2.

27.5.5.3.4 Receiving equipment associated with coded radio wireless-type systems, including any related repeater(s), shall be tested at least hourly. The receipt of test messages that do not exceed 60-minute intervals shall meet this requirement.

27.6 Alarm Transmission Equipment Boxes (Publicly Accessible Fire Alarm Boxes, Auxiliary Boxes, and Master Boxes).

27.6.1* General. The requirements of 27.6.1.1 through 27.6.1.6 shall apply to all alarm transmission equipment boxes.

A.27.6.1 There are three types of alarm boxes covered under Chapter 27. They are the publicly accessible box, auxiliary box, and master box.

(1) The publicly accessible box has a manual control that can be operated by the public. This type of alarm box is typically located outside on a pole or building and was
previously called a street box. The box type was renamed because it is not necessarily located on or near a street.

27.6.1.2 Boxes and associated equipment, when in an abnormal condition, shall leave the circuit usable not disable the public emergency alarm reporting system circuit.

27.6.1.4* Boxes, when actuated, shall give a visible or audible indication to the user that the box is operating or that the signal has been transmitted to the public fire service communications center.

A.27.6.1.4 If the operating mechanism of a box creates sufficient sound to be heard by the user, the requirements are satisfied.

27.6.1.5 Box cases and parts that are accessible to the public shall be permitted to be of nonconductive material.

27.6.1.6 Box cases and parts that are accessible to the public and that are constructed of conductive materials of insulating materials or permanently and effectively grounded. All ground connections to boxes shall comply shall comply be installed in accordance with the requirements of NFPA 70, National Electrical Code, Articles 250 and 760.

27.6.2* Publicly Accessible Fire Alarm Boxes.

A.27.6.2 Publicly accessible fire alarm boxes were commonly referred to as “street boxes” in previous editions of the Code. Applications of these boxes are no longer limited to street locations.

27.6.2.1 Fundamental Requirements. The requirements of 27.6.2.1.1 through 27.6.2.1.11 shall apply to all publicly accessible fire alarm boxes.

27.6.2.1.1 Means for actuation of alarms by the public shall be located where they are conspicuous visible, unobstructed, and readily accessible for operation.

27.6.2.1.2 The box housing shall protect the internal components from the weather and shall be identified for the location installed.

27.6.3.1.4 Where the auxiliary box is a wired box, the requirements of Section 27.7 shall apply.

27.6.3.1.5 Where the auxiliary box is a wireless box, the requirements of 27.6.6 shall apply.

27.6.3.2 Auxiliary Fire Alarm Systems.

27.6.3.2.1 Application. The equipment and circuits necessary to connect a protected premises to a public fire emergency alarm reporting system shall comply with the requirements of 27.6.3.2.
27.6.3.2.1.1 The requirements of Chapter 10, in addition to those of Chapters 14 and Chapter 17, shall apply to auxiliary fire alarm systems unless they conflict with the requirements of 27.6.3.2.

27.6.3.2.1.3 The requirements of Section 27.7 shall also apply to coded wired auxiliary fire alarm systems.

27.6.3.2.2 Types of Systems.

27.6.3.2.2.1 Auxiliary fire alarm systems shall be of the following two types:

(1) *Local energy type

A.27.6.3.2.2.1(1) The local energy-type system [see Figure A.27.6.3.2.2.1(1)(a) and Figure A.27.6.3.2.2.1(1)(b)] is electrically isolated from the public fire emergency alarm reporting system and has its own power supply. The tripping of the transmitting device does not depend on the current in the system. In a wired circuit, receipt of the alarm by the communications center when the circuit is accidentally opened depends on the design of the transmitting device and the associated communications center equipment (i.e., whether or not the system is designed to receive alarms through manual or automatic ground operational facilities). In a radio box–type system, receipt of the alarm by the communications center depends on the proper operation of the radio transmitting and receiving equipment.

(a) Local energy systems shall be permitted to be of the coded or noncoded type.
(b) Power supply sources for local energy systems shall conform to Chapter 10.
(c) Transmitter trouble signals shall be annunciated at the control unit and the building fire command center in accordance with 10.12.6.

(2) *Shunt type

A.27.6.3.2.2.1(2) The shunt-type system [see Figure A.27.6.3.2.2.1(2)(a) and Figure A.27.6.3.2.2.1(2)(b)] is electrically connected to, and is an integral part of, the public fire emergency alarm reporting system. A ground fault on the auxiliary circuit is a fault on the public fire emergency alarm reporting system circuit, and an accidental opening of the auxiliary circuit sends a needless (or false) alarm to the communications center. An open circuit in the transmitting device trip coil is not indicated either at the protected property or at the communications center. Also, if an initiating device is operated, an alarm is not transmitted, but an open circuit indication is given at the communications center. If a public fire emergency alarm reporting system circuit is open when a connected shunt-type system is operated, the transmitting device does not trip until the public fire emergency alarm reporting system circuit returns to normal, at which time the alarm is transmitted, unless the auxiliary circuit is first returned to a normal condition.

Additional design restrictions for shunt-type systems are found in laws or ordinances.

(a) Shunt systems shall be noncoded with respect to any remote electrical tripping or actuating devices.
(b) All conductors of the shunt circuit shall be installed in accordance with NFPA 70, National Electrical Code, Article 344, for rigid metal conduit, or Article 358, for electrical metallic tubing.
(c) Both sides of the shunt circuit shall be in the same conduit.
(d) Where a shunt loop is used, it shall not exceed a length of 750 ft (230 m) and shall be in conduit.

(e) Conductors of the shunt circuits shall not be smaller than 14 AWG and shall be insulated as prescribed in NFPA 70, National Electrical Code, Article 310.

(f) The power for shunt-type systems shall be provided by the public fire emergency alarm reporting system.

(g) *A local system made to an auxiliary alarm system by the addition of a relay whose coil is energized by a local power supply and whose normally closed contacts trip a shunt-type master box shall not be permitted.

A.27.6.3.2.2.1(2)(g) See Figure A.27.6.3.2.2.1(2)(b).

27.6.3.2.2.2 The interface of the two types of auxiliary fire alarm systems with the three types of public emergency alarm reporting systems shall be in accordance with Table 27.6.3.2.2.

Table 27.6.3.2.2.2 Application of Public Fire Emergency Alarm Reporting Systems with Auxiliary Fire Alarm Systems

27.6.3.2.2.3 Application of Initiating Devices with Auxiliary Fire Alarm Systems

27.6.3.2.3.3 The same box shall be permitted to be used as a public fire emergency alarm reporting system box and as a transmitting device for an auxiliary alarm system where permitted by the authority having jurisdiction, provided that the box is located at the outside of the entrance to the protected property.

27.6.3.2.3.6 The system shall be designed and arranged so that a single fault on the auxiliary alarm system shall not jeopardize operation of the public fire emergency alarm reporting system and shall not, in case of a single fault on either the auxiliary or public fire emergency alarm reporting system, transmit a false alarm on either system.

Exception: Shunt systems complying with 27.6.3.2.2.1(2).

27.6.3.2.3.7 A means that is available only to the agency responsible for maintaining the public fire emergency alarm reporting system shall be provided for disconnecting the auxiliary loop to the connected property.

27.6.3.2.3.9 An auxiliary fire alarm system shall be used only in connection with a public fire emergency alarm reporting system that is approved for the service. A system approved by the authority having jurisdiction shall meet this requirement.

27.6.3.2.3.10 Permission for the connection of an auxiliary fire alarm system to a public fire emergency alarm reporting system, and acceptance of the type of auxiliary transmitter and its actuating mechanism, circuits, and components connected thereto shall be obtained from the authority having jurisdiction.

27.6.3.2.3.11 Paragraph 27.6.3.2 shall not require the use of audible alarm signals other than those necessary to operate the auxiliary fire alarm system. Where it is desired to provide fire alarm evacuation signals in the protected property, the alarms, circuits, and controls shall comply with the provisions of Chapter 23 in addition to the provisions of 27.6.3.2.
27.6.3.2.3.12 Multizone auxiliary fire alarm systems shall provide a means for transmitting an alarm to the public reporting system upon the subsequent actuation of initiating devices on other initiating device circuits or subsequent actuation of addressable initiating devices. Where an auxiliary alarm system is in an alarm condition that has been acknowledged, deactivated, or bypassed, subsequent actuation of initiating devices on other initiating device circuits or subsequent actuation of addressable initiating devices on signaling line circuits shall cause an alarm signal to be transmitted to the communications center.

27.6.3.2.3.14 Where data communications between a microprocessor-based fire alarm control unit and an auxiliary fire alarm system are utilized, they shall comply with the requirements of 27.6.3.2.3.14(A) through 27.6.3.2.3.14(C).

(A) The monitoring for integrity shall include communications test messages transmitted between the fire alarm control unit and the auxiliary alarm system.

(B) The communications test message shall be initiated by either the fire alarm control unit or the auxiliary fire alarm system and shall require a response from the corresponding unit, and the following shall apply:

(1) An invalid response or no response from the fire alarm control unit or the auxiliary fire alarm system shall be recognized as a communications failure.

(2) A communications failure shall initiate a specific communications failure trouble message, which shall be transmitted from the auxiliary fire alarm system and shall be automatically indicated within 200 seconds at the public fire service communications center.

(3) A trouble condition in 27.6.3.2.3.14(B)(2) shall activate an audible and distinctive visual signal at the auxiliary box indicating a communications failure.

(4) A trouble condition shall activate a trouble signal be indicated at the fire alarm control unit or and the building fire command center in accordance with 10.12.6.

(C) Where a separate device is required to interface the fire alarm control unit to the auxiliary fire alarm system, all communication paths shall be monitored for integrity and shall comply with 27.6.3.2.3.14.

27.6.5 Wired Network Boxes. The requirements of Section 27.7 shall apply to wired network boxes.

27.6.5.1 Telephone Boxes. The requirements of Section 27.7 shall also apply to telephone boxes.

27.6.5.1.2 Telephone boxes shall be designed to allow the public fire service communications center operator to determine whether or not the telephone box has been restored to normal condition after use.

27.6.6 Coded Radio Wireless Network Boxes.

27.6.6.1 In addition to the requirements of this Code, coded radio wireless boxes shall be designed and operated in compliance with all applicable rules and regulations of the Federal Communications Commission (FCC) or, where required by other governing laws, the National Telecommunications and Information Administration (NTIA).
27.6.6.3 Coded-radio Wireless boxes shall provide no less than three specific and individually identifiable functions to the public fire service communications center, in addition to the box number, as follows:

1. Test
2. Tamper
3. Fire

27.6.6.4 Coded radio Wireless boxes shall transmit to the public fire service communications center as follows:

1. No less than one repetition for “test”
2. No less than one repetition for “tamper”
3. No less than two repetitions for “fire”

27.6.6.5 Where multifunction- coded radio wireless boxes are used to transmit signals in addition to those in 27.6.6.3, each such additional signal shall be individually identifiable.

27.6.6.6 Multifunction- coded radio wireless boxes shall be designed so as to prevent the loss of supplemental or concurrently actuated messages.

27.6.6.8 The primary power source for coded radio wireless boxes shall be permitted to be from one or more of the following, as approved by the authority having jurisdiction:

1. A utility distribution system
2. A solar photovoltaic power system
3. User power
4. Self-powered, using either an integral battery or other stored energy source

27.6.6.9.5 When the primary power has failed, boxes shall transmit a power failure message to the public fire service communications center as part of subsequent test messages until primary power is restored.

27.6.6.9.6 A low-battery message shall be transmitted to the public fire service communications center where the remaining battery standby time is less than 54 hours.

27.6.6.10 Boxes powered by a solar photovoltaic system shall comply with 27.6.6.10.1 through 27.6.6.10.5.

27.6.6.10.1 Solar photovoltaic power systems shall provide box operation for not less than 6 months.

27.6.6.10.2 Solar photovoltaic power systems shall be monitored for integrity.

27.6.6.10.4 The box shall transmit a trouble message to the public fire service communications center when the charger has failed for more than 24 hours. This message shall be part of all subsequent transmissions.

27.6.6.10.5 Where the remaining battery standby duration is less than 10 days, a low-battery message shall be transmitted to the public fire service communications center.

27.6.6.12.2 Self-powered boxes shall transmit a low-power warning message to the public fire service communications center for at least 15 days prior to the time the power...
source will fail to operate the box. This message shall be part of all subsequent transmissions.

27.7.1.1.2 Where a public box is installed inside a building, the circuit from the point of entrance to the public box shall be installed in rigid metal conduit, intermediate metal conduit, or electrical metallic tubing in accordance with NFPA 70, National Electrical Code.

_exception: This requirement shall not apply to coded radio wireless box systems._

27.7.1.2.5.1 Signaling wires supplied by a power source having a voltage and/or current rating sufficient to introduce a hazard shall be installed in accordance with NFPA 70, National Electrical Code, Article 760, Part II.

27.7.1.3 Underground Cables.

27.7.1.3.1 Underground metallic and fiber-optic cables in duct or direct burial shall be permitted to be brought aboveground only at points where liability of mechanical injury or of disablement from heat incidental to fires in adjacent buildings is minimized locations approved by the authority having jurisdiction.

27.7.1.3.1.1 Protection from physical damage or heat incidental to fires in adjacent buildings shall be provided.

27.7.1.3.2 Metallic and fiber-optic cables shall be permitted to be located in duct systems and manholes containing low-tension power limited fire alarm system conductors only, except low-tension power limited secondary power cables shall be permitted.

27.7.1.3.3 Where located in duct systems or manholes that contain power circuit conductors in excess of over 250 volts to ground, metallic and fiber-optic fire emergency alarm cables shall be located as far as possible from such power cables and shall be separated from them by a noncombustible barrier or by such other means as is practicable approved by the authority having jurisdiction to protect the fire emergency alarm cables from injury physical damage.

27.7.1.3.5 All conduits Raceways or ducts entering buildings from underground duct systems shall be effectively sealed against with an identified sealing compound or other means acceptable to the authority having jurisdiction to prevent the entrance of moisture or gases entering the building from the underground duct system.

27.7.1.3.7.2 Such cables shall be buried at least 18 in. (500mm) deep and, where crossing streets or other areas likely to be opened for other underground construction, shall be in duct or conduit or be covered by creosoted planking of at least 50 mm × 100 mm (2 in. × 4 in.) with half-round grooves, spiked or banded together after the cable is installed.

27.7.1.4 Aerial Construction.

27.7.1.4.1 Fire alarm wires and cables shall be run located under all other wires except communications wires.
27.7.1.4.1.1 Precautions shall be provided where passing through trees, under bridges, over railroads, and at other places where injury or deterioration is possible subject to physical damage.

27.7.1.4.1.2 All wires and cables shall not be attached to a crossarm that carries electric light and power wires, except circuits carrying up to 220 volts for public communications use, and then only where the 220 volt circuits are tagged or otherwise identified. Conductors and cables for public emergency alarm reporting system use shall not be attached to a crossarm that carries electric light and power conductors.

*Exception: Power conductors for public emergency alarm reporting system use, operating at 250 volts or less, shall be permitted to share the crossarm with the conductors and cables and shall be tagged.*

27.7.1.4.2 Aerial cable shall be supported by messenger wire of approved tensile strength or shall conform to one of the following:

(1) IMSA specifications as a self-supporting cable assembly or an approved equivalent

(2) Fiber-optic cable with integral supporting means or all dielectric self-supporting (ADSS) type

*Exception No. 1: Two-conductor cable that has conductors of 20 AWG or larger size and has mechanical strength equal to 10 AWG hard-drawn copper.*

*Exception No. 2: Fiber optic cable with integral supporting means or all dielectric self-supporting (ADSS) type.*

27.7.1.5 Leads Down Poles.

27.7.1.5.1 Leads down poles shall be protected against mechanical injury physical damage. Any metallic covering shall form a continuous conducting path to ground. Installation, in all cases, shall prevent water from entering the conduit or box.

27.7.1.5.2 Leads to boxes shall have 600-volt insulation listed or approved for wet locations, as defined in *NFPA 70, National Electrical Code.*

27.7.1.6 Wiring Inside Buildings.

27.7.1.6.1 At the public fire service communications center, all conductors, cables, and metallic and fiber-optic cables shall extend as directly as possible to the operating room operations center in conduits, ducts, shafts, raceways, or overhead racks and troughs of a type of construction listed or identified as suitable to afford protection against fire and mechanical injury physical damage.

27.7.1.6.2* Where installed in buildings, conductors and fiber optic cables shall be installed in any of the following wiring methods:

A.27.7.1.6.2 There may be environmental conditions that necessitate the use of rigid nonmetallic conduit.

(1) Electrical metallic tubing

(2) Intermediate metal conduit

(3) Rigid metal conduit
Exception: Rigid nonmetallic conduit shall be permitted where approved by the authority having jurisdiction.

27.7.2.2.1 A means provided accessible only to the authority having jurisdiction or the agency responsible for maintaining the public fire emergency alarm reporting systems shall be provided for disconnecting all circuit conductors inside the building or other structure.

27.7.3.2 Surge arresters designed and approved for the purpose shall be provided installed at a location accessible to qualified persons and shall be marked with the name of the manufacturer and model designation.

27.7.3.4 All fuses, fuseholders, and adapters shall be plainly marked with their ampere capacity rating. All fuses rated over 2 amperes shall be of the enclosed type.

27.7.3.5 Circuit protection required at the public fire service communications center shall be provided in every building that houses public fire service communications center equipment.

27.7.3.7 All metallic conductors entering the public fire service communications center shall be protected by the following devices, in the order named, starting from the exterior circuit:

1. A fuse rated at 3 amperes minimum to 7 amperes maximum and not less than 2000 volts
2. A surge arrester(s)
3. A fuse or circuit breaker rated at ½ ampere

9.8 Mass Notification System.

See Annex E.

27.7.3.8 In regard to 27.7.3.7, the ½-ampere protection on the tie circuits shall be omitted at subsidiary public fire service communications centers.

27.8.1* ECS shall be permitted to be connected to public emergency alarm reporting systems.

A.27.8.1 The public emergency alarm reporting system infrastructure could be used to facilitate the operation of wide area signaling, as is currently being done for emergency notification to the public in some communities and as has been done in the past for civil defense notification.

27.8.2 ECS equipment and interface methods connecting to or utilizing public emergency alarm reporting systems shall be electrically and operationally compatible so as not to interfere with the public emergency alarm reporting systems.