

1301:7-7-09**Fire protection systems.**(A) Section 901 General

- (1) 901.1 Scope. The provisions of this rule shall specify where fire protection systems are required and shall apply to the design, installation, inspection, operation, testing and maintenance of all fire protection systems. The requirements in this rule for fire protection systems in structures regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code submitted for plan review in accordance with this paragraph are subject to and do not supersede or otherwise conflict with the requirements of paragraph (D)(2)(a)(104.2.1) of rule 1301:7-7-01 of the Administrative Code.
- (2) 901.2 Construction documents. Notwithstanding the requirements of paragraph (D)(2)(a)(104.2.1) of rule 1301:7-7-01 of the Administrative Code, the fire code official shall have the authority to require construction documents and calculations for all fire protection systems and to require permits be obtained for the installation, rehabilitation or modification of any fire protection system. Construction documents for fire protection systems shall be submitted for review prior to system installation. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the construction documents shall be reviewed and approved by the fire code official prior to system installation.
- (3) 901.3 Permits. Permits shall be required as set forth in rule 1301:7-7-01 of the Administrative Code and as required by the building code as listed in rule 1301:7-7-47 of the Administrative Code.
- (4) 901.4 Installation. Fire protection systems shall be maintained in accordance with the original installation standards for that system. Required fire protection systems shall be extended, altered or augmented when necessary to maintain and continue protection whenever the building is altered, remodeled or added to. Alterations to fire protection systems shall be done in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code and applicable standards.
- (a) 901.4.1 Required fire protection systems. Fire protection systems required by this code or the building code as listed in rule 1301:7-7-47 of the Administrative Code shall be installed, repaired, operated, tested and maintained in accordance with this code.
- (b) 901.4.2 Nonrequired fire protection systems. Any fire protection system or portion thereof not required by this code or the building code as listed in rule 1301:7-7-47 of the Administrative Code shall be allowed to be furnished for partial or complete protection provided such installed system meets the applicable requirements of this code and the building code as listed in rule 1301:7-7-47 of the Administrative Code.

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- (c) 901.4.3 Additional fire protection systems. In occupancies of a hazardous nature, where special hazards exist in addition to the normal hazards of the occupancy, or where the fire code official determines that access for fire apparatus is unduly difficult, the fire code official shall have the authority to require additional safeguards. Such safeguards include, but shall not be limited to, the following: automatic fire detection systems, fire alarm systems, automatic fire-extinguishing systems, standpipe systems, or portable or fixed extinguishers. Fire protection equipment required under this paragraph shall be installed in accordance with this code and the applicable referenced standards.
- (d) 901.4.4 Appearance of equipment. Any device that has the physical appearance of life safety or fire protection equipment but that does not perform that life safety or fire protection function shall be prohibited.
- (5) 901.5 Installation acceptance testing. Fire detection and alarm systems, fire-extinguishing systems, fire hydrant systems, fire standpipe systems, fire pump systems, private fire service mains and all other fire protection systems and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as approved by the fire code official in accordance with this code and the building official in accordance with section 901.5 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.
1. The fire code official shall be notified by the responsible person of any scheduled acceptance testing of a fire protection system not less than forty-eight hours prior to the occurrence of such acceptance test. Advanced notice of the test schedule shall be given to the building official in accordance with section 901.5 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.
  2. When required by the fire code official all acceptance testing shall be conducted in the presence of the fire code official.
- (a) 901.5.1 Statement of compliance. Before requesting final inspection of the installation, where required by the fire code official, the installing contractor shall furnish a written statement to the fire code official that the subject fire protection system has been installed in accordance with plans approved by the building code official and has been tested in accordance with the manufacturer's specifications and the appropriate installation standard. Any deviations from the design standards shall be noted and copies of the approvals or such deviations shall be attached to the written statement.
- (b) 901.5.2 Occupancy. It shall be unlawful to occupy any portion of a

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building or structure until the required fire detection, alarm and suppression systems have been tested, inspected and approved by the fire code official in accordance with this code and the building official in accordance with section 901.5 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(6) 901.6 Inspection, testing and maintenance. Fire detection, alarm and extinguishing systems shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. Nonrequired fire protection systems and equipment shall be inspected, tested and maintained or removed. Any discontinuance or removal of nonrequired fire protection equipment shall be approved by the fire code official. Such approval shall be conditioned upon receipt of verification of building official determination that such fire protection equipment is nonrequired.

(a) 901.6.1 Standards. Fire protection systems shall be inspected, tested and maintained in accordance with the referenced standards listed in Table 901.6.1 of this rule.

**Table 901.6.1**  
**Fire protection system maintenance standards**

<b>System</b>	<b>Standard</b>
Portable fire extinguishers	NFPA 10 as listed in rule <del>1301:7-7-45</del> 1301:7-7-47 of the Administrative Code
Carbon dioxide fire-extinguishing systems	NFPA 12 as listed in rule <del>1301:7-7-45</del> 1301:7-7-47 of the Administrative Code
Halon 1301 fire-extinguishing systems	NFPA 12A as listed in rule <del>1301:7-7-45</del> 1301:7-7-47 of the Administrative Code
Dry-chemical extinguishing systems	NFPA 17 as listed in rule <del>1301:7-7-45</del> 1301:7-7-47 of the Administrative Code
Wet-chemical extinguishing systems	NFPA 17A as listed in rule <del>1301:7-7-45</del> 1301:7-7-47 of the Administrative Code
Water-based fire protection systems	NFPA 25 as listed in rule <del>1301:7-7-45</del> 1301:7-7-47 of the Administrative Code
Fire alarm systems	NFPA 72 as listed in rule <del>1301:7-7-45</del> 1301:7-7-47 of the Administrative Code
Water-mist systems	NFPA 750 as listed in rule <del>1301:7-7-45</del> 1301:7-7-47 of the Administrative Code
Clean-agent extinguishing systems	NFPA 2001 as listed in rule <del>1301:7-7-45</del> 1301:7-7-47 of the Administrative Code

(b) 901.6.2 Records. Records of all system inspections, tests and maintenance required by the referenced standards shall be maintained on the premises for a minimum of 3 years unless otherwise provided for by law or regulation and shall be copied to the fire code official upon

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request.

(i) 901.6.2.1 Records information. Initial records shall include the name of the installation contractor, type of components installed, the manufacturer of the components, location and number of components installed per floor. Records shall also include the manufacturer's operation and maintenance instruction manuals. Such records shall be maintained on the premises. Acceptance testing records (original documents) shall be retained for the life of the system.

(c) 901.6.3 Annual inspection tag for fire protection systems. An inspection tag shall be attached to each fire protection system near the main control valve, main panel, or other such appropriate and visible location as determined by the fire code official. The annual inspection tag shall contain the following information:

1. The individual performing the work and the state fire marshal installer certification number(s) (when applicable);

2. Date of test;

3. Results of inspection and test;

4. Deficiencies or impairments noted (yes or no).

(i) 901.6.3.1 When a sprinkler or standpipe system is found impaired or out of service, the tag requirement shall include an impairment tag in accordance with NFPA 25 as listed in rule 1301:7-7-47 of the Administrative Code.

(7) 901.7 Systems out of service. Where a required fire protection system is out of service, the fire department and the fire code official shall be notified immediately and, where required by the fire code official, the building shall either be evacuated or an approved fire watch shall be provided for all occupants left unprotected by the shutdown until the fire protection system has been returned to service.

Where utilized, fire watches shall be provided with at least one approved means for notification of the fire department and their only duty shall be to perform constant patrols of the protected premises and keep watch for fires.

(a) 901.7.1 Impairment coordinator. The building owner shall assign an impairment coordinator to comply with the requirements of this paragraph. In the absence of a specific designee, the owner shall be considered the impairment coordinator.

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- (b) 901.7.2 Tag required. A tag shall be used to indicate that a system, or portion thereof, has been removed from service.
- (c) 901.7.3 Placement of tag. The tag shall be posted at each fire department connection, system control valve, fire alarm control unit, fire alarm annunciator and fire command center, indicating which system, or part thereof, has been removed from service. The fire code official shall specify where the tag is to be placed.
- (d) 901.7.4 Preplanned impairment programs. Preplanned impairments shall be authorized by the impairment coordinator. Before authorization is given, a designated individual shall be responsible for verifying that all of the following procedures have been implemented:
- (i) The extent and expected duration of the impairment have been determined.
  - (ii) The areas or buildings involved have been inspected and the increased risks determined.
  - (iii) Recommendations have been submitted to management or building owner/manager.
  - (iv) The fire department has been notified.
  - (v) The insurance carrier, the alarm company, building owner/manager, and other authorities having jurisdiction have been notified.
  - (vi) The supervisors in the areas to be affected have been notified.
  - (vii) A tag impairment system has been implemented.
  - (viii) Necessary tools and materials have been assembled on the impairment site.
- (e) 901.7.5 Emergency impairments. When unplanned impairments occur, appropriate emergency action shall be taken to minimize potential injury and damage. The impairment coordinator shall implement the steps outlined in paragraph (A)(7)(d)(9017.4) of this rule.
- (f) 901.7.6 Restoring systems to service. When impaired equipment is restored to normal working order, the impairment coordinator shall verify that all of the following procedures have been implemented:
- (i) Necessary inspections and tests have been conducted to verify that affected systems are operational.

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(ii) Supervisors have been advised that protection is restored.

(iii) The fire department has been advised that protection is restored.

(iv) The building owner/manager, insurance carrier, alarm company, and other involved parties have been advised that protection is restored.

(v) The impairment tag has been removed.

(8) 901.8 Removal of or tampering with equipment. It shall be unlawful for any person to remove, tamper with or otherwise disturb any fire hydrant, fire detection and alarm system, fire suppression system, or other fire appliance required by this code except for the purpose of extinguishing fire, training purposes, recharging or making necessary repairs, or when approved by the fire code official.

(a) 901.8.1 Removal of or tampering with appurtenances. Locks, gates, doors, barricades, chains, enclosures, signs, tags or seals that have been installed by or at the direction of the fire code official shall not be removed, unlocked, destroyed, tampered with or otherwise vandalized in any manner.

(b) 901.8.2 Notification of termination of supervising service. The responsible person shall notify the local fire code official of the termination of any supervisory service within twenty-four (24) hours of such termination.

(9) 901.9 Recall of fire protection components. Any fire protection system component regulated by this code that is the subject of a voluntary or mandatory recall under federal law shall be replaced with approved, listed components in compliance with the referenced standards of this code. The fire code official shall be notified in writing by the building owner when the recalled component parts have been replaced.

#### (B) Section 902 Definitions

(1) 902.1 Definitions. The following words and terms shall, for the purposes of this rule and as used elsewhere in this code have the meanings shown herein.

"Alarm notification appliance." A fire alarm system component such as a bell, horn, speaker, light or text display that provide audible, tactile or visible outputs, or any combination thereof.

"Alarm signal." A signal indicating an emergency requiring immediate action, such as a signal indicative of fire.

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"Alarm verification feature." A feature of automatic fire detection and alarm systems to reduce unwanted alarms wherein smoke detectors report alarm conditions for a minimum period of time, or confirm alarm conditions within a given time period, after being automatically reset, in order to be accepted as a valid alarm-initiation signal.

"Annunciator." A unit containing one or more indicator lamps, alphanumeric displays or other equivalent means in which each indication provides status information about a circuit, condition or location.

"Audible alarm notification appliance." A notification appliance that alerts by the sense of hearing.

"Automatic." As applied to fire protection devices, a device or system providing an emergency function without the necessity for human intervention and activated as a result of a predetermined temperature rise, rate of temperature rise or combustion products.

"Automatic fire-extinguishing system." An approved system of devices and equipment which automatically detects a fire and discharges an approved fire-extinguishing agent onto or in the area of fire.

"Automatic smoke detection system." A fire alarm system that has initiation devices that utilize smoke detectors for protection of an area such as a room or space with detectors to provide early warning of fire.

"Automatic sprinkler system." An automatic sprinkler system, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which automatic sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the fire area.

"Average ambient sound level." The root mean square, A-weighted sound pressure level measured over a 24-hour period, or the time any person is present, whichever time period is less.

"Carbon dioxide extinguishing system." A system supplying carbon dioxide (CO<sub>2</sub>) from a pressurized vessel through fixed pipes and nozzles. The system includes a manual- or automatic-actuating mechanism.

"Clean agent." Electrically nonconducting, volatile or gaseous fire extinguishant that does not leave a residue upon evaporation.

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"Constantly attended location." A designated location at a facility staffed by trained personnel on a continuous basis where alarm or supervisory signals are monitored and facilities are provided for notification of the fire department or other emergency services.

"Deluge system." A sprinkler system employing open sprinklers attached to a piping system connected to a water supply through a valve that is opened by the operation of a detection system installed in the same area as the sprinklers. When this valve opens, water flows into the piping system and discharges from all sprinklers attached thereto.

"Detector, heat." A fire detector that senses heat either abnormally high temperature or rate of rise, or both.

"Dry-chemical extinguishing agent." A powder composed of small particles, usually of sodium bicarbonate, potassium bicarbonate, urea-potassium-based bicarbonate, potassium chloride or monoammonium phosphate, with added particulate material supplemented by special treatment to provide resistance to packing, resistance to moisture absorption (caking) and the proper flow capabilities.

"Elevator group." A grouping of elevators in a building located adjacent or directly across from one another that respond to a common hall call button(s).

"Emergency alarm system." A system to provide indication and warning of emergency situations involving hazardous materials.

"Emergency voice/alarm communications." Dedicated manual or automatic facilities for originating and distributing voice instructions, as well as alert and evacuation signals pertaining to a fire emergency, to the occupants of a building.

"Fire alarm box, manual." See "Manual fire alarm box."

"Fire alarm control unit." A system component that receives inputs from automatic and manual fire alarm devices and may be capable of supplying power to detection devices and transponder(s) or off-premises transmitter(s). The control unit may be capable of providing a transfer of power to the notification appliances and transfer of condition to relays or devices.

"Fire alarm signal." A signal initiated by a fire alarm-initiating device such as a manual fire alarm box, automatic fire detector, waterflow switch or other device whose activation is indicative of the presence of a fire or fire signature.

"Fire alarm system." A system or portion of a combination system consisting

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of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals.

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

"Fire detector, automatic." A device designed to detect the presence of a fire signature and to initiate action.

"Fire protection system." Approved devices, equipment and systems or combinations of systems used to detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination thereof.

"Fire safety functions." Building and fire control functions that are intended to increase the level of life safety for occupants or to control the spread of the harmful effects of fire.

[B] "Fixed base operator (FBO)." A commercial business granted the right by the airport sponsor to operate an airport and provide aeronautical services such as fueling, hangaring, tie-down and parking, aircraft rental, aircraft maintenance and flight instruction.

"Foam-extinguishing system." A special system discharging a foam made from concentrates, either mechanically or chemically, over the area to be protected.

"Halogenated extinguishing system." A fire-extinguishing system using one or more atoms of an element from the halogen chemical series: fluorine, chlorine, bromine and iodine.

"Impairment coordinator." The person responsible for the maintenance of a particular fire protection system.

"Initiating device." A system component that originates transmission of a change-of-state condition, such as in a smoke detector, manual fire alarm box, or supervisory switch.

"Manual fire alarm box." A manually operated device used to initiate an alarm signal.

"Multiple-station alarm device." Two or more single-station alarm devices

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that can be interconnected such that actuation of one causes all integral or separate audible alarms to operate. It also can consist of one single-station alarm device having connections to other detectors or to a manual fire alarm box.

"Nuisance alarm." An alarm caused by mechanical failure, malfunction, improper installation or lack of proper maintenance, or an alarm activated by a cause that cannot be determined.

"Record drawings." Drawings ("as built") that document the location of all devices, appliances, wiring, sequences, wiring methods and connections of the components of a fire alarm system as installed.

"Single-station smoke alarm." An assembly incorporating the detector, the control equipment and the alarm-sounding device in one unit, operated from a power supply either in the unit or obtained at the point of installation.

[B] "Sleeping unit." A room or space in which people sleep, which can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

"Smoke alarm." A single- or multiple-station alarm responsive to smoke.

"Smoke detector." A listed device that senses visible or invisible particles of combustion.

"Standpipe system, classes of." Standpipe classes are as follows:

"Class I system." A system providing 2½-inch (64 mm) hose connections to supply water for use by fire departments and those trained in handling heavy fire streams.

"Class II system." A system providing 1½-inch (38 mm) hose stations to supply water for use primarily by the building occupants or by the fire department during initial response.

"Class III system." A system providing 1½-inch (38 mm) hose stations to supply water for use by building occupants and 2½-inch (64 mm) hose connections to supply a larger volume of water for use by fire departments and those trained in handling heavy fire streams.

"Standpipes, types of." Standpipe types are as follows:

"Automatic dry." A dry standpipe system, normally filled with pressurized air, that is arranged through the use of a device, such as a dry pipe valve, to

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admit water into the system piping automatically upon the opening of a hose valve. The water supply for an automatic dry standpipe system shall be capable of supplying the system demand.

"Automatic wet." A wet standpipe system that has a water supply that is capable of supplying the system demand automatically.

"Manual dry." A dry standpipe system that does not have a permanent water supply attached to the system. Manual dry standpipe systems require water from a fire department pumper to be pumped into the system through the fire department connection in order to supply the system demand.

"Manual wet." A wet standpipe system connected to a water supply for the purpose of maintaining water within the system but which does not have a water supply capable of delivering the system demand attached to the system. Manual wet standpipe systems require water from a fire department pumper (or the like) to be pumped into the system in order to supply the system demand.

"Semiautomatic dry." A dry standpipe system that is arranged through the use of a device, such as a deluge valve, to admit water into the system piping upon activation of a remote control device located at a hose connection. A remote control activation device shall be provided at each hose connection. The water supply for a semiautomatic dry standpipe system shall be capable of supplying the system demand.

"Supervising station." A facility that receives signals and at which personnel are in attendance at all times to respond to these signals.

"Supervisory service." The service required to monitor performance of guard tours and the operative condition of fixed suppression systems or other systems for the protection of life and property.

"Supervisory signal." A signal indicating the need of action in connection with the supervision of guard tours, the fire suppression systems or equipment, or the maintenance features of related systems.

"Supervisory signal-initiating device." An initiating device such as a valve supervisory switch, water level indicator, or low-air pressure switch on a dry-pipe sprinkler system whose change of state signals an off-normal condition and its restoration to normal of a fire protection or life safety system; or a need for action in connection with guard tours, fire suppression systems or equipment, or maintenance features of related systems.

"Tires, bulk storage of." Storage of tires where the area available for storage exceeds 20,000 cubic feet (566m<sup>3</sup>).

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[B] "Transient aircraft." Aircraft based at another location and is at the transient location for not more than 90 days.

"Trouble signal." A signal initiated by the fire alarm system or device indicative of a fault in a monitored circuit or component.

"Visible alarm notification appliance." A notification appliance that alerts by the sense of sight.

"Wet-chemical extinguishing agent." A solution of water and potassium-carbonate-based chemical, potassium-acetate-based chemical or a combination thereof, forming an extinguishing agent.

"Wireless protection system." A system or a part of a system that can transmit and receive signals without the aid of wire.

"Zone." A defined area within the protected premises. A zone can define an area from which a signal can be received, an area to which a signal can be sent or an area in which a form or control can be executed.

"Zone, notification." An area within a building or facility covered by notification appliances which are activated simultaneously.

(C) Section 903 Automatic sprinkler systems

(1) 903.1 General. Automatic sprinkler systems shall comply with this paragraph.

(a) 903.1.1 Alternative protection. Alternative automatic fire-extinguishing systems complying with paragraph (D)(904) of this rule may be installed in lieu of automatic sprinkler protection where recognized by the applicable standard and approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the alternative automatic fire-extinguishing system shall be approved by the fire code official prior to system installation.

(2) 903.2 Where required. Approved automatic sprinkler systems in new buildings and structures shall be provided in the locations where required by the building code as listed in rule 1301:7-7-47 of the Administrative Code and as described in this paragraph. The requirements for automatic sprinkler systems in new buildings contained in this rule are subject to and do not supersede or otherwise conflict with the requirements of paragraph (D)(2)(a)(104.2.1) of rule 1301:7-7-01 of the Administrative Code.

Exception: Spaces or areas in telecommunications buildings used exclusively

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for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided those spaces or areas are equipped throughout with an automatic smoke detection system in accordance with paragraph (G)(2)(907.2) of this rule and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with section 707 of the building code as listed in rule 1301:7-7-47 of the Administrative Code or not less than 2-hour horizontal assemblies constructed in accordance with section 712 of the building code as listed in rule 1301:7-7-47 of the Administrative Code, or both.

(a) 903.2.1 Group A. An automatic sprinkler system shall be provided throughout buildings and portions thereof used as Group A occupancies as provided in this paragraph. For Group A-1, A-2, A-3 and A-4 occupancies, the automatic sprinkler system shall be provided throughout the floor area where the Group A-1, A-2, A-3 or A-4 occupancy is located, and in all floors from the Group A occupancy to, and including, the nearest level of exit discharge serving the Group A occupancy. For Group A-5 occupancies, the automatic sprinkler system shall be provided in the spaces indicated in paragraph (C)(2)(a)(iv)(903.2.1.5) of this rule.

(i) 903.2.1.1 Group A-1. An automatic sprinkler system shall be provided for Group A-1 occupancies where one of the following conditions exists:

(a) The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>);

(b) The fire area has an occupant load of 300 or more;

(c) The fire area is located on a floor other than a level of exit discharge serving such occupancies.

(d) The fire area contains a multitheater complex.

(ii) 903.2.1.2 Group A-2. An automatic sprinkler system shall be provided for Group A-2 occupancies where one of the following conditions exists:

(a) The fire area exceeds 5,000 square feet (464 m<sup>2</sup>).

(b) The fire area has an occupant load of 100 or more.

(c) The fire area is located on a floor other than a level of exit discharge serving such occupancies.

(iii) 903.2.1.3 Group A-3. An automatic sprinkler system shall be

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provided for Group A-3 occupancies where one of the following conditions exists:

(a) The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).

Exception: Fire areas used exclusively for religious worship services with fixed seating.

(b) The fire area has an occupant load of 300 or more.

Exceptions:

1. Fire areas used primarily for worship with fixed seating.

2. Fire areas without fixed seating not used for exhibition or display.

(c) The fire area is located on a floor other than a level of exit discharge serving such occupancies.

(iv) 903.2.1.4 Group A-4. An automatic sprinkler system shall be provided for Group A-4 occupancies where one of the following conditions exists:

(a) The fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).

(b) The fire area has an occupant load of 300 or more.

(c) The fire area is located on a floor other than a level of exit discharge serving such occupancies.

(v) 903.2.1.5 Group A-5. An automatic sprinkler system shall be provided for Group A-5 occupancies in the following areas: concession stands, retail areas, press boxes and other accessory use areas in excess of 1,000 square feet (93 m<sup>2</sup>).

(b) [F] 903.2.2 Group B ambulatory health care facilities. An automatic sprinkler system shall be installed throughout all fire areas containing a Group B ambulatory health care facility occupancy when either of the following conditions exist at any time:

(i) Four or more care recipients are incapable of self-preservation.

(ii) One or more care recipients who are incapable of self-preservation are located at other than the level of exit discharge serving such an occupancy.

(c) 903.2.3 Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:

(i) Throughout all Group E fire areas greater than 20,000 square feet (1858 m<sup>2</sup>) in area.

(ii) Throughout every portion of educational buildings below the lowest level of exit discharge serving that portion of the building.

Exception: An automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area where every classroom throughout the building has at least one exterior exit door at ground level.

(d) 903.2.4 Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exist:

1. A Group F-1 fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).

2. A Group F-1 fire area is located more than three stories above grade plane.

3. The combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).

(i) 903.2.4.1 Woodworking operations. An automatic sprinkler system shall be provided throughout all Group F-1 occupancy fire areas that contain woodworking operations in excess of 2,500 square feet in area (232 m<sup>2</sup>) which generate finely divided combustible waste or which use finely divided combustible materials.

(e) 903.2.5 Group H. Automatic sprinkler systems shall be provided in high-hazard occupancies as required in paragraphs (C)(2)(e)(i)(903.2.5.1) to (C)(2)(e)(iii)(903.2.5.3) of this rule.

(i) 903.2.5.1 General. An automatic sprinkler system shall be installed in Group H occupancies.

(ii) 903.2.5.2 Group H-5 occupancies. An automatic sprinkler system shall be installed throughout buildings containing Group H-5 occupancies. The design of the sprinkler system shall not be less than that required under the building code as listed in rule 1301:7-7-47 of the Administrative Code for the occupancy hazard classifications in accordance with Table 903.2.5.2 of this rule.

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Where the design area of the sprinkler system consists of a corridor protected by one row of sprinklers, the maximum number of sprinklers required to be calculated is 13.

**Table 903.2.4.2 903.2.5.2  
Group H-5 sprinkler design criteria**

<b>Location</b>	<b>Occupancy hazard classification</b>
Fabrication areas	Ordinary hazard group 2
Service corridors	Ordinary hazard group 2
Storage rooms without dispensing	Ordinary hazard group 2
Storage rooms with dispensing	Extra hazard group 2
Corridors	Ordinary hazard group 2

(iii) 903.2.5.3 Pyroxylin plastics. An automatic sprinkler system shall be provided in buildings, or portions thereof, where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg).

(f) 903.2.6 Group I. An automatic sprinkler system shall be provided throughout buildings with a Group I fire area.

Exceptions:

1. An automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(ii)(903.3.1.2) or (C)(3)(a)(iii)(903.3.1.3) of this rule shall be allowed in Group I-1 facilities.

2. An automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(ii)(903.3.1.2) of this rule shall be allowed in Group I-4 facilities.

(g) 903.2.7 Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exist:

1. A Group M fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).

2. A Group M fire area is located more than three stories above grade plane.

3. The combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).

4. A Group M occupancy is used for the display and sale of upholstered

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furniture.

(i) 903.2.7.1 High-piled storage. An automatic sprinkler system shall be provided as required in rule 1301:7-7-23 of the Administrative Code in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.

(h) 903.2.8 Group R. An automatic sprinkler system installed in accordance with paragraph (C)(3)(903.3) of this rule shall be provided throughout all buildings with a Group R fire area.

Exceptions:

1. An automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(ii)(903.3.1.2) of this rule shall be allowed in buildings, or portions thereof, of Group R.

2. An automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(ii)(903.3.1.3) of this rule shall be allowed in R-3 and R-4 buildings.

3. An automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(ii)(903.3.1.2) or (C)(3)(a)(iii)(903.3.1.3) of this rule shall be allowed in one, two or three family dwellings constructed of industrialized units.

4. Buildings of Group R-2 permitted to have a single exit per section 1018.2 of the building code as listed in rule 1301:7-7-47 of the Administrative Code where:

4.1 The exit is constructed as an exterior stair per section 1022 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

4.2 The dwellings egress directly into an exit.

4.3 Two-hour fire barriers divide the building into fire areas with a maximum of two dwelling units per floor and not more than six units per fire area, and;

4.4 All units in the fire area must have separations as required by section 708.1 of the building code as listed in rule 1301:7-7-47 of the Administrative Code for dwelling units.

(i) 903.2.9 Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exist:

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1. A Group S-1 fire area exceeds 12,000 square feet (1115 m<sup>2</sup>).
  2. A Group S-1 fire area is located more than three stories above grade plane.
  3. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).
  4. A Group S-1 fire area used for the storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m<sup>2</sup>).
- (i) 903.2.9.1 Repair garages. An automatic sprinkler system shall be provided throughout all buildings used as repair garages in accordance with section 406 of the building code as listed in rule 1301:7-7-47 of the Administrative Code, as shown:
- (a) Buildings having two or more stories above grade plane, including basements, with a fire area containing a repair garage exceeding 10,000 square feet (929 m<sup>2</sup>).
  - (b) Buildings no more than one story above grade plane, with a fire area containing a repair garage exceeding 12,000 square feet (1115 m<sup>2</sup>).
  - (c) Buildings with repair garages servicing vehicles parked in basements.
  - (d) A Group S-1 fire area used for the repair of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m<sup>2</sup>).
- (ii) 903.2.9.2 Bulk storage of tires. Buildings and structures where the area for the storage of tires exceeds 20,000 cubic feet (566 m<sup>3</sup>) shall be equipped throughout with an automatic sprinkler system in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule.
- (j) 903.2.10 Group S-2 enclosed parking garages. An automatic sprinkler system shall be provided throughout buildings classified as enclosed parking garages in accordance with section 406.4 of the building code as listed in rule 1301:7-7-47 of the Administrative Code as follows:
1. Where the fire area of the enclosed parking garage exceeds 12,000 square feet (1115 m<sup>2</sup>); or
  2. Where the enclosed parking garage is located beneath other groups.

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Exception: Enclosed parking garages located beneath Group R-3 occupancies.

(i) 903.2.10.1 Commercial parking garages. An automatic sprinkler system shall be provided throughout buildings used for storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m<sup>2</sup>).

(k) 903.2.11 Specific buildings areas and hazards. In all occupancies an automatic sprinkler system shall be installed for building design or hazards in the locations set forth in paragraphs (C)(2)(k)(i)(903.2.11.1) to (C)(2)(k)(vi)(903.2.11.6) of this rule.

Exception: Groups R-3 and U.

(i) 903.2.11.1 Stories without openings. An automatic sprinkler system shall be installed throughout all stories, including basements, of all buildings where the floor area exceeds 1,500 square feet (139.4 m<sup>2</sup>) and where there is not provided at least one of the following types of exterior wall openings:

1. Openings below grade that lead directly to ground level by an exterior stairway complying with paragraph (I)(1009) of rule 1301:7-7-10 of the Administrative Code or an outside ramp complying with paragraph (J)(1010) of rule 1301:7-7-10 of the Administrative Code. Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm).

2. Openings entirely above the adjoining ground level totaling at least 20 square feet (1.86 m<sup>2</sup>) in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm).

(a) 903.2.11.1.1 Opening dimensions and access. Openings shall have a minimum dimension of not less than 30 inches (762 mm). Such openings shall be accessible to the fire department from the exterior and shall not be obstructed in a manner that fire fighting or rescue cannot be accomplished from the exterior.

(b) 903.2.11.1.2 Openings on one side only. Where openings in a

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story are provided on only one side and the opposite wall of such story is more than 75 feet (22 860 mm) from such openings, the story shall be equipped throughout with an approved automatic sprinkler system or openings as specified above shall be provided on at least two sides of the story.

(c) 903.2.11.1.3 Basements. Where any portion of a basement is located more than 75 feet (22 860 mm) from openings required by paragraph (C)(2)(k)(i)(903.2.11.1) of this rule, the basement shall be equipped throughout with an approved automatic sprinkler system.

(ii) 903.2.11.2 Rubbish and linen chutes. An automatic sprinkler system shall be installed at the top of rubbish and linen chutes and in their termination rooms. Chutes extending through three or more floors shall have additional sprinkler heads installed within such chutes at alternate floors. Chute sprinklers shall be accessible for servicing.

(iii) 903.2.11.3 Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout buildings with a floor level having an occupant load of 30 or more that is located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access.

Exceptions:

1. Airport control towers.
2. Open parking structures.
3. Occupancies in Group F-2.

(iv) 903.2.11.4 Ducts conveying hazardous exhausts. Where required by the mechanical code as listed in rule 1301:7-7-47 of the Administrative Code, automatic sprinklers shall be provided in ducts conveying hazardous exhaust, flammable or combustible materials.

Exception: Ducts in which the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).

(v) 903.2.11.5 Commercial cooking operations. An automatic sprinkler system shall be installed in a commercial kitchen exhaust hood and duct system where an automatic sprinkler system is used to comply with paragraph (D)(904) of this rule.

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(vi) 903.2.11.6 Other required suppression system. In addition to the requirements of paragraph (C)(2)(903.2) of this rule, the provisions indicated in Table 903.2.11.6 of this rule also require the installation of a fire suppression system for certain buildings and areas.

**Table 903.2.11.6**  
**Additional required fire-extinguishing systems**

<u>Section</u>	<u>Subject</u>
<u>914.2.1</u>	<u>Covered malls</u>
<u>914.3.1</u>	<u>High rise buildings</u>
<u>914.4.1</u>	<u>Atriums</u>
<u>914.5.1</u>	<u>Underground structures</u>
<u>914.6.1</u>	<u>Stages</u>
<u>914.7.1</u>	<u>Special amusement buildings</u>
<u>914.8.2, 914.8.5</u>	<u>Aircraft hangars</u>
<u>914.9</u>	<u>Flammable finishes</u>
<u>914.10</u>	<u>Drying rooms</u>
<u>914.11.1</u>	<u>Group B ambulatory health care facilities</u>
<u>1024.6.2.3</u>	<u>Smoke-protected seating</u>
<u>1208.2</u>	<u>Dry cleaning plants</u>
<u>1208.3</u>	<u>Dry cleaning machines</u>
<u>1504.2</u>	<u>Spray finishing in Group A, E, I or R</u>
<u>1504.4</u>	<u>Spray booths and spray rooms</u>
<u>1505.2</u>	<u>Dip-tank rooms in Group A, I or R</u>
<u>1505.4.1</u>	<u>Dip tanks</u>
<u>1505.9.4</u>	<u>Hardening and tempering tanks</u>
<u>1803.10</u>	<u>HPM facilities</u>
<u>1803.10.1.1</u>	<u>HPM work station exhaust</u>
<u>1803.10.2</u>	<u>HPM gas cabinets and exhausted enclosures</u>
<u>1803.10.3</u>	<u>HPM exit access corridor</u>
<u>1803.10.4</u>	<u>HPM exhaust ducts</u>
<u>1803.10.4.1</u>	<u>HPM noncombustible ducts</u>
<u>1803.10.4.2</u>	<u>HPM combustible ducts</u>
<u>1907.3</u>	<u>Lumber production conveyor enclosures</u>
<u>1908.7</u>	<u>Recycling facility conveyor enclosures</u>
<u>2106.1</u>	<u>Class A and B ovens</u>
<u>2106.2</u>	<u>Class C and D ovens</u>
<u>2209.3.2.6.2</u>	<u>Hydrogen motor fuel-dispensing area canopies</u>

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**Table 903.2.11.6 cont'd**  
**Additional required fire-extinguishing systems**

<b>Section</b>	<b>Subject</b>
Table 2306.2	Storage fire protection
2306.4	Storage
2703.8.4.1	Gas rooms
2703.8.5.3	Exhausted enclosures
2704.5	Indoor storage of hazardous materials
2705.1.8	Indoor dispensing of hazardous materials
2804.4.1	Aerosol warehouses
2806.3.2	Aerosol display and merchandising areas
2904.5	Storage of more than 1,000 cubic feet of loose combustible fibers
3306.5.2.1	Storage of smokeless propellant
3306.5.2.3	Storage of small arms primers
3404.3.7.5.1	Flammable and combustible liquid storage rooms
3404.3.8.4	Flammable and combustible liquid storage warehouses
3405.3.7.3	Flammable and combustible liquid Group H-2 or H-3 areas
3704.1.2	Gas cabinets for highly toxic and toxic gas
3704.1.3	Exhausted enclosures for highly toxic and toxic gas
3704.2.2.6	Gas rooms for highly toxic and toxic gas
3704.3.3	Outdoor storage for highly toxic and toxic gas
4204.1.1	Pyroxylin plastic storage cabinets
4204.1.3	Pyroxylin plastic storage vaults
4204.2	Pyroxylin plastic storage and manufacturing
4603.4.1	Pyroxylin plastic storage in existing buildings
4603.4.2	Existing Group I-2 occupancies
<i>The building code as listed in rule 1301:7-7-47 of the Administrative Code</i>	<i>Sprinkler system requirements as set forth in section 903.2.11.6 of the building code as listed in rule 1301:7-7-47 of the Administrative Code</i>

For SI: 1 cubic foot = 0.023 m<sup>3</sup>.

- (1) 903.2.12 During construction. Automatic sprinkler systems required during construction, alteration and demolition operations shall be provided in accordance with paragraph (N)(1414) of rule 1301:7-7-14 of the Administrative Code.
- (3) 903.3 Installation requirements. Automatic sprinkler systems shall be designed and installed in accordance with paragraphs (C)(3)(a)(903.3.1) to (C)(3)(g)(903.3.7) of this rule.

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(a) 903.3.1 Standards. Sprinkler systems shall be designed and installed in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule, unless otherwise permitted by paragraphs (C)(3)(a)(ii)(903.3.1.2) and (C)(3)(a)(iii)(903.3.1.3) of this rule.

(i) 903.3.1.1 NFPA 13 sprinkler systems. Where the provisions of this code require that a building or portion thereof be equipped throughout with an automatic sprinkler system in accordance with this paragraph, sprinklers shall be installed throughout in accordance with NFPA 13 as listed in rule 1301:7-7-47 of the Administrative Code except as provided in paragraph (C)(3)(a)(i)(a)(903.3.1.1.1) of this rule.

(a) 903.3.1.1.1 Exempt locations. Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an approved automatic fire detection system in accordance with paragraph (G)(2)(907.2) of this rule that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from any room merely because it is damp, or fire-resistance-rated construction or contains electrical equipment.

(i) Any room where the application of water, or flame and water, constitutes a serious life or fire hazard.

(ii) Any room or space where sprinklers are considered undesirable because of the nature of the contents, when approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the exempt location shall be approved by the fire code official prior to system installation.

(iii) Generator and transformer rooms separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a fire-resistance rating of not less than 2 hours.

(iv) Rooms or areas that are of noncombustible construction with wholly noncombustible contents.

(v) Fire service access elevator machine rooms and machinery spaces.

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- (ii) 903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group I-1, I-4 and R occupancies up to and including four stories in height shall be permitted to be installed throughout in accordance with NFPA 13R as listed in rule 1301:7-7-47 of the Administrative Code.
- (a) 903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units where the building is of Type V construction, provided there is a roof or deck above. Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.
- (iii) 903.3.1.3 NFPA 13D sprinkler systems. Automatic sprinkler systems in Groups I-1 and R, shall be permitted to be installed throughout in accordance with NFPA 13D as listed in rule 1301:7-7-47 of the Administrative Code.
- (b) 903.3.2 Quick-response and residential sprinklers. Where automatic sprinkler systems are required by this code, quick-response or residential automatic sprinklers shall be installed in the following areas in accordance with paragraph (C)(3)(a)(903.3.1) of this rule and their listings:
- (i) Throughout all spaces within a smoke compartment containing patient sleeping units in Group I-2 in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code.
- (ii) Dwelling units and sleeping units in Group R and I-1 occupancies.
- (iii) Light-hazard occupancies as defined in NFPA 13 as listed in rule 1301:7-7-47 of the Administrative Code.
- (c) 903.3.3 Obstructed locations. Automatic sprinklers shall be installed with due regard to obstructions that will delay activation or obstruct the water distribution pattern. Automatic sprinklers shall be installed in or under covered kiosks, displays, booths, concession stands or equipment that exceeds 4 feet (1219 mm) in width. Not less than a 3-foot (914 mm) clearance shall be maintained between automatic sprinklers and the top of piles of combustible fibers.

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Exception: Kitchen equipment under exhaust hoods protected with a fire-extinguishing system in accordance with paragraph (D)(904) of this rule.

(d) 903.3.4 Actuation. Automatic sprinkler systems shall be automatically actuated unless specifically provided for in this code.

(e) 903.3.5 Water supplies. Water supplies for automatic sprinkler systems shall comply with this paragraph and the standards referenced in paragraph (C)(3)(a)(903.3.1) of this rule. The potable water supply shall be protected against backflow in accordance with the requirements of this paragraph and the plumbing code as listed in rule 1301:7-7-47 of the Administrative Code.

(i) 903.3.5.1 Domestic services. Where the domestic service provides the water supply for the automatic sprinkler system, the supply shall be in accordance with this paragraph.

(a) 903.3.5.1.1 Limited area sprinkler systems. Limited area sprinkler systems serving fewer than 20 sprinklers on any single connection are permitted to be connected to the domestic service where a wet automatic standpipe is not available. Limited area sprinkler systems connected to domestic water supplies shall comply with each of the following requirements:

(i) Valves shall not be installed between the domestic water riser control valve and the sprinklers.

Exception: An approved indicating control valve supervised in the open position in accordance with paragraph (C)(4)(903.4) of this rule.

(ii) The domestic service shall be capable of supplying the simultaneous domestic demand and the sprinkler demand required to be hydraulically calculated by NFPA 13, NFPA 13R or NFPA 13D as listed in rule 1301:7-7-47 of the Administrative Code.

(b) 903.3.5.1.2 Residential combination services. A single combination water supply shall be allowed provided that the domestic demand is added to the sprinkler demand as required by NFPA 13R as listed in rule 1301:7-7-47 of the Administrative Code.

(ii) 903.3.5.2 Secondary water supply. A secondary on-site water

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supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings assigned to seismic design category C, D, E or F as determined by the building code as listed in rule 1301:7-7-47 of the Administrative Code. The secondary water supply shall have a duration not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13 as listed in rule 1301:7-7-47 of the Administrative Code.

Exception: Existing buildings.

(f) 903.3.6 Hose threads. Fire hose threads and fittings used in connection with automatic sprinkler systems shall be as prescribed by the fire code official.

(g) 903.3.7 Fire department connections. The location of fire department connections shall be approved by the fire code official.

(i) 903.3.7.1 Locking fire department connection ("FDC") caps. Where required by the fire code official and the responding fire department carries appropriate key wrenches for removal, locking "FDC" caps on fire department connections for water-based fire protection systems shall be provided.

(4) 903.4 Sprinkler system supervision and alarms. All valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels and temperatures, critical air pressures and water-flow switches on all sprinkler systems shall be electrically supervised by a listed fire alarm control unit.

Exceptions:

1. Automatic sprinkler systems protecting one- and two-family dwellings.

2. Limited area systems serving fewer than 20 sprinklers.

3. Automatic sprinkler systems installed in accordance with NFPA 13R as listed in rule 1301:7-7-47 of the Administrative Code where a common supply main is used to supply both domestic water and the automatic sprinkler system, and a separate shutoff valve for the automatic sprinkler system is not provided.

4. Jockey pump control valves that are sealed or locked in the open position.

5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.

6. Valves controlling the fuel supply to fire pump engines that are sealed or

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locked in the open position.

7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.

(a) 903.4.1 Monitoring. Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an approved supervising station or, when approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule, shall sound an audible signal at a constantly attended location. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the constantly attended location shall be approved by the fire code official prior to system installation.

Exceptions:

1. Underground key or hub valves in roadway boxes provided by the municipality or public utility are not required to be monitored.

2. Backflow prevention device test valves located in limited area sprinkler supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code and separately annunciated.

(b) 903.4.2 Alarms. Approved audible devices shall be connected to every automatic sprinkler system. Such sprinkler water-flow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Alarm devices shall be provided on the exterior of the building in an approved location. Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuate the building fire alarm system.

Exception: Water-flow alarms are not required for limited area sprinkler systems installed in accordance with paragraph (C)(3)(e)(i)(a)(903.3.5.1.1) of this rule.

(c) 903.4.3 Floor control valves. Approved supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.

(5) 903.5 Testing and maintenance. Sprinkler systems shall be tested and maintained in accordance with paragraph (A)(901) of this rule.

(6) 903.6 Existing buildings. The provisions of this paragraph are intended to

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provide a reasonable degree of safety in existing structures not complying with the minimum requirements of the building code as listed in rule 1301:7-7-47 of the Administrative Code by requiring installation of an automatic fire-extinguishing system.

(a) 903.6.1 Pyroxylin plastics. All structures occupied for the manufacture or storage of articles of cellulose nitrate (pyroxylin) plastic shall be equipped with an approved automatic fire-extinguishing system where required in rule 1301:7-7-46 of the Administrative Code.

(b) 903.6.2 Group I-2. An automatic sprinkler system shall be provided throughout Group I-2 fire areas where required in rule 1301:7-7-46 of the Administrative Code.

(D) Section 904 Alternative automatic-fire extinguishing systems

(1) 904.1 General. Automatic fire-extinguishing systems, other than automatic sprinkler systems, shall be designed, installed, inspected, tested and maintained in accordance with the provisions of this paragraph and the applicable referenced standards.

(2) 904.2 Where required. Automatic fire-extinguishing systems installed as an alternative to the required automatic sprinkler systems of paragraph (C)(903) of this rule shall be approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the alternative automatic fire-extinguishing system shall be approved by the fire code official prior to system installation. Automatic fire-extinguishing systems shall not be considered alternatives for the purposes of exceptions or reductions permitted by other requirements of this code.

(a) 904.2.1 Commercial hood and duct systems. Each required commercial kitchen exhaust hood and duct system required by paragraph (D)(609) of rule 1301:7-7-06 of the Administrative Code to have a Type I hood shall be protected with an approved automatic fire-extinguishing system installed in accordance with this code.

(3) 904.3 Installation. Automatic fire-extinguishing systems shall be installed in accordance with this paragraph.

(a) 904.3.1 Electrical wiring. Electrical wiring shall be in accordance with NFPA 70 as listed in rule 1301:7-7-47 of the Administrative Code.

(b) 904.3.2 Actuation. Automatic fire-extinguishing systems shall be automatically actuated and provided with a manual means of actuation in accordance with paragraph (D)(11)(a)(904.11.1) of this rule.

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- (c) 904.3.3 System interlocking. Automatic equipment interlocks with fuel shutoffs, ventilation controls, door closers, window shutters, conveyor openings, smoke and heat vents, and other features necessary for proper operation of the fire-extinguishing system shall be provided as required by the design and installation standard utilized for the hazard.
- (d) 904.3.4 Alarms and warning signs. Where alarms are required to indicate the operation of automatic fire-extinguishing systems, distinctive audible, visible alarms and warning signs shall be provided to warn of pending agent discharge. Where exposure to automatic-extinguishing agents poses a hazard to persons and a delay is required to ensure the evacuation of occupants before agent discharge, a separate warning signal shall be provided to alert occupants once agent discharge has begun. Audible signals shall be in accordance with paragraph (G)(6)(b)(907.6.2) of this rule.
- (e) 904.3.5 Monitoring. Where a building fire alarm system is installed, automatic fire-extinguishing systems shall be monitored by the building fire alarm system in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.
- (4) 904.4 Inspection and testing. Automatic fire-extinguishing systems shall be inspected and tested in accordance with the provisions of this paragraph prior to acceptance.
- (a) 904.4.1 Inspection. Prior to conducting final acceptance tests, the following items shall be inspected:
- (i) Hazard specification for consistency with design hazard.
  - (ii) Type, location and spacing of automatic- and manual-initiating devices.
  - (iii) Size, placement and position of nozzles or discharge orifices.
  - (iv) Location and identification of audible and visible alarm devices.
  - (v) Identification of devices with proper designations.
  - (vi) Operating instructions.
- (b) 904.4.2 Alarm testing. Notification appliances, connections to fire alarm systems, and connections to approved supervising stations shall be tested in accordance with this paragraph and paragraph (G)(907) of this rule to verify proper operation.

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- (i) 904.4.2.1 Audible and visible signals. The audibility and visibility of notification appliances signaling agent discharge or system operation, where required, shall be verified.
- (c) 904.4.3 Monitor testing. Connections to protected premises and supervising station fire alarm systems shall be tested to verify proper identification and retransmission of alarms from automatic fire-extinguishing systems.
- (5) 904.5 Wet-chemical systems. Wet-chemical extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 17A as listed in rule 1301:7-7-47 of the Administrative Code and their listing.
- (a) 904.5.1 System test. Systems shall be inspected and tested for proper operation at 6-month intervals. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing system units shall be weighed and the required amount of agent verified. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals indicated by the manufacturer.
- (b) 904.5.2 Fusible link maintenance. Fixed temperature-sensing elements shall be maintained in accordance with NFPA 17A as listed in rule 1301:7-7-47 of the Administrative Code to ensure proper operation of the system.
- (6) 904.6 Dry-chemical systems. Dry-chemical extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 17 as listed in rule 1301:7-7-47 of the Administrative Code and their listing.
- (a) 904.6.1 System test. Systems shall be inspected and tested for proper operation at 6-month intervals. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing system units shall be weighed, and the required amount of agent verified. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals indicated by the manufacturer.
- (b) 904.6.2 Fusible link maintenance. Fixed temperature-sensing elements shall be maintained to ensure proper operation of the system.
- (7) 904.7 Foam systems. Foam-extinguishing systems shall be installed,

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maintained, periodically inspected and tested in accordance with NFPA 11 and NFPA 16 as listed in rule 1301:7-7-47 of the Administrative Code and their listing.

(a) 904.7.1 System test. Foam-extinguishing systems shall be inspected and tested at intervals in accordance with NFPA 25 as listed in rule 1301:7-7-47 of the Administrative Code.

(8) 904.8 Carbon dioxide systems. Carbon dioxide extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 12 as listed in rule 1301:7-7-47 of the Administrative Code and their listing.

(a) 904.8.1 System test. Systems shall be inspected and tested for proper operation at 12-month intervals.

(b) 904.8.2 High-pressure cylinders. High-pressure cylinders shall be weighed and the date of the last hydrostatic test shall be verified at 6-month intervals. Where a container shows a loss in original content of more than 10 per cent, the cylinder shall be refilled or replaced.

(c) 904.8.3 Low-pressure containers. The liquid-level gauges of low-pressure containers shall be observed at one-week intervals. Where a container shows a content loss of more than 10 per cent, the container shall be refilled to maintain the minimum gas requirements.

(d) 904.8.4 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At five-year intervals, all hoses shall be tested.

(i) 904.8.4.1 Test procedure. Hoses shall be tested at not less than 2,500 pounds per square inch (psi) (17 238 kPa) for high-pressure systems and at not less than 900 psi (6206 kPa) for low-pressure systems.

(e) 904.8.5 Auxiliary equipment. Auxiliary and supplementary components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated a 12-month intervals to ensure that such components are in proper operating condition.

(9) 904.9 Halon systems. Halogenated extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 12A as listed in rule 1301:7-7-47 of the Administrative Code and their listing.

(a) 904.9.1 System test. Systems shall be inspected and tested for proper operation at 12-month intervals.

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- (b) 904.9.2 Containers. The extinguishing agent quantity and pressure of containers shall be checked at 6-month intervals. Where a container shows a loss of original weight of more than 5 per cent or a loss in original pressure (adjusted for temperature) of more than 10 per cent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.
- (c) 904.9.3 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At 5-year intervals, all hoses shall be tested.
- (i) 904.9.3.1 Test procedure. For Halon 1301 systems, hoses shall be tested at not less than 1,500 psi (10 343 kPa) for 600 psi (4137 kPa) charging pressure systems and not less than 900 psi (6206 kPa) for 360 psi (2482 kPa) charging pressure systems. For Halon 1211 hand-hose line systems, hoses shall be tested at 2,500 psi (17 238 kPa) for high-pressure systems and 900 psi (6206 kPa) for low-pressure systems.
- (d) 904.9.4 Auxiliary equipment. Auxiliary and supplementary components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated at 12-month intervals to ensure such components are in proper operating condition.
- (10) 904.10 Clean-agent systems. Clean-agent fire-extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 2001 as listed in rule 1301:7-7-47 of the Administrative Code and their listing.
- (a) 904.10.1 System test. Systems shall be inspected and tested for proper operation at 12-month intervals.
- (b) 904.10.2 Containers. The extinguishing agent quantity and pressure of the containers shall be checked at 6-month intervals. Where a container shows a loss in original weight of more than 5 per cent or a loss in original pressure, adjusted for temperature, of more than 10 per cent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.
- (c) 904.10.3 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. All hoses shall be tested at 5-year intervals.
- (11) 904.11 Commercial cooking systems. The automatic fire-extinguishing system for commercial cooking systems shall be of a type recognized for protection

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of commercial cooking equipment and exhaust systems of the type and arrangement protected. Preengineered automatic dry- and wet-chemical extinguishing systems shall be tested in accordance with UL 300 as listed in rule 1301:7-7-47 of the Administrative Code and listed and labeled for the intended application. Other types of automatic fire-extinguishing systems shall be listed and labeled for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, its listing and the manufacturer's installation instructions. Automatic fire-extinguishing systems of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. Carbon dioxide extinguishing systems, NFPA 12 as listed in rule 1301:7-7-47 of the Administrative Code.
2. Automatic sprinkler systems, NFPA 13 as listed in rule 1301:7-7-47 of the Administrative Code.
3. Foam-water sprinkler system or foam-water spray systems, NFPA 16 as listed in rule 1301:7-7-47 of the Administrative Code.
4. Dry-chemical extinguishing systems, NFPA 17 as listed in rule 1301:7-7-47 of the Administrative Code.
5. Wet-chemical extinguishing systems, NFPA 17A as listed in rule 1301:7-7-47 of the Administrative Code.

Exception: Factory-built commercial cooking recirculating systems that are tested in accordance with UL 710B as listed in rule 1301:7-7-47 of the Administrative Code and listed, labeled and installed in accordance with section 304.1 of the mechanical code as listed in rule 1301:7-7-47 of the Administrative Code.

(a) 904.11.1 Manual system operation. A manual actuation device shall be located at or near a means of egress from the cooking area a minimum of 10 feet (3048 mm) and a maximum of 20 feet (6096 mm) from the kitchen exhaust system. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

Exception: Automatic sprinkler systems shall not be required to be equipped with manual actuation means.

(b) 904.11.2 System interconnection. The actuation of the fire extinguishing system shall automatically shut down the fuel or electrical power

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supply to the cooking equipment. The fuel and electrical supply reset shall be manual.

(c) 904.11.3 Carbon dioxide systems. When carbon dioxide systems are used, there shall be a nozzle at the top of the ventilating duct. Additional nozzles that are symmetrically arranged to give uniform distribution shall be installed within vertical ducts exceeding 20 feet (6096 mm) and horizontal ducts exceeding 50 feet (15 240 mm). Dampers shall be installed at either the top or the bottom of the duct and shall be arranged to operate automatically upon activation of the fire-extinguishing system. When the damper is installed at the top of the duct, the top nozzle shall be immediately below the damper. Automatic carbon dioxide fire-extinguishing systems shall be sufficiently sized to protect all hazards venting through a common duct simultaneously.

(i) 904.11.3.1 Ventilation system. Commercial-type cooking equipment protected by an automatic carbon dioxide extinguishing system shall be arranged to shut off the ventilation system upon activation.

(d) 904.11.4 Special provisions for automatic sprinkler systems. Automatic sprinkler systems protecting commercial-type cooking equipment shall be supplied from a separate, readily accessible, indicating-type control valve that is identified.

(i) 904.11.4.1 Listed sprinklers. Sprinklers used for the protection of fryers shall be tested in accordance with UL 199 E as listed in rule 1301:7-7-47 of the Administrative Code, listed for that application and installed in accordance with their listing.

(e) 904.11.5 Portable fire extinguishers for commercial cooking equipment. Portable fire extinguishers shall be provided within a 30-foot (9144 mm) travel distance of commercial-type cooking equipment. Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K rated portable extinguisher in accordance with paragraphs (D)(11)(e)(i)(904.11.5.1) or (D)(11)(e)(ii)(904.11.5.2) of this rule, as applicable.

(i) 904.11.5.1 Portable fire extinguishers for solid fuel cooking appliances. All solid fuel cooking appliances, whether or not under a hood, with fireboxes 5 cubic feet (0.14 m<sup>3</sup>) or less in volume shall have a minimum 2.5-gallon (9 L) or two 1.5-gallon (6 L) Class K wet-chemical portable fire extinguishers located in accordance with paragraph (D)(11)(e)(904.11.5) of this rule.

(ii) 904.11.5.2 Class K portable fire extinguishers for deep fat fryers.

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When hazard areas include deep fat fryers, listed Class K portable fire extinguishers shall be provided as follows:

- (a) For up to four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: One Class K portable fire extinguisher of a minimum 1.5 gallon (6 L) capacity.
  - (b) For every additional group of four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: One additional Class K portable fire extinguisher with a minimum 1.5 gallon (6 L) capacity shall be provided.
  - (c) For individual fryers exceeding 6 square feet (0.55 m<sup>2</sup>) in surface area: Class K portable fire extinguishers shall be installed in accordance with the extinguisher manufacturer's recommendations.
- (f) 904.11.6 Operations and maintenance. Automatic fire-extinguishing systems protecting commercial cooking systems shall be maintained in accordance with paragraphs (D)(11)(f)(i)(904.11.6.1) to (D)(11)(f)(iii)(904.11.6.3) of this rule.
- (i) 904.11.6.1 Existing automatic fire extinguishing systems. Where changes in the cooking media, positioning of cooking equipment or replacement of cooking equipment occur in existing commercial cooking systems, the automatic fire-extinguishing system shall be required to comply with the applicable provisions of paragraphs (D)(11)(904.11) to (D)(11)(d)(904.11.4) of this rule.
  - (ii) 904.11.6.2 Extinguishing system service. Automatic fire-extinguishing systems shall be serviced at least every 6 months and after activation of the system. Inspection shall be by qualified individuals, and a certificate of inspection shall be forwarded to the fire code official upon completion.
  - (iii) 904.11.6.3 Fusible link and sprinkler head replacement. Fusible links and automatic sprinkler heads shall be replaced at least annually, and other protection devices shall be serviced or replaced in accordance with the manufacturer's instructions.

Exception: Frangible bulbs are not required to be replaced annually.

#### (E) Section 905 Standpipe systems

- (1) 905.1 General. Standpipe systems shall be provided in new buildings and

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structures in accordance with this paragraph. Fire hose threads used in connection with standpipe systems shall be approved and shall be compatible with fire department hose threads. The location of fire department hose connections shall be approved. In buildings used for high-piled combustible storage, fire protection shall be in accordance with rule 1301:7-7-23 of the Administrative Code.

(2) 905.2 Installation standard. Standpipe systems shall be installed in accordance with this paragraph and NFPA 14 as listed in rule 1301:7-7-47 of the Administrative Code.

(3) 905.3 Required installations. Standpipe systems shall be installed when required by paragraphs (E)(3)(a)(905.3.1) to (E)(3)(g)(905.3.7) of this rule and in the locations indicated in paragraphs (E)(4)(905.4), (E)(5)(905.5) and (E)(6)(905.6) of this rule. Standpipe systems are permitted to be combined with automatic sprinkler systems.

Exception: Standpipe systems are not required in Group R-3 occupancies.

(a) 905.3.1 Height. Class III standpipe systems shall be installed throughout buildings where the floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access, or where the floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access.

Exceptions:

1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) or (C)(3)(a)(ii)(903.3.1.2) of this rule.

2. Class I manual standpipes are allowed in open parking garages where the highest floor is located not more than 150 feet (45 720 mm) above the lowest level of fire department vehicle access.

3. Class I manual dry standpipes are allowed in open parking garages that are subject to freezing temperatures, provided that the hose connections are located as required for Class II standpipes in accordance with paragraph (E)(5)(905.5) of this rule.

4. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.

5. In determining the lowest level of fire department vehicle access, it shall not be required to consider:

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5.1 Recessed loading docks for four vehicles or less, and

5.2 Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

- (b) 905.3.2 Group A. Class I automatic wet standpipes shall be provided in nonsprinklered Group A buildings having an occupant load exceeding 1,000 persons.

Exceptions:

1. Open-air-seating spaces without enclosed spaces.

2. Class I automatic dry and semiautomatic dry standpipes or manual wet standpipes are allowed in buildings where the highest floor surface used for human occupancy is 75 feet (22 860 mm) or less above the lowest level of fire department vehicle access.

- (c) 905.3.3 Covered mall buildings. A covered mall building shall be equipped throughout with a standpipe system where required by paragraph (E)(3)(a)(905.3.1) of this rule. Covered mall buildings not required to be equipped with a standpipe system by paragraph (E)(3)(a)(905.3.1) of this rule shall be equipped with Class I hose connections connected to the automatic sprinkler system sized to deliver water at 250 gallons per minute (946.4 L/min) at the most hydraulically remote hose connection while concurrently supplying the automatic sprinkler system demand. The standpipe system shall be designed not to exceed a 50-pounds-per-square-inch (345 kPa) residual pressure loss with flow of 250 gallons per minute (946.4 L/min) from the fire department connection to the hydraulically most remote hose connection. Hose connections shall be provided at each of the following locations:

(i) Within the mall at the entrance to each exit passageway or corridor.

(ii) At each floor-level landing within enclosed stairways opening directly on the mall.

(iii) At exterior public entrances to the mall.

(iv) At other locations as necessary so that the distance to reach all portions of a tenant space does not exceed 200 feet (60 960 mm) from a hose connection.

- (d) 905.3.4 Stages. Stages greater than 1,000 square feet (93 m<sup>2</sup>) in area shall be equipped with a Class III wet standpipe system with 1½-inch and

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2½-inch (38 mm and 64 mm) hose connections on each side of the stage.

Exception: Where the building or area is equipped throughout with an automatic sprinkler system, a 1½ inch (38 mm) hose connection shall be installed in accordance with NFPA 13 as listed in rule 1301:7-7-47 of the Administrative Code or in accordance with NFPA 14 as listed in rule 1301:7-7-47 of the Administrative Code for Class II or III standpipes.

(i) 905.3.4.1 Hose and cabinet. The 1½-inch (38 mm) hose connections shall be equipped with sufficient lengths of 1½-inch (38 mm) hose to provide fire protection for the stage area. Hose connections shall be equipped with an approved adjustable fog nozzle and be mounted in a cabinet or on a rack.

(e) 905.3.5 Underground buildings. Underground buildings shall be equipped throughout with a Class I automatic wet or manual wet standpipe system.

(f) 905.3.6 Helistops and heliports. Buildings with a helistop or heliport that are equipped with a standpipe shall extend the standpipe to the roof level on which the helistop or heliport is located in accordance with paragraph (G)(5)(1107.5) of rule 1301:7-7-11 of the Administrative Code.

(g) 905.3.7 Marinas and boatyards. Standpipes in marinas and boatyards shall comply with rule 1301:7-7-45 of the Administrative Code.

(4) 905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required stairway, a hose connection shall be provided for each floor level above or below grade. Hose connections shall be located at an intermediate floor level landing between floors, unless otherwise approved by the fire code official and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code.

2. On each side of the wall adjacent to the exit opening of a horizontal exit.

Exception: Where floor areas adjacent to a horizontal exit are reachable from exit stairway hose connections by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal exit.

3. In every exit passageway, at the entrance from the exit passageway to other areas of a building.

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Exception: Where floor areas adjacent to an exit passageway are reachable from exit stairway hose connections by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the exit passageway to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit passageway or exit corridor to the mall.

5. Where the roof has a slope less than four units vertical in 12 units horizontal (33.3-per cent slope), each standpipe shall be provided with a hose connection located either on the roof or at the highest landing of a stairway with stair access to the roof. An additional hose connection shall be provided at the top of the most hydraulically remote standpipe for testing purposes.

6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in approved locations and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(a) 905.4.1 Protection. Risers and laterals of Class I standpipe systems not located within an enclosed stairway or pressurized enclosure shall be protected by a degree of fire resistance equal to that required for vertical enclosures in the building in which they are located.

Exception: In buildings equipped throughout with an approved automatic sprinkler system, laterals that are not located within an enclosed stairway or pressurized enclosure are not required to be enclosed within fire-resistance-rated construction.

(b) 905.4.2 Interconnection. In buildings where more than one standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14 as listed in rule 1301:7-7-47 of the Administrative Code.

(5) 905.5 Location of Class II standpipe hose connections. Class II standpipe hose connections shall be accessible and shall be located so that all portions of the building are within 30 feet (9144 mm) of a nozzle attached to 100 feet (30 480 mm) of hose.

(a) 905.5.1 Groups A-1 and A-2. In Group A-1 and A-2 occupancies with occupant loads of more than 1,000 hose connections shall be located on each side of any stage, on each side of the rear of the auditorium, on each side of the balcony, and on each tier of dressing rooms.

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- (b) 905.5.2 Protection. Fire-resistance-rated protection of risers and laterals of Class II standpipe systems is not required.
- (c) 905.5.3 Class II system 1-inch hose. A minimum 1-inch (25 mm) hose shall be allowed to be used for hose stations in light-hazard occupancies where investigated and listed for this service and where approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the 1-inch (25 mm) hose shall be approved by the fire code official prior to system installation.
- (6) 905.6 Location of Class III standpipe hose connections. Class III standpipe systems shall have hose connections located as required for Class I standpipes in paragraph (E)(4)(905.4) of this rule and shall have Class II hose connections as required in paragraph (E)(5)(905.5) of this rule.
- (a) 905.6.1 Protection. Risers and laterals for Class III standpipe systems shall be protected as required for Class I systems in accordance with paragraph (E)(4)(a)(905.4.1) of this rule.
- (b) 905.6.2 Interconnection. In buildings where more than one Class III standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14 as listed in rule 1301:7-7-47 of the Administrative Code.
- (7) 905.7 Cabinets. Cabinets containing fire-fighting equipment, such as standpipes, fire hose, fire extinguishers or fire department valves, shall not be blocked from use or obscured from view.
- (a) 905.7.1 Cabinet equipment identification. Cabinets shall be identified in an approved manner by a permanently attached sign with letters not less than 2 inches (51 mm) high in a color that contrasts with the background color, indicating the equipment contained therein.

Exceptions:

1. Doors not large enough to accommodate a written sign shall be marked with a permanently attached pictogram of the equipment contained therein.

2. Doors that have either an approved visual identification clear glass panel or a complete glass door panel are not required to be marked.

(b) 905.7.2 Locking cabinet doors. Cabinets shall be unlocked.

Exceptions:

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1. Visual identification panels of glass or other approved transparent frangible material that is easily broken and allows access.

2. Approved locking arrangements.

3. Use Group I-3 occupancies.

(8) 905.8 Dry standpipes. Dry standpipes shall not be installed.

Exception: Where subject to freezing and in accordance with NFPA 14 as listed in rule 1301:7-7-47 of the Administrative Code.

(9) 905.9 Valve supervision. Valves controlling water supplies shall be supervised in the open position so that a change in the normal position of the valve will generate a supervisory signal at the supervising station required by paragraph (C)(4)(903.4) of this rule. Where a fire alarm system is provided, a signal shall also be transmitted to the control unit.

Exceptions:

1. Valves to underground key or hub valves in roadway boxes provided by the municipality or public utility do not require supervision.

2. Valves locked in the normal position and inspected as provided in this code in buildings not equipped with a fire alarm system.

(10) 905.10 During construction. Standpipe systems required during construction and demolition operations shall be provided in accordance with paragraph (M)(1413) of rule 1301:7-7-14 of the Administrative Code.

(11) 905.11 Existing buildings. Where required in rule 1301:7-7-46 of the Administrative Code, existing structures shall be equipped with standpipes installed in accordance with paragraph (E)(905) of this rule.

(F) Section 906 Portable fire extinguishers

(1) 906.1 Where required. Portable fire extinguishers shall be installed in the following locations:

(a) In all new and existing Group A, B, E, F, H, I, M, R-1, R-2 and S occupancies.

(b) Within 30 feet (9144 mm) of commercial cooking equipment.

(c) In areas where flammable or combustible liquids are stored, used or dispensed.

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- (d) On each floor of structures under construction, except Group R-3 occupancies, in accordance with paragraph (O)(1)(1415.1) of rule 1301:7-7-14 of the Administrative Code.
- (e) Where required by the paragraphs indicated in Table 906.1 of this rule.
- (f) Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the fire code official and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code.



**Table 906.1**  
**Additional required portable fire extinguishers**

<b>Paragraph</b>	<b>Subject</b>
<i>Paragraph (C)(5)(303.5) of rule 1301:7-7-03 of the Administrative Code</i>	Asphalt kettles
<i>Paragraph <del>(G)(4)(307.4)</del> <u>(G)(5)(307.5)</u> of rule 1301:7-7-03 of the Administrative Code</i>	Open burning
<i>Paragraph <del>(H)(4)(308.4)</del> <u>(H)(1)(c)(308.1.3)</u> of rule 1301:7-7-03 of the Administrative Code</i>	Open flames-torches
<i>Paragraph (I)(4)(309.4) of rule 1301:7-7-03 of the Administrative Code</i>	Powered industrial trucks
<i>Paragraph (E)(2)(1105.2) of rule 1301:7-7-11 of the Administrative Code</i>	Aircraft towing vehicles
<i>Paragraph (E)(3)(1105.3) of rule 1301:7-7-11 of the Administrative Code</i>	Aircraft welding apparatus
<i>Paragraph (E)(4)(1105.4) of rule 1301:7-7-11 of the Administrative Code</i>	Aircraft fuel-servicing tank vehicles
<i>Paragraph (E)(5)(1105.5) of rule 1301:7-7-11 of the Administrative Code</i>	Aircraft hydrant fuel-servicing vehicles
<i>Paragraph (E)(6)(1105.6) of rule 1301:7-7-11 of the Administrative Code</i>	Aircraft fuel-dispensing stations
<i>Paragraph (G)(7)(1107.7) of rule 1301:7-7-11 of the Administrative Code</i>	Heliports and helistops
<i>Paragraph (H)(4)(1208.4) of rule 1301:7-7-12 of the Administrative Code</i>	Dry cleaning plants
<i>Paragraph (O)(1)(1415.1) of rule 1301:7-7-14 of the Administrative Code</i>	Buildings under construction or demolition
<i>Paragraph (Q)(3)(1417.3) of rule 1301:7-7-14 of the Administrative Code</i>	Roofing operations
<i>Paragraph <del>(D)(6)(d)(1504.6.4)</del> <u>(D)(4)(a)(1504.4.1)</u> of rule 1301:7-7-15 of the Administrative Code</i>	Spray-finishing operations
<i>Paragraph <del>(E)(5)(1505.5)</del> <u>(E)(4)(b)(1505.4.2)</u> of rule 1301:7-7-15 of the Administrative Code</i>	Dip-tank operations
<i>Paragraph (F)(4)(b)(1506.4.2) of rule 1301:7-7-15 of the Administrative Code</i>	Powder-coating areas
<i>Paragraph (D)(2)(1904.2) of rule 1301:7-7-19 of the Administrative Code</i>	Lumberyards/woodworking facilities
<i>Paragraph (H)(8)(1908.8) of rule 1301:7-7-19 of the Administrative Code</i>	Recycling facilities
<i>Paragraph (I)(5)(1909.5) of rule 1301:7-7-19 of the Administrative Code</i>	Exterior lumber storage
<i>Paragraph (C)(5)(2003.5) of rule 1301:7-7-20 of the Administrative Code</i>	Organic-coating areas

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**Table 906.1 continued**  
**Additional required portable fire extinguishers**

<b>Paragraph</b>	<b>Subject</b>
<i>Paragraph (F)(3)(2106.3) of rule 1301:7-7-21 of the Administrative Code</i>	Industrial ovens
<i>Paragraph (E)(5)(2205.5) of rule 1301:7-7-22 of the Administrative Code</i>	Motor fuel-dispensing facilities
<i>Paragraph (J)(6)(d)(2210.6.4) of rule 1301:7-7-22 of the Administrative Code</i>	Marine motor fuel-dispensing facilities
<i>Paragraph (K)(6)(2211.6) of rule 1301:7-7-22 of the Administrative Code</i>	Repair garages
<i>Paragraph (F)(10)(2306.10) of rule 1301:7-7-23 of the Administrative Code</i>	Rack storage
<i>Paragraph (D)(12)(2404.12) of rule 1301:7-7-24 of the Administrative Code</i>	Tents, canopies and membrane structures
<i>Paragraph (H)(2)(2508.2) of rule 1301:7-7-25 of the Administrative Code</i>	Tire rebuilding/storage
<i>Paragraph (D)(2)(f)(2604.2.6) of rule 1301:7-7-26 of the Administrative Code</i>	Welding and other hot work
<i>Paragraph (C)(6)(2903.6) of rule 1301:7-7-29 of the Administrative Code</i>	Combustible fibers
<i>Paragraph (D)(3)(c)(i)(3404.3.3.1) of rule 1301:7-7-34 of the Administrative Code</i>	Indoor storage of flammable and combustible liquids
<i>Paragraph (D)(3)(g)(v)(b)(3404.3.7.5.2) of rule 1301:7-7-34 of the Administrative Code</i>	Liquid storage rooms for flammable and combustible liquids
<i>Paragraph (E)(4)(i)(3405.4.9) of rule 1301:7-7-34 of the Administrative Code</i>	Solvent distillation units
<i>Paragraph (F)(2)(g)(3406.2.7) of rule 1301:7-7-34 of the Administrative Code</i>	Farms and construction sites-flammable and combustible liquids storage
<i>Paragraph (F)(4)(j)(i)(3406.4.10.1) of rule 1301:7-7-34 of the Administrative Code</i>	Bulk plants and terminals for flammable and combustible liquids
<i>Paragraph (F)(5)(d)(iv)(3406.5.4.5) of rule 1301:7-7-34 of the Administrative Code</i>	Commercial, industrial, governmental or manufacturing establishments-fuel dispensing
<i>Paragraph (F)(6)(d)(3406.6.4) of rule 1301:7-7-34 of the Administrative Code</i>	Tank vehicles for flammable and combustible liquids
<i>Paragraph (F)(5)(g)(3606.5.7) of rule 1301:7-7-36 of the Administrative Code</i>	Flammable solids
<i>Paragraph (H)(2)(3808.2) of rule 1301:7-7-38 of the Administrative Code</i>	LP-gas
<i>Paragraph (D)(4)(4504.4) of rule 1301:7-7-45 of the Administrative Code</i>	Marinas

(2) 906.2 General requirements. Portable fire extinguishers shall be selected, installed and maintained in accordance with this paragraph and NFPA 10 as listed in rule 1301:7-7-47 of the Administrative Code.

Exceptions:

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1. The travel distance to reach an extinguisher shall not apply to the spectator seating portions of Group A-5 occupancies.
  2. Thirty-day inspections shall not be required and maintenance shall be allowed to be once every three years for dry-chemical or halogenated agent portable fire extinguishers that are supervised by a listed and approved electronic monitoring device, provided that all of the following conditions are met:
    - 2.1 Electronic monitoring shall confirm that extinguishers are properly positioned, properly charged and unobstructed.
    - 2.2 Loss of power or circuit continuity to the electronic monitoring device shall initiate a trouble signal.
    - 2.3 The extinguishers shall be installed inside of a building or cabinet in a noncorrosive environment.
    - 2.4 Electronic monitoring devices and supervisory circuits shall be tested every three years when extinguisher maintenance is performed.
    - 2.5 A written log of required hydrostatic test dates for extinguishers shall be maintained by the owner to verify that hydrostatic tests are conducted at the frequency required by NFPA 10 as listed in rule 1301:7-7-47 of the Administrative Code.
  3. In Group I-3, portable fire extinguishers shall be permitted to be located at staff locations.
- (3) 906.3 Size and distribution. The size and distribution of portable fire extinguishers shall be in accordance with paragraphs (F)(3)(a)(906.3.1) to (F)(3)(d)(906.3.4) of this rule.
- (a) 906.3.1 Class A fire hazards. Portable fire extinguishers for occupancies that involve primarily Class A fire hazards, the minimum sizes and distribution shall comply with Table 906.3(1) of this rule.

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**Table 906.3 (1)**  
**Fire extinguishers for Class A fire hazards**

	<b>Light (low) hazard occupancy</b>	<b>Ordinary (moderate) hazard occupancy</b>	<b>Extra (high) hazard occupancy</b>
Minimum rated single extinguisher	2-A <sup>c</sup>	2-A	4-A <sup>a</sup>
Maximum floor area per unit of A	3,000 square feet	1,500 square feet	1,000 square feet
Maximum floor area for extinguisher <sup>b</sup>	11,250 square feet	11,250 square feet	11,250 square feet
Maximum travel distance to extinguisher	75 feet	75 feet	75 feet

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m<sup>2</sup>, 1 gallon = 3.785 L.

a. Two 2½-gallon water-type extinguishers shall be deemed the equivalent of one 4-A rated extinguisher.

b. Annex E.3.3 of NFPA 10 as listed in rule 1301:7-7-47 of the Administrative Code provides more details concerning application of the maximum floor area criteria.

c. Two water-type extinguishers each with a 1-A rating shall be deemed the equivalent of one 2-A rated extinguisher for Light (Low) Hazard Occupancies.

**Table 906.3(2)**  
**Flammable or combustible liquids with depths of less than or equal to 0.25-inch**

<b>Type of hazard</b>	<b>Basic minimum extinguisher rating</b>	<b>Maximum travel distance to extinguishers (feet)</b>
Light (low)	5-B	30
	10-B	50
Ordinary (moderate)	10-B	30
	20-B	50
Extra (high)	40-B	30
	80-B	50

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Note. For requirements on water-soluble flammable liquids and alternating sizing criteria, see section 5.5 of NFPA 10 as listed in rule

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1301:7-7-47 of the Administrative Code.

(b) 906.3.2 Class B fire hazards. Portable fire extinguishers for occupancies involving flammable or combustible liquids with depths of less than or equal to 0.25-inch (6.35 mm) shall be selected and placed in accordance with Table 906.3(2) of this rule.

Portable fire extinguishers for occupancies involving flammable or combustible liquids with a depth of greater than 0.25-inch (6.35 mm) shall be selected and placed in accordance with NFPA 10 as listed in rule 1301:7-7-47 of the Administrative Code.

(c) 906.3.3 Class C fire hazards. Portable fire extinguishers for Class C fire hazards shall be selected and placed on the basis of the anticipated Class A or B hazard.

(d) 906.3.4 Class D fire hazards. Portable fire extinguishers for occupancies involving combustible metals shall be selected and placed in accordance with NFPA 10 as listed in rule 1301:7-7-47 of the Administrative Code.

(4) 906.4 Cooking grease fires. Fire extinguishers provided for the protection of cooking grease fires shall be of an approved type compatible with the automatic fire-extinguishing system agent and in accordance with paragraph (D)(11)(e)(904.11.5) of this rule.

(5) 906.5 Conspicuous location. Portable fire extinguishers shall be located in conspicuous locations where they will be readily accessible and immediately available for use. These locations shall be along normal paths of travel, unless the fire code official determines that the hazard posed indicates the need for placement away from normal paths of travel and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(6) 906.6 Unobstructed and unobscured. Portable fire extinguishers shall not be obstructed or obscured from view. In rooms or areas in which visual obstruction cannot be completely avoided, means shall be provided to indicate the locations of extinguishers.

(7) 906.7 Hangars and brackets. Hand-held portable fire extinguishers, not housed in cabinets, shall be installed on the hangars or brackets supplied. Hangers or brackets shall be securely anchored to the mounting surface in accordance with the manufacturer's installation instructions.

(8) 906.8 Cabinets. Cabinets used to house portable fire extinguishers shall not be locked.

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Exceptions:

1. Where portable fire extinguishers subject to malicious use or damage are provided with a means of ready access.

2. In Group I-3 occupancies and in mental health areas in Group I-2 occupancies, access to portable fire extinguishers shall be permitted to be locked or to be located in staff locations provided the staff has keys.

(9) 906.9 Extinguisher installation. The installation of portable fire extinguishers shall be in accordance with paragraphs (F)(9)(a)(906.9.1) to (F)(9)(c)(906.9.3) of this rule.

(a) 906.9.1 Extinguishers weighing 40 pounds or less. Portable fire extinguishers having a gross weight not exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 5 feet (1524 mm) above the floor.

(b) 906.9.2 Extinguishers weighing more than 40 pounds. Hand-held portable fire extinguishers having a gross weight exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 3.5 feet (1067 mm) above the floor.

(c) 906.9.3 Floor clearance. The clearance between the floor and the bottom of installed hand-held portable fire extinguishers shall not be less than 4 inches (102 mm).

(10) 906.10 Wheeled units. Wheeled fire extinguishers shall be conspicuously located in a designated location.

(G) Section 907 Fire alarm and detection systems

(1) 907.1 General. This paragraph covers the application, installation, performance and maintenance of fire alarm systems and their components in new and existing buildings and structures. The requirements of paragraph (G)(2)(907.2) of this rule are applicable to new buildings and structures. The requirements for fire alarm and detection systems in new buildings contained in this rule are subject to and do not supersede or otherwise conflict with the requirements of paragraph (D)(2)(a)(104.2.1) of rule 1301:7-7-01 of the Administrative Code. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the fire alarm and detection system shall be approved by the fire code official prior to system installation. The requirements of paragraph (G)(3)(907.3) of this rule are applicable to existing buildings and structures.

(a) 907.1.1 Construction documents. Construction documents for fire alarm

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systems shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code, the building code as listed in rule 1301:7-7-47 of the Administrative Code, and the relevant laws, ordinances, rules and regulations, as determined by the fire code official and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code.

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

(i) A floor plan which indicates the use of all rooms.

(ii) Locations of alarm-initiating devices.

(iii) Locations of alarm notification appliances, including candela ratings for visible alarm notification appliances.

(iv) Location of fire alarm control unit, transponders and notification power supplies.

(v) Annunciators.

(vi) Power connection.

(vii) Battery calculations.

(viii) Conductor type and sizes.

(ix) Voltage drop calculations.

(x) Manufacturers' data sheets indicating model numbers and listing information for equipment, devices and materials.

(xi) Details of ceiling height and construction.

(xii) The interface of fire safety control functions.

(xiii) Classification of the supervising station.

(c) 907.1.3 Equipment. Systems and components shall be listed and approved for the purpose for which they are installed.

(2) 907.2 Where required-new buildings and structures. An approved fire alarm system installed in accordance with the provisions of this code and NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code shall be provided in

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new buildings and structures in accordance with paragraphs (G)(2)(a)(907.2.1) to (G)(2)(w)(907.2.23) of this rule and provide occupant notification in accordance with paragraph (G)(6)(907.6) of this rule, unless other requirements are provided by another paragraph of this code.

A minimum of one manual fire alarm box shall be provided in an approved location to initiate a fire alarm signal for fire alarm systems employing automatic fire detectors or waterflow detection devices. Where other paragraphs of this code allow elimination of the fire alarm boxes due to sprinkler, a single fire alarm box shall be installed.

Exceptions:

1. The manual fire alarm box is not required for fire alarm systems dedicated to elevator recall control and supervisory service.

2. The manual fire alarm box is not required for Group R-2 occupancies unless required by the fire code official and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code to provide a means for fire watch personnel to initiate an alarm during a sprinkler system impairment event. The fire code official shall provide notice to the building official when the manual fire alarm box is required. Where provided, the manual fire alarm box shall not be located in an area that is accessible to the public.

(a) 907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule shall be installed in Group A occupancies having an occupant load of 300 or more. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

(i) 907.2.1.1 System initiation of 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 paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule.

Exception: Where approved, the prerecorded announcement is allowed to be manually deactivated for a period of time, not to

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exceed 3 minutes, for the sole purpose of allowing a live voice announcement from an approved, constantly attended location.

(b) 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 Group B fire area contains a Group B ambulatory health 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 paragraph (C)(3)(a)(i)(903.3.1.1) of this rule and the occupant notification zones upon sprinkler water flow.

(i) 907.2.2.1 Group B-ambulatory health care facilities. Fire areas containing Group B ambulatory health care facilities shall be provided with an electronically supervised automatic smoke detection system installed within the ambulatory health 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 paragraph (C)(3)(a)(i)(903.3.1.1) of this rule provided the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

(c) 907.2.3 Group E. A manual fire alarm system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule 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 less than 50.
2. Manual fire alarm boxes are not required in Group E occupancies where all of the following apply:

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.

2.4 The capability to activate the evacuation signal from a central point is provided.

2.5 In buildings where normally occupied spaces are provided with a two-way communication system between such spaces and a constantly attended receiving station from where a general evacuation alarm can be sounded, except in locations specifically designated by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule and upon notice by the fire code official to the building official.

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 paragraph (C)(3)(a)(i)(903.3.1.1) of this rule, the notification appliances will activate on sprinkler water flow and manual activation is provided from a normally occupied location.

(d) 907.2.4 Group F. A manual fire alarm system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule shall be installed in Group F occupancies where both the following conditions exist:

(i) The Group F occupancy is two or more stories in height; and

(ii) 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 paragraph (C)(3)(a)(i)(903.3.1.1) of this rule and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

(e) 907.2.5 Group H. A manual fire alarm system that activates the occupant notification system shall be installed in Group H-5 occupancies and in occupancies used for the manufacture of organic coatings. An automatic smoke detection system that activates the occupant

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notification system shall be installed for highly toxic gases, organic peroxides and oxidizers in accordance with rules 1301:7-7-37, 1301:7-7-39 and 1301:7-7-40 of the Administrative Code, respectively.

(f) 907.2.6 Group I. A manual fire alarm system that activates the occupant notification system shall be installed in Group I occupancies. An automatic smoke detection system that activates the occupant notification system shall be provided in accordance with paragraphs (J)(2)(f)(i)(907.2.6.1) to (J)(2)(f)(iii)(907.2.6.3) of this rule.

Exceptions:

1. Manual fire alarm boxes in resident or patient sleeping areas in Group I-1 and I-2 occupancies shall not be required at exits if located at all nurses' control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible and that travel distances required in paragraph (G)(5)(b)(907.5.2) of this rule are not exceeded.

2. Occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code is approved by the fire code official and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(i) 907.2.6.1 Group I-1. An automatic smoke detection system shall be installed in corridors, waiting areas open to corridors and habitable spaces other than sleeping units and kitchens. The system shall be activated in accordance with paragraphs (G)(6)(907.6) of this rule.

Exceptions:

1. Smoke detection in habitable spaces is not required where the facility is equipped throughout with an automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule.

2. Smoke detection is not required for exterior balconies.

(a) 907.2.6.1.1 Smoke alarms. Single- and multiple-station smoke alarms shall be installed in accordance with paragraph (G)(2)(k)(907.2.11) of this rule.

(ii) 907.2.6.2 Group I-2. An automatic smoke detection system shall be installed in corridors in nursing homes (both intermediate care and skilled nursing facilities), detoxification facilities and spaces

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permitted to be open to the corridors by section 407.2 of the building code as listed in rule 1301:7-7-47 of the Administrative Code. The system shall be activated in accordance with paragraph (G)(6)(907.6) of this rule. Hospitals shall be equipped with smoke detection as required in section 407.2 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

Exceptions:

1. Corridor smoke detection is not required in smoke compartments that contain patient sleeping units where such units are provided with smoke detectors that comply with UL 268 as listed in rule 1301:7-7-47 of the Administrative Code. Such detectors shall provide a visual display on the corridor side of each patient sleeping unit and shall provide an audible and visible alarm at the nursing station attending each unit.

2. Corridor smoke detection is not required in smoke compartments that contain patient sleeping units where sleeping unit doors are equipped with automatic door-closing devices with integral smoke detectors on the unit sides installed in accordance with their listing, provided that the integral detectors perform the required alerting function.

(iii) 907.2.6.3 Group I-3 occupancies. Group I-3 occupancies shall be equipped with a manual fire alarm system and automatic smoke detection system installed for alerting staff.

(a) 907.2.6.3.1 System initiation. Actuation of an automatic fire-extinguishing system, a manual fire alarm box or a fire detection shall initiate an approved fire alarm signal which automatically notifies staff.

(b) 907.2.6.3.2 Manual fire alarm boxes. Manual fire alarm boxes are not required to be located in accordance with paragraph (G)(5)(b)(907.5.2) of this rule where the fire alarm boxes are provided at staff-attended locations having direct supervision over areas where manual fire alarm boxes have been omitted.

(i) 907.2.6.3.2.1 Manual fire alarm boxes in detainee areas. Manual fire alarm boxes are allowed to be locked in areas occupied by detainees, provided that staff members are present within the subject area and have keys readily available to operate the manual fire alarm boxes.

(c) 907.2.6.3.3 Automatic smoke detection system. An automatic smoke detection system shall be installed throughout resident housing areas, including sleeping units and contiguous day rooms, group activity spaces and other common spaces normally accessible to residents.

Exceptions:

1. Other approved smoke-detection arrangements providing equivalent protection, including, but not limited to, placing detectors in exhaust ducts from cells or behind protective guards listed for the purpose, are allowed when necessary to prevent damage or tampering.

2. Sleeping units in Use Conditions 2 and 3 as described in section 308 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

3. Smoke detectors are not required in sleeping units with four or fewer occupants in smoke compartments that are equipped throughout with an automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule.

(g) 907.2.7 Group M. A manual fire alarm system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule shall be installed in Group M occupancies where one of the following conditions exist:

1. The combined Group M occupant load of all floors is 500 or more persons.

2. The Group M occupant load is more than 100 persons above or below the lowest level of exit discharge.

Exceptions:

1. A manual fire alarm system is required in covered mall buildings complying with section 402 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

2. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule and the occupant notification appliances will automatically activate throughout the notification zones upon sprinkler water flow.

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(i) 907.2.7.1 Occupant notification. During times that the building is occupied, the initiation of a signal from a manual fire alarm box or from a water flow switch shall not be required to activate the alarm notification appliances when an alarm signal is activated at a constantly attended location from which evacuation instructions shall be initiated over an emergency voice/alarm communication system installed in accordance with paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule.

(h) 907.2.8 Group R-1. Fire alarm systems and smoke alarms shall be installed in Group R-1 occupancies as required in paragraphs (G)(2)(h)(i)(907.2.8.1) to (G)(2)(h)(iii)(907.2.8.3) of this rule.

(i) 907.2.8.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule shall be installed in Group R-1 occupancies.

Exceptions:

1. A manual fire alarm system is not required in buildings not more than two stories in height where all individual sleeping units and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by at least 1-hour fire partitions and each individual sleeping unit has an exit directly to a public way, exit court or yard.

2. Manual fire alarm boxes are not required throughout the building when the following conditions are met:

2.1 The building is equipped throughout with an automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) or (C)(3)(a)(ii)(903.3.1.2) of this rule;

2.2 The notification appliances will activate upon sprinkler water flow; and

2.3 At least one manual fire alarm box is installed at an approved location.

(ii) 907.2.8.2 Automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule shall be installed throughout all interior corridors serving sleeping units.

Exception: An automatic smoke detection system is not required

in buildings that do not have interior corridors serving sleeping units and where each sleeping unit has a means of egress door opening directly to an exit or to an exterior exit access that leads directly to an exit.

(iii) 907.2.8.3 Smoke alarms. Single- and multiple-station smoke alarms shall be installed in accordance with paragraph (G)(2)(k)(907.2.11) of this rule.

(i) 907.2.9 Group R-2. Fire alarm systems and smoke alarms shall be installed in Group R-2 occupancies as required in paragraphs (G)(2)(i)(i)(907.2.9.1) and (G)(2)(i)(ii)(907.2.9.2) of this rule.

(i) 907.2.9.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule shall be installed in Group R-2 occupancies where:

(a) Any dwelling unit or sleeping unit is located three or more stories above the lowest level of exit discharge;

(b) Any dwelling unit or sleeping unit is located more than one story below the highest level of exit discharge of exits serving the dwelling unit or sleeping unit; or

(c) The building contains more than 16 dwelling units or sleeping units.

Exceptions:

1. A fire alarm system is not required in buildings not more than two stories in height where all dwelling units or sleeping units and contiguous attic and crawl spaces are separated from each other and public or common areas by at least 1-hour fire partitions and each dwelling unit or sleeping unit has an exit directly to a public way, exit court or yard.

2. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with paragraphs (C)(3)(a)(i)(903.3.1.1) or (C)(3)(a)(ii)(903.3.1.2) of this rule and the occupant notification appliances will automatically activate throughout the notification zones upon a sprinkler water flow.

3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with paragraphs (C)(3)(a)(i)(903.3.1.1) or (C)(3)(a)(ii)(903.3.1.2) of this rule, provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by open-ended corridors designed in accordance with paragraph (Z)(6)(1026.6) exception 4 of rule 1301:7-7-10 of the Administrative Code.

(ii) 907.2.9.2 Smoke alarms. Single- and multiple-station smoke alarms shall be installed in accordance with paragraph (G)(2)(k)(907.2.11) of this rule.

(j) 907.2.10 Group R-4. Fire alarm systems and smoke alarms shall be installed in Group R-4 occupancies as required in paragraphs (G)(2)(j)(i)(907.2.10.1) to (G)(2)(j)(iii)(907.2.10.3) of this rule.

(i) 907.2.10.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule shall be installed in Group R-4 occupancies.

Exceptions:

1. A manual fire alarm system is not required in buildings not more than two stories in height where all individual sleeping units and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by at least 1-hour fire partitions and each individual sleeping unit has an exit directly to a public way, exit court or yard.

2. Manual fire alarm boxes are not required throughout the building when the following conditions are met:

2.1 The building is equipped throughout with an automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) or (C)(3)(a)(ii)(903.3.1.2) of this rule.

2.2 The notification appliances will activate upon sprinkler water flow; and

2.3 At least one manual fire alarm box is installed at an approved location.

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3. Manual fire alarm boxes in resident or patient sleeping areas shall not be required at exits where located at all nurses' control stations or other constantly attended staff locations, provided such stations are visible and continuously accessible and that travel distances required in paragraph (G)(5)(b)(i)(907.5.2.1) of this rule are not exceeded.

(ii) 907.2.10.2 Automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule shall be installed in corridors, waiting areas open to corridors and habitable spaces other than sleeping units and kitchens.

Exceptions:

1. Smoke detection in habitable spaces is not required where the facility is equipped throughout with an automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule.

2. An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units and where each sleeping unit has a means of egress door opening directly to an exit or to an exterior exit access that leads directly to an exit.

(iii) 907.2.10.3 Smoke alarms. Single- and multiple-station alarms shall be installed in accordance with paragraph (G)(2)(k)(907.2.11) of this rule.

(k) 907.2.11 Single- and multiple-station smoke alarms. Listed single- and multiple-station smoke alarms complying with UL 217 as listed in rule 1301:7-7-47 of the Administrative Code shall be installed in accordance with paragraphs (G)(2)(k)(i)(907.2.11.1) to (G)(2)(k)(iv)(907.2.11.4) of this rule and NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.

(i) 907.2.11.1 Group R-1. Single- or multiple-station smoke alarms shall be installed in all of the following locations in Group R-1:

(a) In sleeping areas.

(b) In every room in the path of the means of egress from the sleeping area to the door leading from the sleeping unit.

(c) In each story within the sleeping unit, including basements.

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For sleeping units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

(ii) 907.2.11.2 Groups R-2, R-3, R-4 and I-1. Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of occupant load at all of the following locations:

(a) On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.

(b) In each room used for sleeping purposes.

Exception: Single- or multiple-station smoke alarms in Group I-1 shall not be required where smoke detectors are provided in the sleeping rooms as part of an automatic smoke detection system.

(c) In each story within a dwelling unit, including basements but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level is less than one full story below the upper level.

(iii) 907.2.11.3 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit or sleeping unit in Group R-1, R-2, R-3 or R-4, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.

(iv) 907.2.11.4 Power source. In new construction, required smoke alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery back-up shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exception: Smoke alarms are not required to be equipped with

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battery backup where they are connected to an emergency electrical system.

(l) 907.2.12 Special amusement buildings. An automatic smoke detection system shall be provided in special amusement buildings in accordance with paragraphs (G)(2)(l)(i)(907.2.12.1) to (G)(2)(l)(iii)(907.2.12.3) of this rule.

(i) 907.2.12.1 Alarm. Activation of any single smoke detector, the automatic sprinkler system or any other automatic fire detection device shall immediately sound an alarm at the building at a constantly attended location from which emergency action can be initiated, including the capability of manual initiation of requirements in paragraph (G)(2)(l)(ii)(907.2.12.2) of this rule.

(ii) 907.2.12.2 System response. The activation of two or more smoke detectors, a single smoke detector equipped with an alarm verification, the automatic sprinkler system or other approved fire detection device shall automatically:

(a) Cause illumination of the means of egress with light of not less than 1 foot-candle (11 lux) at the walking surface level;

(b) Stop any conflicting or confusing sounds and visual distractions;

(c) Activate an approved directional exit marking that will become apparent in an emergency; and

(d) Activate a prerecorded message, audible throughout the special amusement building, instructing patrons to proceed to the nearest exit. Alarm signals used in conjunction with the prerecorded message shall produce a sound which is distinctive from other sounds used during normal operation.

(iii) 907.2.12.3 Emergency voice/alarm communication system. An emergency voice/alarm communication system, which is also allowed to serve as a public address system, shall be installed in accordance with paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule and be audible throughout the entire special amusement building.

(m) 907.2.13 High-rise buildings. Buildings with a floor used for human occupancy located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall be provided with an automatic smoke detection system in accordance with paragraph (G)(2)(m)(i)(907.2.13.1) of this rule, a fire department communication

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system in accordance with paragraph (G)(2)(m)(ii)(907.2.13.2) of this rule and an emergency voice/alarm communication system in accordance with paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule.

Exceptions:

1. Airport traffic control towers in accordance with paragraph (G)(2)(u)(907.2.22) of this rule and section 412 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

2. Open parking garages in accordance with section 406.3 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

3. Buildings with an occupancy in Group A-5 in accordance with section 303.1 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

4. Low-hazard special occupancies in accordance with section 503.1.1 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

5. Buildings with an occupancy in Group H-1, H-2 or H-3 in accordance with section 415 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

6. In Group I-1 and I-2 occupancies, the alarm shall sound at a constantly attended location and general occupant notification shall be broadcast by the emergency voice/alarm communication system.

(i) 907.2.13.1 Automatic smoke detection. Automatic smoke detection in high-rise buildings shall be in accordance with paragraphs (G)(2)(m)(i)(a)(907.2.13.1.1) and (G)(2)(m)(i)(b)(907.2.13.1.2) of this rule.

(a) 907.2.13.1.1 Area smoke detection. Area smoke detectors shall be provided in accordance with this paragraph. Smoke detectors shall be connected to an automatic fire alarm system. The activation of any detector required by this paragraph shall operate the emergency voice/alarm communication system in accordance with paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule. Smoke detectors shall be located as follows:

(i) In each mechanical equipment, electrical, transformer, telephone equipment or similar room which is not provided with sprinkler protection.

- (ii) In each elevator machine room and in elevator lobbies.
- (b) 907.2.13.1.2 Duct smoke detection. Duct smoke detectors complying with paragraph (G)(4)(a)(907.4.1) of this rule shall be located as follows:
- (i) In the main return air and exhaust air plenum of each air-conditioning system having a capacity greater than 2,000 cubic feet per minute (cfm) (0.94 m<sup>3</sup>/s). Such detectors shall be located in a serviceable area downstream of the last duct inlet.
- (ii) At each connection to a vertical duct or riser serving two or more stories from a return air duct or plenum of an air-conditioning system. In Group R-1 and R-2 occupancies, a smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm (2.4 m<sup>3</sup>/s) and serving not more than 10 air-inlet openings.
- (ii) 907.2.13.2 Fire department communication system. Where a wired communication system is approved in lieu of a radio coverage system in accordance with paragraph (J)(510) of rule 1301:7-7-05 of the Administrative Code, the wired fire department communication system shall be designed and installed in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code and shall operate between a fire command center complying with paragraph (H)(508) of rule 1301:7-7-05 of the Administrative Code, elevators, elevator lobbies, emergency and standby power rooms, fire pump rooms, areas of refuge and inside enclosed exit stairways. The fire department communication device shall be provided at each floor level within the enclosed exit stairway.
- (n) 907.2.14 Atriums connecting more than two stories. A fire alarm system shall be installed in occupancies with an atrium that connects more than two stories, with smoke detection installed throughout the atrium. The system shall be activated in accordance with paragraph (G)(6)(907.6) of this rule. Such occupancies in Group A, E or M shall be provided with an emergency voice/alarm communication system complying with the requirements of paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule.
- (o) 907.2.15 High-piled combustible storage areas. An automatic smoke detection system shall be installed throughout high-piled combustible storage areas where required by paragraph (F)(5)(2306.5) of rule

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1301:7-7-23 of the Administrative Code.

- (p) 907.2.16 Aerosol storage uses. Aerosol storage rooms and general-purpose warehouses containing aerosols shall be provided with an approved manual fire alarm system where required by this code.
- (q) 907.2.17 Lumber, wood structural panel and veneer mills. Lumber, wood structural panel and veneer mills shall be provided with a manual fire alarm system.
- (r) 907.2.18 Underground buildings with smoke control systems. Where a smoke control system is installed in an underground building in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code, automatic smoke detectors shall be provided in accordance with paragraph (G)(2)(r)(i)(907.2.18.1) of this rule.
- (i) 907.2.18.1 Smoke detectors. A minimum of one smoke detector listed for the intended purpose shall be installed in the following areas:
- (a) Mechanical equipment, electrical, transformer, telephone equipment, elevator machine or similar rooms.
- (b) Elevator lobbies.
- (c) The main return and exhaust air plenum of each air-conditioning system serving more than one story and located in a serviceable area downstream of the last duct inlet.
- (d) Each connection to a vertical duct or riser serving two or more floors from return air ducts or plenums of heating, ventilating and air-conditioning systems, except that in Group R occupancies, a listed smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm (2.4 m<sup>3</sup>/s) and serving not more than 10 air inlet openings.
- (ii) 907.2.18.2 Alarm required. Activation of the smoke control system shall activate an audible alarm at a constantly attended location.
- (s) 907.2.19 Deep underground buildings. Where the lowest level of a structure is more than 60 feet (18 288 mm) below the finished floor of the lowest level of exit discharge, the structure shall be equipped throughout with a manual fire alarm system, including an emergency voice/alarm communication system installed in accordance with paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule.

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(t) 907.2.20 Covered mall buildings. Covered mall buildings exceeding 50,000 square feet (4645 m<sup>2</sup>) in total floor area shall be provided with an emergency voice/alarm communication system. An emergency voice/alarm communication system serving a mall required or otherwise, shall be accessible to the fire department. The system shall be provided in accordance with paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule.

(u) 907.2.21 Residential aircraft hangars. A minimum of one single-station smoke alarm shall be installed within a residential aircraft hangar as defined in the building code as listed in rule 1301:7-7-47 of the Administrative Code and shall be interconnected into the residential smoke alarm or other sounding device to provide an alarm which will be audible in all sleeping areas of the dwelling.

(v) 907.2.22 Airport traffic control towers. An automatic smoke detection system that activates the occupant notification system in accordance with paragraph (G)(6)(907.6) of this rule shall be provided in airport traffic control towers in all occupiable and equipment spaces.

Exception: Audible appliances shall not be installed within the control tower cab.

(w) 907.2.23 Battery rooms. An automatic smoke detection system shall be installed in areas containing stationary storage battery systems with a liquid capacity of more than 50 gallons (189 L).

(3) 907.3 Where required in existing buildings and structures. The retroactive application of paragraphs (G)(3)(a)(907.3.1) to (G)(3)(a)(viii)(907.3.1.8) of this rule shall be applied only in conformance with the requirements of (B)(1)(d)(102.1) of rule 1301:7-7-01 of the Administrative Code. An approved fire alarm system shall be installed in existing buildings and structures where required in rule 1301:7-7-46 of the Administrative Code.

(4) 907.4 Fire safety functions. Automatic fire detectors utilized for the purpose of performing fire safety functions shall be connected to the building's fire alarm control unit where a fire alarm system is required by paragraph (G)(2)(907.2) of this rule. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliances or activate a visible and audible supervisory signal at a constantly attended location. In buildings not equipped with a fire alarm system, the automatic fire detector shall be powered by normal electrical service and, upon actuation, perform the intended function. The detectors shall be located in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.

(a) 907.4.1 Duct smoke detectors. Smoke detectors installed in ducts shall be

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listed for the air velocity, temperature and humidity present in the duct. Duct smoke detectors shall be connected to the building's fire alarm control unit when a fire alarm system is required by paragraph (G)(2)(907.2) of this rule. Activation of a duct smoke detector shall initiate a visible and audible supervisory signal at a constantly attended location and shall perform the intended fire safety function in accordance with this code and the mechanical code as listed in rule 1301:7-7-47 of the Administrative Code. Duct smoke detectors shall not be used as a substitute for required open area detection.

Exceptions:

1. The supervisory signal at a constantly attended location is not required where duct smoke detectors activate the building's alarm notification appliances.
  2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and an audible signal in an approved location. Smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble.
- (b) 907.4.2 Delayed egress locks. Where delayed egress locks are installed on means of egress doors in accordance with paragraph (H)(1)(i)(vi)(1008.1.9.6) of rule 1301:7-7-10 of the Administrative Code, an automatic smoke or heat detection system shall be installed as required by that paragraph.
- (c) 907.4.3 Elevator emergency operation. Automatic fire detectors installed for elevator emergency operation shall be installed in accordance with the provisions of ASME A17.1 and NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.
- (d) 907.4.4 Wiring. The wiring to the auxiliary devices and equipment used to accomplish the above fire safety functions shall be monitored for integrity in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.
- (5) 907.5 Initiating devices. Where manual or automatic alarm initiation is required as part of a fire alarm system, the initiating devices shall be installed in accordance with paragraphs (G)(5)(a)(907.5.1) to (G)(5)(c)(907.5.3) of this rule.
- (a) 907.5.1 Protection of fire alarm control unit. In areas that are not continuously occupied, a single smoke detector shall be provided at the location of each fire alarm control unit, notification appliance circuit power extenders and supervising station transmitting equipment.

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Exceptions:

1. Where ambient conditions prohibit installation of a smoke detector, a heat detector shall be permitted.

2. The smoke detector shall not be required where the building is equipped throughout with an automatic sprinkler system in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) or (C)(3)(a)(ii)(903.3.1.2) of this rule.

(b) 907.5.2 Manual fire alarm boxes. Where a manual fire alarm system is required by another paragraph of this code, it shall be activated by fire alarm boxes installed in accordance with paragraphs (G)(5)(b)(i)(907.5.2.1) to (G)(5)(b)(v)(907.5.2.5) of this rule.

(i) 907.5.2.1 Location. Manual fire alarm boxes shall be located not more than 5 feet (1524 mm) from the entrance to each exit. Additional manual fire alarm boxes shall be located so that travel distance to the nearest box does not exceed 200 feet (60 960 mm).

(ii) 907.5.2.2 Height. The height of the manual fire alarm boxes shall be a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1372 mm) measured vertically, from the floor level to the activating handle or lever of the box.

(iii) 907.5.2.3 Color. Manual fire alarm boxes shall be red in color.

(iv) 907.5.2.4 Signs. Where fire alarm systems are not monitored by a supervising station, an approved permanent sign shall be installed adjacent to each manual fire alarm box that reads: "WHEN ALARM SOUNDS-CALL FIRE DEPARTMENT."

Exception: Where the manufacturer has permanently provided this information on the manual fire alarm box.

(v) 907.5.2.5 Protective covers. The fire code official is authorized to require the installation of listed manual fire alarm box protective covers to prevent malicious false alarms or to provide the manual fire alarm box with protection from physical damage and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code. The protective cover shall be transparent or red in color with a transparent face to permit visibility of the manual fire alarm box. Each cover shall include proper operating instructions. A protective cover that emits a local alarm signal shall not be installed unless approved. Protective covers shall not project more than that permitted by paragraph

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(C)(3)(c)(1003.3.3) of rule 1301:7-7-10 of the Administrative Code.

(c) 907.5.3 Automatic smoke detection. Where an automatic smoke detection system is required it shall utilize smoke detectors unless ambient conditions prohibit such installation. In spaces where a smoke detector cannot be utilized due to ambient conditions, approved automatic heat detectors shall be permitted.

(i) 907.5.3.1 Automatic sprinkler system. For conditions other than specific fire safety functions noted in paragraph (G)(4)(907.4) of this rule in areas where ambient conditions prohibit the installation of smoke detectors, an automatic sprinkler system installed in such areas in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) or (C)(3)(a)(ii)(903.3.1.2) of this rule and that is connected to the fire alarm system shall be approved as automatic heat detection.

(6) 907.6 Occupant notification systems. A fire alarm system shall annunciate at the panel and shall initiate occupant notification upon activation, in accordance with paragraphs (G)(6)(a)(907.6.1) to (G)(6)(b)(iii)(907.6.2.3) of this rule. Where a fire alarm system is required by another paragraph of this code, it shall be activated by:

1. Automatic fire detectors.
2. Sprinkler waterflow devices.
3. Manual fire alarm boxes.
4. Automatic fire-extinguishing systems.

Exception: Where notification systems are allowed elsewhere in this paragraph (G)(907) of this rule to annunciate at a constantly attended location.

(a) 907.6.1 Presignal feature. Presignal feature shall not be installed unless approved by the fire code official and the fire department and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code. Where a presignal feature is provided, a signal shall be annunciated at a constantly attended location approved by the fire department and in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code, in order that occupant notification can be activated in the event of fire or other emergency.

(b) 907.6.2 Alarm notification appliances. Alarm notification appliances shall be provided and shall be listed for their purpose. Audible and visual

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alarm notification appliances shall be located and installed in accordance with this paragraph, the "ADAAG" and NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.

(i) 907.6.2.1 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.

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

(a) 907.6.2.1.1 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. The minimum sound pressure levels shall be 75 dBA in occupancies in Groups R and I-1; 90 dBA in mechanical equipment rooms; and 60 dBA in other occupancies.

(b) 907.6.2.1.2 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 as listed in rule 1301:7-7-47 of the Administrative Code and audible alarm notification appliances shall not be required.

(ii) 907.6.2.2 Emergency voice/alarm communication systems. Emergency voice/alarm communication systems shall be designed and installed in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code. 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 paragraph (D)(404) of rule 1301:7-7-04 of the Administrative Code. 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:

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1. Elevator groups.
2. Exit stairways.
3. Each floor.
4. Areas of refuge as defined in paragraph (B)(1)(1002.1) of rule 1301:7-7-10 of the Administrative Code.

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.

- (a) 907.6.2.2.1 Manual override. A manual override for emergency voice communication shall be provided on a selective and all-call basis for all paging zones.
  - (b) 907.6.2.2.2 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.
  - (c) 907.6.2.2.3 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.
  - (d) 907.6.2.2.4 Emergency power. Emergency voice/alarm communications systems shall be provided with an approved emergency power source.
- (iii) 907.6.2.3 Visible alarms. Visible alarm notification appliances shall be provided in accordance with paragraphs (G)(6)(b)(iii)(a)(907.6.2.3.1) to (G)(6)(b)(iii)(d)(907.6.2.3.4) of this rule.

Exceptions:

1. Visible alarm notification appliances shall not be required in exits as defined in paragraph (B)(1)(1002.1) of rule 1301:7-7-10 of the Administrative Code.
2. Visible alarm notification appliances shall not be required in elevator cars.
  - (a) 907.6.2.3.1 Public and common areas. Visible alarm

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notification appliances shall be provided in public areas and common areas.

(b) 907.6.2.3.2 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-per cent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing impaired employee(s).

(c) 907.6.2.3.3 Group I-1 and R-1. Group I-1 and R-1 dwelling units or sleeping units in accordance with Table 907.6.2.3.3 of this rule shall be provided with a visible notification appliance, activated by both the in-room smoke alarm and the building fire alarm system.

**Table 907.6.2.3.3**  
**Visible alarms**

<u>Number of sleeping units</u>	<u>Sleeping accommodations with visible alarms</u>
6 to 25	2
26 to 50	4
51 to 71	7
76 to 100	9
101 to 150	12
151 to 200	14
201 to 300	17
301 to 400	20
401 to 500	22
501 to 1,000	5 per cent of total
1,001 and over	50 plus 3 for each 100 over 1,000

(d) 907.6.2.3.4 Group R-2. In Group R-2 occupancies required by paragraph (G)(907) of this rule to have a fire alarm system, all dwelling units and sleeping units shall be provided with the capability to support visible alarm notification appliances in accordance with ICC A117.1 as listed in rule 1301:7-7-47 of the Administrative Code.

(7) 907.7 Installation. A fire alarm system shall be installed in accordance with paragraphs (G)(7)(a)(907.7.1) to (G)(7)(e)(i)(907.7.5.1) of this rule and NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.

(a) 907.7.1 Wiring. Wiring shall comply with the requirements of NFPA 70 and 72 as listed in rule 1301:7-7-47 of the Administrative Code. Wireless protection systems utilizing radio-frequency transmitting

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devices shall comply with the special requirements for supervision of low-power wireless systems in NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.

- (b) 907.7.2 Power supply. The primary and secondary power supply for the fire alarm system shall be provided in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.

Exception: Backup power for single-station and multiple-station smoke alarms as required by paragraph (G)(2)(k)(iv)(907.2.11.4) of this rule.

- (c) 907.7.3 Zones. Each floor shall be zoned separately and a zone shall not exceed 22,500 square feet (2090 m<sup>2</sup>). The length of any zone shall not exceed 300 feet (91 440 mm) in any direction.

Exception: Automatic sprinkler system zones shall not exceed the area permitted by NFPA 13 as listed in rule 1301:7-7-47 of the Administrative Code.

- (i) 907.7.3.1 Zoning indicator panel. A zoning indicator panel and the associated controls shall be provided in an approved location. The visual zone indication shall lock in until the system is reset and shall not be canceled by the operation of an audible alarm-silencing switch.

- (ii) 907.7.3.2 High-rise buildings. In high-rise buildings, a separate zone by floor shall be provided for each of the following types of alarm-initiating devices where provided:

(a) Smoke detectors.

(b) Sprinkler water-flow devices.

(c) Manual fire alarm boxes.

(d) Other approved types of automatic fire detection devices or suppression systems.

- (d) 907.7.4 Access. Access shall be provided to each fire alarm device and notification appliance for periodic inspection, maintenance and testing.

- (e) 907.7.5 Monitoring. Fire alarm systems required by this rule or by the building code as listed in rule 1301:7-7-47 of the Administrative Code shall be monitored by an approved supervising station in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.

Exception: Monitoring by a supervising station is not required for:

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1. Single- and multiple-station smoke alarms required by paragraph (G)(2)(k)(907.2.11) of this rule.
2. Smoke detectors in Group I-3 occupancies.
  - (i) 907.7.5.1 Automatic telephone-dialing services. Automatic telephone-dialing devices used to transmit an emergency alarm shall not be connected to any fire department telephone number unless approved by the fire code official. The fire code official shall notify the building code official of the certified building code department having jurisdiction of this approval.
- (8) 907.8 Acceptance tests and completion. Upon completion of the installation, the fire alarm system and all fire alarm components shall be tested in accordance with NFPA 72 and the building code as listed in rule 1301:7-7-47 of the Administrative Code. When required by the fire code official, all acceptance testing shall be conducted in the presence of the fire code official.
  - (a) 907.8.1 Single- and multiple-station alarm devices. When the installation of the alarm devices is complete, each device and interconnecting wiring for multiple-station alarm devices shall be tested in accordance with the smoke alarm provisions of NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.
  - (b) 907.8.2 Record of completion. A record of completion in accordance with NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code verifying that the system has been installed and tested in accordance with the approved plans and specifications shall be provided.
  - (c) 907.8.3 Instructions. Operating, testing and maintenance instructions and record drawings ("as built") and equipment specifications shall be provided at an approved location.
- (9) 907.9 Inspection, testing and maintenance. The maintenance and testing schedules and procedures for fire alarm and fire detection systems shall be in accordance with paragraphs (G)(9)(a)(907.9.1) to (G)(9)(e)(907.9.5) of this rule and NFPA 72 as listed in rule 1301:7-7-47 of the Administrative Code.
  - (a) 907.9.1 Maintenance required. Whenever required for compliance with the provisions of this code, devices, equipment, systems, conditions, arrangements, levels of protection or other features shall thereafter be continuously maintained in accordance with applicable NFPA requirements or as directed by the fire code official.
  - (b) 907.9.2 Testing. Testing shall be performed in accordance with the schedules in NFPA 72 as listed in rule 1301:7-7-47 of the

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Administrative Code or more frequently where required by the fire code official.

Exception: Devices or equipment that are inaccessible for safety considerations shall be tested during scheduled shutdowns where approved by the fire code official, but not less than every 18 months.

(c) 907.9.3 Smoke detector sensitivity. Smoke detector sensitivity shall be checked within one year after installation and every alternate year thereafter. After the second calibration test, where sensitivity tests indicate that the detector has remained within its listed and marked sensitivity range (or 4-per cent obscuration light grey smoke, if not marked), the length of time between calibration tests shall be permitted to be extended to a maximum of five years. Where the frequency is extended, records of detector-caused nuisance alarms and subsequent trends of these alarms shall be maintained. In zones or areas where nuisance alarms show any increase over the previous year, calibration tests shall be performed.

(d) 907.9.4 Method. To verify that each smoke detector is within its listed and marked sensitivity range, it shall be tested using one of the following methods:

1. A calibrated test method;
2. The manufacturer's calibrated sensitivity test instrument;
3. Listed control equipment arranged for the purpose;
4. A smoke detector/control unit arrangement whereby the detector causes a signal at the control unit where the detector's sensitivity is outside its acceptable sensitivity range;
5. Other calibrated sensitivity test method acceptable to the fire code official.

Detectors found to have a sensitivity outside the listed and marked sensitivity range shall be cleaned and recalibrated or replaced.

Exceptions:

1. Detectors listed as field adjustable shall be permitted to be either adjusted within the listed and marked sensitivity range and cleaned and recalibrated or they shall be replaced.

2. This requirement shall not apply to single-station smoke alarms.

(i) 907.4.1 Testing device. Smoke detector sensitivity shall not be tested or measured using a device that administers an unmeasured concentration of smoke or other aerosol into the detector.

(e) 907.9.5 Maintenance, inspection and testing. The building owner shall be responsible to maintain the fire and life safety systems in an operable condition at all times. Service personnel shall meet the certification requirements of this rule as applicable and the qualification requirements of NFPA 2 as listed in rule 1301:7-7-47 of the Administrative Code for maintaining, inspecting and testing such systems. A written record shall be maintained and shall be made available to the fire code official.

#### (H) Section 908 Emergency alarm systems

(1) 908.1 Group H occupancies. Emergency alarms for the detection and notification of an emergency condition in Group H occupancies shall be provided as required in rule 1301:7-7-27 of the Administrative Code.

(2) 908.2 Group H-5 occupancy. Emergency alarms for notification of an emergency condition in an "HPM" facility shall be provided as required in paragraph (C)(12)(1803.12) of rule 1301:7-7-18 of the Administrative Code. A continuous gas detection system shall be provided for "HPM" gases in accordance with paragraph (C)(13)(1803.13) of rule 1301:7-7-18 of the Administrative Code.

(3) 908.3 Highly toxic and toxic materials. Where required by paragraph (D)(2)(b)(x)(3704.2.2.10) of rule 1301:7-7-37 of the Administrative Code, a gas detection system shall be provided for indoor storage and use of highly toxic and toxic compressed gases.

(4) 908.4 Ozone gas-generator rooms. A gas detection system shall be provided in ozone gas-generator rooms in accordance with paragraph (E)(3)(b)(3705.3.2) of rule 1301:7-7-37 of the Administrative Code.

(5) 908.5 Repair garages. A flammable-gas detection system shall be provided in repair garages for vehicles fueled by nonodorized gases in accordance with paragraph (K)(7)(b)(2211.7.2) of rule 1301:7-7-22 of the Administrative Code.

(6) 908.6 Refrigeration systems. Refrigeration system machinery rooms shall be provided with a refrigerant detector in accordance with paragraph (F)(8)(606.8) of rule 1301:7-7-06 of the Administrative Code.

#### (I) Section 909 Smoke control systems

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- (1) 909.1 Scope and purpose. This paragraph applies to mechanical or passive smoke control systems when they are required for new buildings or portions thereof by provisions of the building code as listed in rule 1301:7-7-47 of the Administrative Code or this code. The purpose of this paragraph is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants. These provisions are not intended for the preservation of contents, the timely restoration of operations, or for assistance in fire suppression or overhaul activities. Smoke control systems regulated by this paragraph serve a different purpose than the smoke- and heat-venting provisions found in paragraph (J)(910) of this rule. Mechanical smoke control systems shall not be considered exhaust systems under Chapter 5 of the mechanical code as listed in rule 1301:7-7-47 of the Administrative Code.
- (2) 909.2 General design requirements. Buildings, structures, or parts thereof required by the building code as listed in rule 1301:7-7-47 of the Administrative Code or this code to have a smoke control system or systems shall have such systems designed in accordance with the applicable requirements of paragraph (I)(909) of this rule and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to describe adequately the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied with sufficient information and analysis to demonstrate compliance with these provisions.
- (3) 909.3 Special inspection and test requirements. In addition to the ordinary inspection and test requirements to which buildings, structures and parts thereof are required to undergo, smoke control systems subject to the provisions of paragraph (I)(909) of this rule shall undergo special inspections and tests sufficient to verify the proper commissioning of the smoke control design in its final installed condition. The design submission accompanying the construction documents shall clearly detail procedures and methods to be used and the items subject to such inspections and tests. Such commissioning shall be in accordance with generally accepted engineering practice and, where possible, based on published standards for the particular testing involved. The special inspections and tests required by this paragraph shall be conducted under the same terms as in section 1704 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.
- (4) 909.4 Analysis. A rational analysis supporting the types of smoke control systems to be employed, the methods of their operations, the systems supporting them, and the methods of construction to be utilized shall accompany the construction documents submission and include, but not be

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limited to, the items indicated in paragraphs (I)(4)(a)(909.4.1) to (I)(4)(f)(909.4.6) of this rule.

(a) 909.4.1 Stack effect. The system shall be designed such that the maximum probable normal or reverse stack effect will not adversely interfere with the system's capabilities. In determining the maximum probable stack effect, altitude, elevation, weather history and interior temperatures shall be used.

(b) 909.4.2 Temperature effect of fire. Buoyancy and expansion caused by the design fire in accordance with paragraph (I)(9)(909.9) of this rule shall be analyzed. The system shall be designed such that these effects do not adversely interfere with the system's capabilities.

(c) 909.4.3 Wind effect. The design shall consider the adverse effects of wind. Such consideration shall be consistent with the wind-loading provisions of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(d) 909.4.4 Systems. The design shall consider the effects of the heating, ventilating and air-conditioning ("HVAC") systems on both smoke and fire transport. The analysis shall include all permutations of systems status. The design shall consider the effects of the fire on the heating, ventilating and air-conditioning systems.

(e) 909.4.5 Climate. The design shall consider the effects of low temperatures on systems, property and occupants. Air inlets and exhausts shall be located so as to prevent snow or ice blockage.

(f) 909.4.6 Duration of operation. All portions of active or passive smoke control systems shall be capable of continued operation after detection of the fire event for a period of not less than either 20 minutes or 1.5 times the calculated egress time, whichever is less.

(5) 909.5 Smoke barrier construction. Smoke barriers shall comply with the building code as listed in rule 1301:7-7-47 of the Administrative Code. Smoke barriers shall be constructed and sealed to limit leakage areas exclusive of protected openings. The maximum allowable leakage area shall be the aggregate area calculated using the following leakage area ratios:

1. Walls:  $A/A_w = 0.00100$

2. Exit enclosures:  $A/A_w = 0.00035$

3. All other shafts:  $A/A_w = 0.00150$

4. Floors and roofs:  $A/A_f = 0.00050$

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Where:

A = Total leakage area, square feet (m<sup>2</sup>).

A<sub>f</sub> = Unit floor or roof area of barrier, square feet (m<sup>2</sup>).

A<sub>w</sub> = Unit wall area of barrier, square feet (m<sup>2</sup>).

The leakage area ratios shown do not include openings due to doors, operable windows or similar gaps. These shall be included in calculating the total leakage area.

(a) 909.5.1 Leakage area. Total leakage of the barrier is the product of the smoke barrier gross area multiplied by the allowable leakage area ratio, plus the area of other openings such as gaps and operable windows. Compliance shall be determined by achieving the minimum air pressure difference across the barrier with the system in the smoke control mode for mechanical smoke control systems. Passive smoke control systems tested using other approved means, such as door fan testing, shall be as approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the test method shall be approved by the fire code official prior to system installation.

(b) 909.5.2 Opening protection. Openings in smoke barriers shall be protected by automatic-closing devices actuated by the required controls for the mechanical smoke control system. Door openings shall be protected by fire door assemblies complying with section 715.4.3 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

Exceptions:

1. Passive smoke control systems with automatic-closing devices actuated by spot-type smoke detectors listed for releasing service installed in accordance with paragraph (G)(4)(907.4) of this rule.

2. Fixed openings between smoke zones that are protected utilizing the airflow method.

3. In Group I-2, where such doors are installed across corridors, a pair of opposite-swinging doors without a center mullion shall be installed having vision panels with fire protection-rated glazing materials in fire protection-rated frames, the area of which shall not exceed that tested. The doors shall be close-fitting within operational tolerances and shall not have undercuts, louvers or grilles. The doors shall have head and

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jamb stops, astragals or rabbets at meeting edges and shall be automatic-closing by smoke detection in accordance with section 715.4.8.3 of the building code as listed in rule 130:7-7-47 of the Administrative Code. Positive-latching devices are not required.

4. Group I-3.

5. Openings between smoke zones with clear ceiling heights of 14 feet (4267 mm) or greater and bank-down capacity of greater than 20 minutes as determined by the design fire size.

(i) 909.5.2.1 Ducts and air transfer openings. Ducts and air transfer openings are required to be protected with a minimum Class II, 250°F (121°C) smoke damper complying with section 716 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(6) 909.6 Pressurization method. The primary mechanical means of controlling smoke shall be by pressure differences across smoke barriers. Maintenance of a tenable environment is not required in the smoke-control zone of fire origin.

(a) 909.6.1 Minimum pressure difference. The minimum pressure difference across a smoke barrier shall be 0.05-inch water gage (0.0124 kPa) in fully sprinklered buildings.

In buildings permitted to be other than fully sprinklered, the smoke control system shall be designed to achieve pressure differences at least two times the maximum calculated pressure difference produced by the design fire.

(b) 909.6.2 Maximum pressure difference. The maximum air pressure difference across a smoke barrier shall be determined by required door-opening or closing forces. The actual force required to open exit doors when the system is in the smoke control mode shall be in accordance with paragraph (H)(1)(c)(1008.1.3) of rule 1301:7-7-10 of the Administrative Code. Opening and closing forces for other doors shall be determined by standard engineering methods for the resolution of forces and reactions. The calculated force to set a side-hinged, swinging door in motion shall be determined by:

$$F = F_{dc} + K(WA P)/2(W-d) \text{ (Equation 9-1)}$$

where:

A = Door area, square feet (m<sup>2</sup>).

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d = Distance from door handle to latch edge of door, feet (m).

F = Total door opening force, pounds (N).

F<sub>dc</sub> = Force required to overcome closing device, pounds (N).

K = Coefficient 5.2 (1.0).

W = Door width, feet (m).

P = Design pressure difference, inches of water (Pa).

(7) 909.7 Airflow design method. When approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule, smoke migration through openings fixed in a permanently open position, which are located between smoke-control zones by the use of the airflow method, shall be permitted. The design airflow shall be in accordance with this paragraph. Airflow shall be directed to limit smoke migration from the fire zone. The geometry of openings shall be considered to prevent flow reversal from turbulent effects. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, airflow design method shall be approved by the fire code official prior to system installation.

(a) 909.7.1 Velocity. The minimum average velocity through a fixed opening shall not be less than:

$$v = 217.2 [h (T_f - T_o) / (T_f + 460)]^{1/2} \text{ (Equation 9-2)}$$

$$\text{For SI: } v = 119.9 [h(T_f - T_o) / T_f]^{1/2}$$

where:

h = Height of opening, feet (m).

T<sub>f</sub> = Temperature of smoke, °F (°K).

T<sub>o</sub> = Temperature of ambient air, °F (°K).

v = Air velocity, feet per minute (m/minute).

(b) 909.7.2 Prohibited conditions. This method shall not be employed where either the quantity of air or the velocity of the airflow will adversely affect other portion of the smoke control system, unduly intensify the fire, disrupt plume dynamics or interfere with exiting. In no case shall airflow toward the fire exceed 200 feet per minute (1.02 m/s). Where the formula in paragraph (I)(7)(a)(909.7.1) of this rule requires airflows

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to exceed this limit, the airflow method shall not be used.

(8) 909.8 Exhaust method. When approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule, mechanical smoke control for large enclosed volumes, such as in atriums or malls, shall be permitted to utilize the exhaust method. Smoke control systems using the exhaust method shall be designed in accordance with NFPA 92B as listed in rule 1301:7-7-47 of the Administrative Code. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the exhaust method shall be approved by the fire code official prior to system installation.

(a) 909.8.1 Smoke layer. The height of the lowest horizontal surface of the smoke layer interface shall be maintained at least 6 feet (1829 mm) above any walking surface that forms a portion of a required egress system within the smoke zone.

(9) 909.9 Design fire. The design fire shall be based on a rational analysis performed by the registered design professional and approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule. The design fire shall be based on the analysis in accordance with paragraph (I)(4)(909.4) of this rule and this paragraph. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the design fire shall be approved by the fire code official prior to system installation.

(a) 909.9.1 Factors considered. The engineering analysis shall include the characteristics of the fuel, fuel load, effects included by the fire, and whether the fire is likely to be steady or unsteady.

(b) 909.9.2 Separation distance. Determination of the design fire shall include consideration of the type of fuel, fuel spacing and configuration.

(c) 909.9.3 Heat-release assumptions. The analysis shall make use of best available data from approved sources and shall not be based on excessively stringent limitations of combustible material.

(d) 909.9.4 Sprinkler effectiveness assumptions. A documented engineering analysis shall be provided for conditions that assume fire growth is halted at the time of sprinkler activation.

(10) 909.10 Equipment. Equipment including, but not limited to, fans, ducts, automatic dampers and balance dampers shall be suitable for their intended use, suitable for the probable exposure temperatures that the rational analysis indicates, and as approved by the fire code official pursuant to paragraph (A)(1) of this rule. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the equipment

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shall be approved by the fire code official prior to system installation.

(a) 909.10.1 Exhaust fans. Components of exhaust fans shall be rated and certified by the manufacturer for the probable temperature rise to which the components will be exposed. This temperature rise shall be computed by:

$$\underline{T_s} = (Q_c / mc) = (T_a) \text{ (Equation 9-3)}$$

where:

c = Specific heat of smoke at smokelayer temperature, Btu/lb°F. (kJ/kg°K).

m = Exhaust rate, pounds per second (kg/s).

Q<sub>c</sub> = Convective heat output of fire, Btu/s (kW).

T<sub>a</sub> = Ambient temperature, °F (°K).

T<sub>s</sub> = Smoke temperature, °F (°K).

Exception: Reduced T<sub>s</sub> as calculated based on the assurance of adequate dilution air.

(b) 909.10.2 Ducts. Duct materials and joints shall be capable of withstanding the probable temperatures and pressures to which they are exposed as determined in accordance with paragraph (I)(10)(a)(909.10.1) of this rule. Ducts shall be constructed and supported in accordance with the mechanical code as listed in rule 1301:7-7-47 of the Administrative Code. Ducts shall be leak tested to 1.5 times the maximum design pressure in accordance with nationally accepted practices. Measured leakage shall not exceed 5 per cent of design flow. Results of such testing shall be a part of the documentation procedure. Ducts shall be supported directly from fire-resistance-rated structural elements of the building by substantial, noncombustible supports.

Exception: Flexible connections (for the purpose of vibration isolation) complying with the mechanical code as listed in rule 1301:7-7-47 of the Administrative Code and which are constructed of approved fire-resistance-rated materials.

(c) 909.10.3 Equipment, inlets and outlets. Equipment shall be located so as to not expose uninvolved portions of the building to an additional fire hazard. Outside air inlets shall be located so as to minimize the potential for introducing smoke or flame into the building. Exhaust outlets shall be so located as to minimize reintroduction of smoke into

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the building and to limit exposure of the building or adjacent buildings to an additional fire hazard.

- (d) 909.10.4 Automatic dampers. Automatic dampers, regardless of the purpose for which they are installed within the smoke control system, shall be listed and conform to the requirements of section 716.3 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.
- (e) 909.10.5 Fans. In addition to other requirements, belt-driven fans shall have 1.5 times the number of belts required for the design duty with the minimum number of belts being two. Fans shall be selected for stable performance based on normal temperature and, where applicable, elevated temperature. Calculations and manufacturer's fan curves shall be part of the documentation procedures. Fans shall be supported and restrained by noncombustible devices in accordance with the structural design requirements of Chapter 16 of the building code as listed in rule 1301:7-7-47 of the Administrative Code. Motors driving fans shall not be operating beyond their nameplate horsepower (kilowatts) as determined from measurement of actual current draw and shall have a minimum service factor of 1.15.
- (11) 909.11 Power systems. The smoke control system shall be supplied with two sources of power. Primary power shall be the normal building power systems. Secondary power shall be from an approved standby source complying with paragraph (D)(604) of rule 1301:7-7-06 of the Administrative Code and NFPA 70 as listed in rule 1301:7-7-47 of the Administrative Code. The standby power source and its transfer switches shall be in a room separate from the normal power transformers and switch gears and ventilated directly to and from the exterior. The room shall be enclosed with not less than 1-hour fire barriers constructed in accordance with section 707 of the building code as listed in rule 1301:7-7-47 of the Administrative Code or horizontal assemblies constructed in accordance with section 712 of the building code as listed in rule 1301:7-7-47 of the Administrative Code, or both.
- (a) 909.11.1 Power sources and power surges. Elements of the smoke management system relying on volatile memories or the like shall be supplied with uninterruptible power sources of sufficient duration to span 15-minute primary power interruption. Elements of the smoke management system susceptible to power surges shall be suitably protected by conditioners, suppressors or other approved means.
- (12) 909.12 Detection and control systems. Fire detection systems providing control input or output signals to mechanical smoke control systems or elements thereof shall comply with the requirements of paragraph (G)(907) of this rule. Such systems shall be equipped with a control unit complying with UL 864 as listed in rule 1301:7-7-47 of the Administrative Code and listed as

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smoke control equipment.

Control systems for mechanical smoke control systems shall include provisions for verification. Verification shall include positive confirmation of actuation, testing, manual override, the presence of power downstream of all disconnects and, through a preprogrammed weekly test sequence, report abnormal conditions audibly, visually and by printed report.

(a) 909.12.1 Wiring. In addition to meeting requirements of NFPA 70 as listed in rule 1301:7-7-47 of the Administrative Code, all wiring, regardless of voltage, shall be fully enclosed within continuous raceways.

(b) 909.12.2 Activation. Smoke control systems shall be activated in accordance with this paragraph.

(i) 909.12.2.1 Pressurization, airflow or exhaust method. Mechanical smoke control systems using the pressurization, airflow or exhaust method shall have completely automatic control.

(ii) 909.12.2.2 Passive method. Passive smoke control systems actuated by approved spot-type detectors listed for releasing service shall be permitted.

(c) 909.12.3 Automatic control. Where completely automatic control is required or used, the automatic-control sequences shall be initiated from an appropriately zone automatic sprinkler system complying with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule, manual controls that are readily accessible to the fire department, and any smoke detectors required by the engineering analysis.

(13) 909.13 Control air tubing. Control air tubing shall be of sufficient size to meet the required response times. Tubing shall be flushed clean and dry prior to final connections and shall be adequately supported and protected from damage. Tubing passing through concrete or masonry shall be sleeved and protected from abrasion and electrolytic action.

(a) 909.13.1 Materials. Control air tubing shall be hard drawn copper, Type L, ACR in accordance with ASTM B 42, ASTM B 43, ASTM B 68, ASTM B 88, ASTM B 251 and ASTM B 280 as listed in rule 1301:7-7-47 of the Administrative Code. Fittings shall be wrought copper or brass, solder type, in accordance with ASME B16.18 or ASME B16.22 as listed in rule 1301:7-7-47 of the Administrative Code. Changes in direction shall be made with appropriate tool bends. Brass compression-type fittings shall be used at final connection to devices; other joints shall be brazed using a BCuP5 brazing alloy with solidus above 1,100°F (593°C) and liquids below 1,500°F (816°C). Brazing flux

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shall be used on copper-to-brass joints only.

Exception: Nonmetallic tubing used within control panels and at the final connection to devices, provided all of the following conditions are met:

1. Tubing shall be listed by an approved agency for flame and smoke characteristics.

2. Tubing and the connected device shall be completely enclosed with a galvanized or paint-grade steel enclosure having a minimum thickness of 0.0296-inches (0.7534 mm) (No. 22 gage). Entry to the enclosure shall be by copper tubing with a protective grommet of neoprene or teflon or by suitable brass compression to male-barbed adapter.

3. Tubing shall be identified by appropriately documented coding.

4. Tubing shall be neatly tied and supported within enclosure. Tubing bridging cabinet and door or moveable device shall be of sufficient length to avoid tension and excessive stress. Tubing shall be protected against abrasion. Tubing serving devices on doors shall be fastened along hinges.

(b) 909.13.2 Isolation from other functions. Control tubing serving other than smoke control functions shall be isolated by automatic isolation valves or shall be an independent system.

(c) 909.13.3 Testing. Control air tubing shall be tested at three times the operating pressure for not less than 30 minutes without any noticeable loss in gauge pressure prior to final connection to devices.

(14) 909.14 Marking and identification. The detection and control systems shall be clearly marked at all junctions, accesses and terminations.

(15) 909.15 Control diagrams. Identical control diagrams showing all devices in the system and identifying their location and function shall be maintained current and kept on file with the fire code official, the fire department and in the fire command center in a format and manner approved by the fire chief.

(16) 909.16 Fire-fighter's smoke control panel. A fire-fighter's smoke control panel for fire department emergency response purposes only shall be provided and shall include manual control or override of automatic control for mechanical smoke control systems. The panel shall be located in a fire command center complying with paragraph (H)(508) of rule 1301:7-7-05 of the Administrative Code in high-rise buildings or buildings with smoke-protected assembly seating. In all other buildings, the fire-fighter's smoke control panel shall be installed in an approved location adjacent to the fire alarm control panel. The

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fire-fighter's smoke control panel shall comply with paragraphs (I)(16)(a)(909.16.1) to (I)(16)(c)(909.16.3) of this rule.

(a) 909.16.1 Smoke control systems. Fans within the building shall be shown on the fire-fighter's control panel. A clear indication of the direction of airflow and the relationship of components shall be displayed. Status indicators shall be provided for all smoke control equipment, annunciated by fan and zone and by pilot-lamp-type indicators as follows:

(i) Fans, dampers and other operating equipment in their normal status-"WHITE."

(ii) Fans, dampers and other operating equipment in their off or closed status-"RED."

(iii) Fans, dampers and other operating equipment in their on or open status-"GREEN."

(iv) Fans, dampers and other operating equipment in a fault status-"YELLOW/AMBER."

(b) 909.16.2 Smoke control panel. The fire-fighter's control panel shall provide control capability over the complete smoke-control system equipment within the building as follows:

(i) "ON-AUTO-OFF" control over each individual piece of operating smoke control equipment that can also be controlled from other sources within the building. This includes stairway pressurization fans; smoke exhaust fans; supply, return and exhaust fans; elevator shaft fans; and other operating equipment used or intended for smoke control purposes.

(ii) "OPEN-AUTO-CLOSE" control over individual dampers relating to smoke control and that are also controlled from other sources within the building.

(iii) "ON-OFF" or "OPEN-CLOSE" control over smoke control and other critical equipment associated with a fire or smoke emergency and that can only be controlled from the fire-fighter's control panel.

Exceptions:

1. Complex systems, where approved, where the controls and indicators are combined to control and indicate all elements of a single smoke zone as a unit.

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2. Complex systems, where approved, where the control is accomplished by computer interface using approved, plain English commands.

(c) 909.16.3 Control action and priorities. The fire-fighter's control panel actions shall be as follows:

(i) "ON-OFF" and "OPEN-CLOSE" control actions shall have the highest priority of any control point within the building. Once issued from the fire-fighter's control panel, no automatic or manual control from any other control point within the building shall contradict the control action. Where automatic means are provided to interrupt normal, nonemergency equipment operation or produce a specific result to safeguard the building or equipment (i.e., duct freezestats, duct smoke detectors, high-temperature cutouts, temperature-actuated linkage and similar devices), such means shall be capable of being overridden by the fire-fighter's control panel. The last control action is indicated by each fire-fighter's control panel switch position shall prevail. In no case shall control actions require the smoke control system to assume more than one configuration at any one time.

Exception: Power disconnects required by NFPA 70 as listed in rule 1301:7-7-47 of the Administrative Code.

(ii) Only the "AUTO" position of each three-position fire-fighter's control panel switch shall allow automatic or manual control action from other control points within the building. The "AUTO" position shall be the "NORMAL," nonemergency, building control position. Where a fire-fighter's control panel is in the "AUTO" position, the actual status of the device (on, off, open, closed) shall continue to be indicated by the status indicator described above. When directed by an automatic signal to assume an emergency condition, the "NORMAL" position shall become the emergency condition for that device or group of devices within the zone. In no case shall control actions require the smoke control system to assume more than one configuration at any one time.

(17) 909.17 System response time. Smoke-control system activation shall be initiated immediately after receipt of an appropriate automatic or manual activation command. Smoke control systems shall activate individual components (such as dampers and fans) in the sequence necessary to prevent physical damage to the fans, dampers, ducts and other equipment. For purposes of smoke control, the fire-fighter's control panel response time shall

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be the same for automatic or manual smoke control action initiated from any other building control point. The total response time, including that necessary for detection, shut down of operating equipment and smoke control system startup, shall allow for full operational mode to be achieved before the conditions in the space exceed the design smoke condition. The system response time for each component and their sequential relationships shall be detailed in the required rational analysis and verification of their installed condition reported in the required final report.

(18) 909.18 Acceptance testing. Devices, equipment, components and sequences shall be individually tested. These tests, in addition to those required by other provisions of this code, shall consist of determination of function, sequence and, where applicable, capacity of their installed condition.

(a) 909.18.1 Detection devices. Smoke or fire detectors that are a part of a smoke control system shall be tested in accordance with this rule in their installed condition. When applicable, this testing shall include verification of airflow in both minimum and maximum conditions.

(b) 909.18.2 Ducts. Ducts that are part of a smoke control system shall be traversed using generally accepted practices to determine actual air quantities.

(c) 909.18.3 Dampers. Dampers shall be tested for function in their installed condition.

(d) 909.18.4 Inlets and outlets. Inlets and outlets shall be read using generally accepted practices to determine air quantities.

(e) 909.18.5 Fans. Fans shall be examined for correct rotation. Measurements of voltage, amperage, revolutions per minute and belt tension shall be made.

(f) 909.18.6 Smoke barriers. Measurements using inclined manometers or other approved calibrated measuring devices shall be made of the pressure differences across smoke barriers. Such measurements shall be conducted for each possible smoke control condition.

(g) 909.18.7 Controls. Each smoke zone equipped with an automatic-initiation device shall be put into operation by the actuation of one such device. Each additional device within the zone shall be verified to cause the same sequence without requiring the operation of fan motors in order to prevent damage. Control sequences shall be verified throughout the system, including verification of override from the fire-fighter's control panel and simulation of standby power conditions.

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- (h) 909.18.8 Special inspections for smoke control. Smoke control systems shall be tested by a special inspector.
- (i) 909.18.8.1 Scope of testing. Special inspections shall be conducted in accordance with the following:
- (a) During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.
- (b) Prior to occupancy and after sufficient completion for the purposes of pressure-difference testing, flow measurements, and detection and control verification.
- (ii) 909.18.8.2 Qualifications. Special inspection agencies for smoke control shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers.
- (iii) 909.18.8.3 Reports. A complete report of testing shall be prepared by the special inspector or special inspection agency. The report shall include identification of all devices by manufacturer, nameplate data, design values, measured values and identification tag or mark. The report shall be reviewed by the responsible registered design professional and, when satisfied that the design intent has been achieved, the responsible registered design professional shall seal, sign and date the report.
- (a) 909.18.8.3.1 Report filing. A copy of the final report shall be filed with the fire code official and the building code official and an identical copy shall be maintained in an approved location at the building.
- (i) 909.18.9 Identification and documentation. Charts, drawings and other documents identifying and locating each component of the smoke control system, and describing their proper function and maintenance requirements, shall be maintained on file at the building as an attachment to the report required by paragraph (I)(18)(h)(iii)(909.18.8.3) of this rule. Devices shall have an approved identifying tag or mark on them consistent with other required documentation and shall be dated indicating the last time they were successfully tested and by whom.
- (19) 909.19 System acceptance. Buildings, or portions thereof, required by this code to comply with this paragraph shall not be occupied until such time that the provisions of this paragraph have been fully complied with and that the fire department has received satisfactory instruction on the operation, both

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automatic and manual, of the system.

Exception: In buildings of phase construction, a temporary certificate of occupancy, as approved by the building official in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code, shall be allowed provided that those portions of the building to be occupied meet the requirements of this paragraph and that the remainder does not pose a significant hazard to the safety of the proposed occupants or adjacent buildings.

(20) 909.20 Maintenance. Smoke control systems shall be maintained to ensure to a reasonable degree that the system is capable of controlling smoke for the duration required. The system shall be maintained in accordance with the manufacturer's instructions and paragraphs (I)(20)(a)(909.20.1) to (I)(20)(e)(909.20.5) of this rule.

(a) 909.20.1 Schedule. A routine maintenance and operational testing program shall be initiated immediately after the smoke control system has passed the acceptance tests. A written schedule for routine maintenance and operational testing shall be established.

(b) 909.20.2 Written record. A written record of smoke control system testing and maintenance shall be maintained on the premises. The written record shall include the date of the maintenance, identification of the servicing personnel and notification of any unsatisfactory condition and the corrective action taken, including parts replaced.

(c) 909.20.3 Testing. Operational testing of the smoke control system shall include all equipment such as initiating devices, fans, dampers, controls, doors and windows.

(d) 909.20.4 Dedicated smoke control systems. Dedicated smoke control systems shall be operated for each control sequence semiannually. The system shall also be tested under standby power conditions.

(e) 909.20.5 Nondedicated smoke control systems. Nondedicated smoke control systems shall be operated for each control sequence annually. The system shall also be tested under standby power conditions.

#### (J) Section 910 Smoke and heat vents

(1) 910.1 General. Where required by this code or otherwise installed, smoke and heat vents or mechanical smoke exhaust systems and draft curtains shall conform to the requirements of this paragraph.

Exceptions:

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1. Frozen food warehouses used solely for storage of Class I and II commodities where protected by an approved automatic sprinkler system.
  2. Where areas of buildings are equipped with early suppression fast-response (ESFR) sprinklers, automatic smoke and heat vents shall not be required within these areas.
- (2) 910.2 Where required. Smoke and heat vents, an approved mechanical smoke exhaust system, or an approved manually activated smoke exhaust system shall be installed in the roofs of one-story buildings or portions thereof occupied for the uses set forth in paragraphs (J)(2)(a)(910.2.1) and (J)(2)(b)(910.2.2) of this rule.
- (a) 910.2.1 Group F-1 or S-1. Buildings and portions thereof used as a Group F-1 or S-1 occupancy having more than 50,000 square feet (4645 m<sup>2</sup>) of undivided area.
- Exception: Group S-1 aircraft repair hangars.
- (b) 910.2.2 High-piled combustible storage. Buildings and portions thereof containing high-piled combustible stock or rack storage in any occupancy group when required by paragraph (F)(7)(2306.7) of rule 1301:7-7-23 of the Administrative Code.
- (c) 910.2.3 Exit access travel distance increase. Buildings and portions thereof used as a Group F-1 or S-1 occupancy where the maximum exit travel distance is increased in accordance with paragraph (P)(3)(1016.3) of rule 1301:7-7-10 of the Administrative Code.
- (3) 910.3 Design and installation. The design and installation of smoke and heat vents and draft curtains shall be as specified in paragraphs (J)(3)(a)(910.3.1) to (J)(3)(e)(ii)(910.3.5.2) of this rule and Table 910.3 of this rule.

**Table 910.3  
Requirements for draft curtains and smoke and heat vents<sup>a</sup>**

Occupancy group and commodity classification	Designated storage height (feet)	Minimum draft curtain depth (feet)	Maximum area formed by draft curtains (square feet)	Vent area to floor area ratio <sup>c</sup>	Maximum spacing of vent centers (feet)	Maximum distance to <u>from</u> vents <u>from to</u> wall or draft curtain <sup>b</sup> (feet)
Group F-1 and S-1	---	0.2 x H <sup>d</sup> but >4	50,000	1:100	120	60
High-piled storage (see <i>paragraph (J)(2)(b)(910.2.2) of this rule</i> ) Class I-IV commodities (Option 1)	<20	6	10,000	1:100	100	60
	>20 <40	6	8,000	1:75	100	55
High-piled storage (see <i>paragraph (J)(2)(b)(910.2.2) of this rule</i> ) Class I-IV commodities (Option 2)	<20	4	3,000	1:75	100	55
	>20 <40	4	3,000	1:50	100	50
High-piled storage (see <i>paragraph (J)(2)(b)(910.2.2) of this rule</i> ) High hazard commodities (Option 1)	<20	6	6,000	1:50	100	50
	>20 <30	6	6,000	1:40	90	45
High-piled storage (see <i>paragraph (J)(2)(b)(910.2.2) of this rule</i> ) High hazard commodities (Option 2)	<20	4	4,000	1:50	100	50
	>20 <30	4	2,000	1:30	75	40

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m<sup>2</sup>.

a. Additional requirements for rack storage heights in excess of those indicated shall be in accordance with rule 1301:7-7-23 of the Administrative Code. For solid-piled storage heights in excess of those indicated, an approved engineered design shall be used.

b. Vents adjacent to walls or draft curtains shall be located within a horizontal distance not greater than the maximum distance specified in this column as measured perpendicular to the wall or draft curtain that forms the perimeter of the draft curtained area.

c. Where draft curtains are not required, the vent area to floor area ratio shall

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be calculated based on a minimum draft curtain depth of 6 feet (Option 1).

d. "H" is the height of the vent, in feet, above the floor.

(a) 910.3.1 Design. Smoke and heat vents shall be listed and labeled to indicate compliance with UL 793 as listed in rule 1301:7-7-47 of the Administrative Code.

(b) 910.3.2 Vent operation. Smoke and heat vents shall be capable of being operated by approved automatic and manual means. Automatic operation of smoke and heat vents shall conform to the provisions of paragraphs (J)(3)(b)(i)(910.3.2.1) to (J)(3)(b)(iii)(910.3.2.3) of this rule.

(i) 910.3.1.1 Gravity-operated drop out vents. Automatic smoke and heat vents containing heat-sensitive glazing designed to shrink and drop out of the vent opening when exposed to fire shall fully open within 5 minutes after the vent cavity is exposed to a simulated fire represented by a time-temperature gradient that reaches an air-temperature of 500°F (260°C) within 5 minutes.

(ii) 910.3.1.2 Sprinklered buildings. Where installed in buildings equipped with an approved automatic sprinkler system, smoke and heat vents shall be designed to operate automatically.

(iii) 910.3.1.3 Nonsprinklered buildings. Where installed in buildings not equipped with an approved automatic sprinkler system, smoke and heat vents shall operate automatically by actuation of a heat-responsive device rated at between 100°F (56°C) and 220°F (122°C) above ambient.

Exception: Gravity-operated drop out vents complying with paragraphs (J)(3)(b)(i)(910.3.2.1) of this rule.

(c) 910.3.3 Vent dimensions. The effective venting area shall not be less than 16 square feet (1.5 m<sup>2</sup>) with no dimension less than 4 feet (1219 mm), excluding ribs or gutters having a total width not exceeding 6 inches (152 mm).

(d) 910.3.4 Vent locations. Smoke and heat vents shall be located 20 feet (6096 mm) or more from adjacent lot lines and fire walls and 10 feet (3048 mm) or more from fire barriers. Vents shall be uniformly located within the roof in the areas of the building where the vents are required to be installed by paragraph (J)(2)(910.2) of this rule with consideration given to roof pitch, draft curtain location, sprinkler location and structural members.

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(e) 910.3.5 Draft curtains. Where required by Table 910.3 of this rule, draft curtains shall be installed on the underside of the roof in accordance with this paragraph.

Exception: Where areas of buildings are equipped with "ESFR" sprinklers, draft curtains shall not be provided within these areas. Draft curtains shall only be provided at the separation between the "ESFR" sprinklers and the non-"ESFR" sprinklers.

(i) 910.3.5.1 Construction. Draft curtains shall be constructed of sheet metal, lath and plaster, gypsum board or other approved materials which provide equivalent performance to resist the passage of smoke. Joints and connections shall be smoke tight.

(ii) 910.3.5.2 Location and depth. The location and minimum depth of draft curtains shall be in accordance with Table 910.3 of this rule.

(4) 910.4 Mechanical smoke exhaust. Where approved by the fire code official pursuant to paragraph (A)(1)(901.1) of this rule, engineered mechanical smoke exhaust shall be an acceptable alternative to smoke and heat vents. At locations or in structures not regulated by the building code as listed in rule 1301:7-7-47 of the Administrative Code, the mechanical smoke exhaust shall be approved by the fire code official prior to system installation.

(a) 910.4.1 Location. Exhaust fans shall be uniformly spaced within each draft-curtained area and the maximum distance between fans shall not be greater than 100 feet (30 480 mm).

(b) 910.4.2 Size. Fans shall have a maximum individual capacity of 30,000 cfm (14.2 m<sup>3</sup>/s). The aggregate capacity of smoke exhaust fans shall be determined by the equation:

$$C = A \times 300 \text{ (Equation 9-4)}$$

where:

C = Capacity of mechanical ventilation required, in cubic feet per minute (m<sup>3</sup>/s).

A = Area of roof vents provided in square feet (m<sup>2</sup>) in accordance with Table 910.3 of this rule.

(c) 910.4.3 Operation. Mechanical smoke exhaust fans shall be automatically activated by the automatic sprinkler system or by heat detectors having operating characteristics equivalent to those described in paragraph (J)(3)(b)(910.3.2) of this rule. Individual manual controls of each fan

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unit shall also be provided.

- (d) 910.4.4 Wiring and control. Wiring for operation and control of smoke exhaust fans shall be connected ahead of the main disconnect and protected against exposure to temperatures in excess of 1,000°F (538°C) for a period of not less than 15 minutes. Controls shall be located so as to be immediately accessible to the fire service from the exterior of the building and protected against interior fire exposure by not less than 1-hour fire barriers constructed in accordance with section 707 of the building code as listed in rule 1301:7-7-47 of the Administrative Code or horizontal assemblies constructed in accordance with section 712 of the building code as listed in rule 1301:7-7-47 of the Administrative Code, or both.
- (e) 910.4.5 Supply air. Supply air for exhaust fans shall be provided at or near the floor level and shall be sized to provide a minimum of 50 per cent of required exhaust. Openings for supply air shall be uniformly distributed around the periphery of the area served.
- (f) 910.4.6 Interlocks. On combination comfort air-handling/smoke removal systems or independent comfort air-handling systems, fans shall be controlled to shut down in accordance with the approved smoke control sequence.
- (5) 910.5 Manually activated smoke exhaust system. A manually activated smoke exhaust system shall be an acceptable alternate to smoke and heat vents and to allow for the increased travel distance option provided in paragraph (P)(3)(1016.3) of rule 1301:7-7-10 of the Administrative Code.
- (a) 910.5.1 Location. Exhaust fans shall be uniformly spaced throughout the Group F-1 or S-1 portion of the building.
- (b) 910.5.2 Size. Fans shall have a maximum individual capacity of 50,000 cubic feet per minute (cfm) and provide a minimum of two air changes per hour.
- (c) 910.5.3 Operation. Smoke exhaust fans shall be manually activated by individual manual controls.
- (d) 910.5.4 Wiring and control. Wiring for operation and control of smoke exhaust fans shall be connected ahead of the main disconnect and protected against exposure to temperatures in excess of 1000 degrees F. (538 degrees C.) for a period of not less than 15 minutes. Controls shall be located so as to be immediately accessible to the fire service from the exterior of the building and protected against interior fire exposure by not less than 1-hour fire barriers constructed in accordance with Section 707 of the building code as listed in rule 1301:7-7-47 of the

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Administrative Code or horizontal assemblies constructed in accordance with Section 712 of the building code as listed in rule 1301:7-7-47 of the Administrative Code, or both.

(e) 910.5.5 Supply air. Supply air for exhaust fans shall be provided at or near the floor level and shall be sized to provide a minimum of 50 per cent of required exhaust. Supply air for exhaust fans shall be uniformly distributed around the periphery of the area served.

(f) 910.5.6 Interlocks. Combination comfort air-handling/manually activated smoke exhaust systems are permitted. In combination comfort air-handling/manually activated smoke exhaust systems or independent comfort air-handling systems, the comfort air-handling system fans shall be controlled to automatically shut down upon duct or area smoke detector activation or sprinkler system water flow as specified in the approved manually activated smoke exhaust system sequence of operation.

#### (K) Section 911 Explosion control

(1) 911.1 General. Explosion control shall be provided in the following locations:

(a) Where a structure, room or space is occupied for purposes involving explosion hazards as identified in Table 911.1 of this rule.

(b) Where quantities of hazardous materials specified in Table 911.1 of this rule exceed the maximum allowable quantities in Table 2703.1.1(1) of rule 1301:7-7-27 of the Administrative Code.

Such areas shall be provided with explosion (deflagration) venting, explosion (deflagration) prevention systems, or barricades in accordance with this paragraph and NFPA 69, or NFPA 495 as listed in rule 1301:7-7-47 of the Administrative Code as applicable. Deflagration venting shall not be utilized as a means to protect buildings from detonation hazards.

**Table 911.1  
Explosion control requirements**

Material	Class	Explosion control methods	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
<b>Hazard category</b>			
Combustible dusts <sup>a</sup>	-----	Not required	Required
Cryogenic fluids	Flammable	Not required	Required
Explosives	Division 1.1	Required	Not required
	Division 1.2	Required	Not required
	Division 1.3	Not required	Required
	Division 1.4	Not required	Required
	Division 1.5	Required	Not required
	Division 1.6	Required	Not required
Flammable gas	Gaseous	Not required	Required
	Liquefied	Not required	Required
Flammable liquids	IA <sup>b</sup>	Not required	Required
	IB <sup>c</sup>	Not required	Required
Organic peroxides	U <u>Unclassified</u>	Required	Not permitted
	<u>detonable</u> I	Required	Not permitted
Oxidizer liquids and solids	4	Required	Not permitted
Pyrophoric	Gases	Not required	Required
Unstable (reactive)	4	Required	Not permitted
	3 detonable	Required	Not permitted
	3 nondetonable	Not required	Required
Water-reactive liquids and solids	3	Not required	Required
	2 <sup>e</sup>	Not required	Required
<b>Special uses</b>			
Acetylene generator rooms	-----	Not required	Required
Grain processing	-----	Not required	Required
Liquefied petroleum gas distribution facilities	-----	Not required	Required
Where explosion hazards exist <sup>d</sup>	Detonation	Required	Not permitted
	Deflagration	Not required	Required

a. Combustible dusts that are generated during manufacturing or processing. See definition of combustible dust in rule 1301:7-7-02 of the Administrative Code.

b. Storage or use.

c. In open use or dispensing.

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d. Rooms containing dispensing and use of hazardous materials when an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a results of the dispensing or use process.

e. A method of explosion control shall be provided when Class 2 water-reactive materials can form potentially explosive mixtures.

(2) 911.2 Required deflagration venting. Areas that are required to be provided with deflagration venting shall comply with the following:

(a) Walls, ceilings and roofs exposing surrounding areas shall be designed to resist a minimum internal pressure of 100 pounds per square foot (psf) (4788 Pa). The minimum internal design pressure shall not be less than five times the maximum internal relief pressure specified in paragraph (K)(2)(e)(911.2) of this rule.

(b) Deflagration venting shall be provided only in exterior walls and roofs.

Exception: Where sufficient exterior wall and roof venting cannot be provided because of inadequate exterior wall or roof area, deflagration venting shall be allowed by specially designed shafts vented to the exterior of the building.

(c) Deflagration venting shall be designed to prevent unacceptable structural damage. When relieving a deflagration, vent closures shall not produce projectiles of sufficient velocity and mass to cause life threatening injuries to the occupants or other persons on the property or adjacent public ways.

(d) The aggregate clear area of vents and venting devices shall be governed by the pressure resistance of the construction assemblies specified in paragraph (K)(2)(a)(911.2.1) of this rule and the maximum internal pressure allowed by paragraph (K)(2)(e)(911.2.5) of this rule.

(e) Vents shall be designed to withstand loads in accordance with the building code as listed in rule 1301:7-7-47 of the Administrative Code. Vents shall consist of any one or any combination of the following to relieve at a maximum internal pressure of 20 pounds per square foot (psf) (958 Pa), but not less than the loads required by the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(i) Exterior walls designed to release outward.

(ii) Hatch covers.

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(iii) Outward swinging doors.

(iv) Roofs designed to uplift.

(v) Venting devices listed for the purpose.

(f) Vents designed to release from the exterior walls or roofs of the building when venting a deflagration shall discharge directly to the exterior of the building where an unoccupied space not less than 50 feet (15 240 mm) in width is provided between the exterior walls of the building and the property line.

Exception: Vents complying with paragraph (K)(2)(g)(911.2.7) of this rule.

(g) Vents designed to remain attached to the building when venting a deflagration shall be so located that the discharge opening shall not be less than 10 feet (3048 mm) vertically from window openings and exits in the building and 20 feet (6096 mm) horizontally from exits in the building, from window openings and exits in adjacent buildings on the same property, and from the property line.

(h) Discharge from vents shall not be into the interior of the building.

(3) 911.3 Explosion prevention systems. Explosion prevention systems shall be of an approved type and installed in accordance with the provisions of this code and NFPA 69 as listed in rule 1301:7-7-47 of the Administrative Code.

(4) 911.4 Barricades. Barricades shall be designed and installed in accordance with NFPA 495 as listed in rule 1301:7-7-47 of the Administrative Code.

(L) Section 912 Fire department connections

(1) 912.1 Installation. Fire department connections shall be installed in accordance with the NFPA standard applicable to the system design and shall comply with paragraphs (L)(2)(912.2) to (L)(6)(912.6) of this rule.

Exceptions: Fire department connections are not required for:

1. Limited area sprinkler systems supplied from the domestic water system.

2. Automatic sprinkler systems having less than twenty sprinklers.

(2) 912.2 Location. With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for

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other fire apparatus. The location of the fire department connections shall be approved by the fire code official. After approving the location of the fire department connection(s), the fire code official shall submit his approval to the building code official of the certified building department having jurisdiction.

(a) 912.2.1 Visible location. Fire department connections shall be located on the street side of buildings, fully visible and recognizable from the street or nearest point of fire department vehicle access or otherwise approved by the fire code official. If the fire code official approves a fire department connection location that does not meet the above criteria, the fire code official shall provide this input to the building code official of the certified building department having jurisdiction.

(b) 912.2.2 Existing buildings. On existing buildings, wherever the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an approved sign mounted on the street front or on the side of the building. Such sign shall have the letters "FDC" at least 6 inches (152 mm) high and words in letters at least 2 inches (51 mm) high or an arrow to indicate the location. All such signs shall be subject to the approval of the fire code official.

(3) 912.3 Access. Immediate access to fire department connections shall be maintained at all times and without obstruction by fences, bushes, trees, walls or any other fixed or moveable object. Access to fire department connections shall be approved by the fire code official.

Exception: Fences, where provided with an access gate equipped with a sign complying with the legend requirements of paragraph (L)(4)(912.4) of this rule and a means of emergency operation. The gate and the means of emergency operation shall be approved by the fire code official and maintained operational at all times.

(a) 912.3.1 Locking fire department connection caps. The fire code official is authorized to require locking caps on fire department connections for water-based fire protection systems where the responding fire department carries appropriate key wrenches for removal. The fire code official shall notify the building official of the requirement for locking fire department connection caps.

(b) 912.3.2 Clear space around connections. A working space of not less than 36 inches (762 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided and maintained in front of and to the sides of wall-mounted fire department connections and around the circumference of free-standing fire department connections.

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except as otherwise required or approved by the fire code official. The fire code official shall notify the building code official of the certified building department having jurisdiction of any conditions approved by the fire code official that exceed the minimum requirements contained in this paragraph.

(c) 912.3.3 Physical protection. Where fire department connections are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with paragraph (L)(312) of rule 1301:7-7-03 of the Administrative Code.

(4) 912.4 Signs. A metal sign with raised letters at least 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: "AUTOMATIC SPRINKLERS" or "STANDPIPES" or "TEST CONNECTION" or a combination thereof as applicable. Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.

(5) 912.5 Backflow protection. The potable water supply to automatic sprinkler and standpipe systems shall be protected against backflow as required by the plumbing code as listed in rule 1301:7-7-47 of the Administrative Code.

(6) 912.6 Inspection, testing and maintenance. All fire department connections shall be periodically inspected, tested and maintained in accordance with NFPA 25 as listed in rule 1301:7-7-47 of the Administrative Code.

(M) Section 913 Fire pumps

(1) 913.1 General. Where provided, fire pumps shall be installed in accordance with this paragraph and NFPA 20 as listed in rule 1301:7-7-47 of the Administrative Code.

(a) 913.1.1 Minimum suction pressure to be maintained. When a fire pump is installed, the "Ohio Environmental Protection Agency" requires the installation of a low pressure cut-off or a low suction throttling valve to ensure that a minimum of 10 psi is maintained in the suction line while the pump is operating in accordance with rule 3745-95-07 of the Administrative Code.

(2) 913.2 Protection against interruption of service. The fire pump, driver and controller shall be protected in accordance with NFPA 20 as listed in rule 1301:7-7-47 of the Administrative Code against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism and other adverse conditions.

(a) 913.2.1 Protection of fire pump rooms. Rooms where fire pumps are

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located shall be separated from all other areas of the building in accordance with section 913.2.1 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(3) 913.3 Temperature of pump room. Suitable means shall be provided for maintaining the temperature of a pump room or pump house, where required, above 40°F (5°C).

(a) 913.3.1 Engine manufacturer's recommendation. Temperature of the pump room, pump house or area where engines are installed shall never be less than the minimum recommended by the engine manufacturer. The engine manufacturer's recommendations for oil heaters shall be followed.

(4) 913.4 Valve supervision. Where provided, the fire pump suction, discharge and bypass valves, and the isolation valves on the backflow prevention device or assembly shall be supervised open by one of the following methods.

1. Central-station, proprietary or remote-station signaling service.

2. Local signaling service that will cause the sounding of an audible signal at a constantly attended location.

3. Locking valves open.

4. Sealing valves and approved weekly record inspection where valves are located within fenced enclosures under the control of the owner.

(a) 913.4.1 Test outlet valve supervision. Fire pump test outlet valves shall be supervised in the closed position.

(5) 913.5 Testing and maintenance. Fire pumps shall be inspected, tested and maintained in accordance with the requirements of this paragraph and NFPA 25 as listed in rule 1301:7-7-47 of the Administrative Code.

(a) 913.5.1 Acceptance test. Acceptance testing shall be done in accordance with the requirements of NFPA 20 as listed in rule 1301:7-7-47 of the Administrative Code.

(b) 913.5.2 Generator sets. Engine generator sets supplying emergency or standby power to fire pump assemblies shall be periodically tested in accordance with NFPA 110 as listed in rule 1301:7-7-47 of the Administrative Code. Written records of such tests shall meet the requirements of paragraph (D)(3)(b)(604.3.2) of rule 1301:7-7-06 of the Administrative Code.

(c) 913.5.3 Transfer switches. Automatic transfer switches shall be

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periodically tested in accordance with NFPA 110 as listed in rule 1301:7-7-47 of the Administrative Code. Written records of such tests shall meet the requirements of paragraph (D)(3)(b)(604.3.2) of rule 1301:7-7-06 of the Administrative Code.

(d) 913.5.4 Pump room environmental conditions. Tests of pump room environmental conditions, including heating, ventilation and illumination shall be made to ensure proper manual or automatic operation of the associated equipment.

(N) Section 914 Fire protection based on special detailed requirements of use and occupancy

(1) 914.1 General. This paragraph shall specify where fire protection systems are required based on the detailed requirements of use and occupancy of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(2) 914.2 Covered mall buildings. Covered mall buildings shall comply with paragraphs (N)(2)(a)(914.2.1) to (N)(2)(d)(914.2.4) of this rule.

(a) 914.2.1 Automatic sprinkler system. The covered mall building and buildings connected shall be equipped throughout with an automatic sprinkler system in accordance with paragraph (C)(1)(a)(903.1.1) of this rule, which shall comply with the following:

(i) The automatic sprinkler system shall be complete and operative throughout occupied space in the covered mall building prior to occupancy of any of the tenant spaces. Unoccupied tenant spaces shall be similarly protected unless provided with approved alternative protection.

(ii) Sprinkler protection for the mall shall be independent from that provided for tenant spaces or anchors. Where tenant spaces are supplied by the same system, they shall be independently controlled.

Exception: An automatic sprinkler system shall not be required in spaces or areas of open parking garages constructed in accordance with section 406.2 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(b) 914.2.2 Standpipe system. The covered mall building shall be equipped throughout with a standpipe system in accordance with paragraph (E)(905) of this rule.

(c) 914.2.3 Emergency voice/alarm communication system. Covered mall buildings exceeding 50,000 square feet (4645 m<sup>2</sup>) in total floor area

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shall be provided with an emergency voice/alarm communication system. Emergency voice/alarm communication systems serving a mall, required or otherwise, shall be accessible to the fire department. The system shall be provided in accordance with paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule.

(d) 914.2.4 Fire department access to equipment. Rooms or areas containing controls for air-conditioning systems, automatic fire-extinguishing systems or other detection, suppression or control elements shall be identified for use by the fire department.

(3) 914.3 High-rise buildings. High-rise buildings shall comply with paragraphs (N)(3)(a)(914.3.1) to (N)(3)(e)(914.3.5) of this rule.

(a) 914.3.1 Automatic sprinkler system. Buildings and structures shall be equipped throughout with an automatic sprinkler system in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule and a secondary water supply where required by paragraph (C)(3)(e)(ii)(903.3.5.2) of this rule.

Exception: An automatic sprinkler system shall not be required in spaces or areas of:

1. Open parking garages in accordance with section 406.3 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

2. Telecommunication equipment buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an automatic fire detection system in accordance with paragraph (G)(2)(907.2) of this rule and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with section 707 of the building code as listed in rule 1301:7-7-47 of the Administrative Code or not less than 2-hour horizontal assemblies constructed in accordance with section 712 of the building code as listed in rule 1301:7-7-47 of the Administrative Code, or both.

(i) 914.3.1.1 Number of sprinkler risers and system design. Each sprinkler system zone in buildings that are more than 420 feet (128 m) in height shall be supplied by a minimum of two risers. Each riser shall supply sprinklers on alternate floors. If more than two risers are provided for a zone, sprinklers on adjacent floors shall not be supplied from the same riser.

(a) 914.3.1.1.1 Riser location. Sprinkler risers shall be placed in stair enclosures which are remotely located in accordance

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with paragraph (O)(2)(1015.2) of rule 1301:7-7-10 of the Administrative Code.

(ii) 914.3.1.2 Water supply to required fire pumps. Required fire pumps shall be supplied by connections to a minimum of two water mains located in different streets. Separate supply piping shall be provided between each connection to the water main and the pumps. Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

Exception: Two connections to the same main shall be permitted provided the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through at least one of the connections.

(b) 914.3.2 Fire alarm system. A fire alarm system shall be provided in accordance with paragraph (G)(2)(m)(907.2.13) of this rule.

(c) 914.3.3 Automatic smoke detection. Smoke detection shall be provided in accordance with paragraph (G)(2)(m)(i)(907.2.13.1) of this rule.

(d) 914.3.4 Emergency voice/alarm communication system. An emergency voice/alarm communication system shall be provided in accordance with paragraph (G)(6)(b)(ii)(907.6.2.2) of this rule.

(e) 914.3.5 Emergency responder radio coverage. Emergency responder radio coverage shall be provided in accordance with paragraph (J)(510) of rule 1301:7-7-05 of the Administrative Code.

(f) 914.3.6 Fire command. A fire command center complying with paragraph (H)(508) of rule 1301:7-7-05 of the Administrative Code shall be provided in a location approved by the fire department.

(4) 914.4 Atriums. Atriums shall comply with paragraphs (N)(4)(a)(914.4.1) and (N)(4)(b)(914.4.2) of this rule.

(a) 914.4.1 Automatic sprinkler system. An approved automatic sprinkler system shall be installed throughout the entire building.

Exceptions:

1. That area of a building adjacent to or above the atrium need not be sprinklered, provided that portion of the building is separated from the atrium portion by not less than a 2-hour fire barrier constructed in accordance with section 707 of the building code as listed in rule 1301:7-7-47 of the Administrative Code or horizontal assemblies

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constructed in accordance with section 712 of the building code as listed in rule 1301:7-7-47 of the Administrative Code, or both.

2. Where the ceiling of the atrium is more than 55 feet (16 764 mm) above the floor, sprinkler protection at the ceiling of the atrium is not required.

(b) 914.4.2 Fire alarm system. A fire alarm system shall be provided where required by paragraph (G)(2)(n)(907.2.14) of this rule.

(5) 914.5 Underground buildings. Underground buildings shall comply with paragraphs (N)(5)(a)(914.5.1) to (N)(5)(e)(914.5.5) of this rule.

(a) 914.5.1 Automatic sprinkler system. The highest level of exit discharge serving the underground portions of the building and all levels below shall be equipped with an automatic sprinkler system installed in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule. Water-flow switches and control valves shall be supervised in accordance with paragraph (C)(4)(903.4) of this rule.

(b) 914.5.2 Smoke control system. A smoke control system is required to control the mitigation of products of combustion in accordance with paragraph (I)(909) of this rule and provisions of this paragraph. Smoke control shall restrict movement of smoke to the general area of fire origin and maintain means of egress in a usable condition.

(c) 914.5.3 Compartment smoke control system. Where compartmentation is required by section 405.4 of the building code as listed in rule 1301:7-7-47 of the Administrative Code, each compartment shall have an independent smoke-control system. The system shall be automatically activated and capable of manual operation in accordance with paragraph (G)(2)(r)(907.2.18) of this rule.

(d) 914.5.4 Fire alarm system. A fire alarm system shall be provided where required by paragraph (G)(2)(s)(907.2.19) of this rule.

(e) 914.5.5 Standpipe system. The underground building shall be provided throughout with a standpipe system in accordance with paragraph (E)(905) of this rule.

(6) 914.6 Stages. Stages shall comply with paragraphs (N)(6)(a)(914.6.1) and (N)(6)(b)(914.6.2) of this rule.

(a) 914.6.1 Automatic sprinkler system. Stages shall be equipped with an automatic fire-extinguishing system in accordance with this rule. Sprinklers shall be installed under the roof and gridiron and under all

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catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

Exceptions:

1. Sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height utilized exclusively for storage of tables and chairs, provided the concealed space is separated from the adjacent spaces by not less than 5/8-inch (15.9 mm) Type X gypsum board.

2. Sprinklers are not required for stages 1,000 square feet (93 m<sup>2</sup>) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.

3. Sprinklers are not required within portable orchestra enclosures on stages.

(b) 914.6.2 Standpipe system. Standpipe systems shall be provided in accordance with paragraph (E)(905) of this rule.

(7) 914.7 Special amusement buildings. Special amusement buildings shall comply with paragraphs (N)(7)(a)(914.7.1) and (N)(7)(b)(914.7.2) of this rule.

(a) 914.7.1 Automatic sprinkler system. Special amusement buildings shall be equipped throughout with an automatic sprinkler system in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule. Where the special amusement building is temporary, the sprinkler water supply shall be of an approved temporary means.

Exception: Automatic sprinklers are not required where the total floor area of a temporary special amusement building is less than 1,000 square feet (93 m<sup>2</sup>) and the travel distance from any point to an exit is less than 50 feet (15 240 mm).

(b) 914.7.2 Automatic smoke detection. Special amusement buildings shall be equipped with an automatic smoke detection system in accordance with paragraph (G)(2)(l)(907.2.12) of this rule.

(8) 914.8 Aircraft-related occupancies. Aircraft-related occupancies shall comply with paragraphs (N)(8)(a)(914.8.1) to (G)(2)(e)(914.8.5) of this rule.

(a) 914.8.1 Automatic smoke detection systems. Airport traffic control towers shall be provided with an automatic smoke detection system installed in accordance with paragraph (G)(2)(v)(907.2.22) of this rule.

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(b) 914.8.2 Fire suppression. Aircraft hangars shall be provided with a fire suppression system designed in accordance with NFPA 409 as listed in rule 1301:7-7-47 of the Administrative Code, based upon the classification for the hangar given in Table 914.8.2 of this rule.

Exception: When a fixed base operator has separate repair facilities on site, Group II hangars, operated by a fixed base operator used for storage of transient aircraft only, shall have a fire suppression system, but the system shall be exempt from foam requirements.

**Table 914.8.2**  
**Hangar fire suppression requirements<sup>a,b,c</sup>**

Maximum single fire area, square feet (m <sup>2</sup> )	Building code as listed in rule 1301:7-7-47-Type of construction								
	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
>40,001	Group I	Group I	Group I	Group I	Group I	Group I	Group I	Group I	Group I
40,000	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II
30,000	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II
20,000	Group III	Group III	Group II	Group II	Group II	Group II	Group II	Group II	Group II
15,000	Group III	Group III	Group III	Group II	Group III	Group II	Group III	Group II	Group II
12,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group II	Group II
8,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group II
5,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 foot = 304.8 mm.

a. Aircraft hangars with a door height greater than 28 feet shall be provided with fire suppression for a Group I hangar regardless of maximum fire area.

b. Groups shall be as classified in accordance with NFPA 409 as listed in rule 1301:7-7-47 of the Administrative Code.

c. Membrane structures complying with section 3102 of the building code as listed in rule 1301:7-7-47 of the Administrative Code shall be classified as a Group IV hangar.

(i) 914.8.2.1 Hazardous operations. Any Group III aircraft hangar according to Table 914.8.2 of this rule that contains hazardous

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operations including, but not limited to, the following shall be provided with a Group I or Group II fire suppression system in accordance with NFPA 409 as listed in rule 1301:7-7-47 of the Administrative Code as applicable:

(a) Doping.

(b) Hot working including, but not limited to, welding, torch cutting and torch soldering.

(c) Fuel transfer.

(d) Fuel tank repair or maintenance not including defueled tanks per NFPA 409 as listed in rule 1301:7-7-47 of the Administrative Code, inerted tanks or tanks that have never been fueled.

(e) Spray finishing operations.

(f) Total fuel capacity of all aircraft within the unsprinklered single fire area in excess of 1,600 gallons (6057 L).

(g) Total fuel capacity of all aircraft within the maximum single fire area in excess of 7,500 gallons (28 390 L) for a hangar equipped throughout with an automatic fire sprinkler system in accordance with paragraph (C)(3)(a)(i)(903.3.1.1) of this rule.

(ii) 914.8.2.2 Separation of maximum single fire areas. Maximum single fire areas established in accordance with hangar classification and construction type in Table 914.8.2 of this rule shall be separated by 2-hour fire walls constructed in accordance with section 706 of the building code as listed in rule 1301:7-7-47 of the Administrative Code.

(c) 914.8.3 Finishing. The processing of "doping," involving the use of a volatile flammable solvent, or of painting shall be carried on in a separate detached building equipped with automatic fire-extinguishing equipment in accordance with paragraph (C)(903) of this rule.

(d) 914.8.4 Residential aircraft hangar smoke alarms. Smoke alarms shall be provided within residential aircraft hangars in accordance with paragraph (G)(2)(u)(907.2.21) of this rule.

(e) 914.8.5 Aircraft paint hangar fire suppression. Aircraft paint hangars shall be provided with fire suppression as required by NFPA 409 as listed in rule 1301:7-7-47 of the Administrative Code.

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- (9) 914.9 Application of flammable finishes. An automatic fire-extinguishing system shall be provided in all spray, dip and immersing spaces and storage rooms, and shall be installed in accordance with this rule.
- (10) 914.10 Drying rooms. Drying rooms designed for high-hazard materials and processes, including special occupancies as provided for in Chapter 4 of the building code as listed in rule 1301:7-7-47 of the Administrative Code, shall be protected by an approved automatic fire-extinguishing system complying with the provisions of this rule.
- (11) 914.11 Group B ambulatory health care facilities. Occupancies classified as Group B ambulatory health care facilities shall comply with paragraphs (N)(11)(a)(914.11.1) to (N)(11)(c)(914.11.3) of this rule.
- (a) 914.11.1 Automatic sprinkler systems. An automatic sprinkler system shall be provided for Group B ambulatory health care facilities in accordance with paragraph (C)(2)(b)(903.2.2) of this rule.
- (b) 914.11.2 Manual fire alarm systems. A manual fire alarm system shall be provided for Group B ambulatory care facilities in accordance with paragraph (G)(2)(b)(907.2.2) of this rule.
- (c) 914.11.3 Fire alarm systems. An automatic smoke detection system shall be provided for Group B ambulatory care facilities in accordance with paragraph (G)(2)(b)(i)(907.2.2.1) of this rule.

(O) Section 915 Fire protection and fire fighting equipment certification

- (1) 915.1 No person shall sell, offer for sale, or use any fire protection or fire fighting equipment which does not meet the minimum standards for such equipment as specified in this code.
- (2) 915.2 Except for public and private mobile fire trucks, no person shall engage in the business of servicing, testing, repairing, or installing fire protection or fire fighting equipment for profit without first being certified by the state fire marshal, as required by section 3737.65 of the Revised Code and this code.
- (3) 915.3 Terms defined for this paragraph. The following words take on exclusive meanings as used in this paragraph of this rule only.

"Company." Any individual, sole proprietorship, partnership, association, or corporation certified pursuant to this rule.

"Provisional individual." Any person enrolled in a bona fide apprenticeship training program registered with the apprenticeship council pursuant to section 4139.08 of the Revised Code or with the bureau of apprenticeship and

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training of the United States department of labor.

(4) 915.4 Individual and provisional individual certification. Upon satisfactory application and examination pursuant to paragraph (O)(6)(915.6) of this rule, the state fire marshal may certify any individual or provisional individual to service, test, repair or install fire protection or fire fighting equipment in the following categories:

(a) Automatic sprinkler and standpipe systems;

(b) Fire service mains and water tanks;

Exception: Excavation and earth moving equipment operators are not required to be certified in this category provided the work they perform to meet the requirements of NFPA 22 and 24 is conducted under the direct supervision and active direction of an individual certified in this category and who remains at the site during the work being performed.

(c) Fire pumps;

(d) Fire alarm and detection equipment;

(e) Household fire warning equipment only;

(f) Portable fire extinguishers;

(g) Engineered extinguishing equipment other than water;

(h) Pre-engineered extinguishing equipment other than water;

(i) Fire pump diesel technician;

(j) Aerosol extinguishing equipment; or

(k) Such other categories as deemed necessary by the state fire marshal.

(5) 915.5 "Satisfactory application" includes, but is not limited to:

(a) The provision to the state fire marshal of all information requested by the state fire marshal or required by this rule;

(b) The provision to the state fire marshal of documentation describing the applicant's recent work history relating to fire protection installer work or similar construction trade experience.

(6) 915.6 Those seeking certification to work on a particular engineered or

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pre-engineered system must show at least one of the following:

- (a) Proof from the manufacturer of training or approval to work on the manufacturer's engineered or pre-engineered system; or
  - (b) The applicant must have witnessed the code compliant installation of ten engineered or pre-engineered systems within two years immediately prior to making application and provide documentation listing license number of individual performing such installations, type of system, date and location of installation.
- (7) 915.7 Except for provisional individuals, the state fire marshal shall require all applicants to obtain a passing grade of at least seventy per cent on a fire protection installer examination administered by the state fire marshal prior to certification.
- (8) 915.8 An individual may only work in those categories for which he has been certified pursuant to paragraph (O)(4)(915.4) of this rule.
- (9) 915.9 An individual must be a company certified pursuant to paragraph (O)(4)(915.4) of this rule or must be associated with a certified company when such individual engages in the business of servicing, testing, repairing or installing fire protection or fire fighting equipment for profit.
- (10) 915.10 Individuals may only work on those particular engineered or pre-engineered systems for which the individual has recent experience or education to show competence and has provided documentation thereof to the state fire marshal.
- (11) 915.11 Every certified individual shall carry the certificate issued pursuant to paragraph (O)(915) of this rule on their person while engaging in the business of servicing, testing, repairing or installing fire protection or fire fighting equipment for profit and produce the certificate for inspection upon request by the fire code official.
- (12) 915.12 A provisional individual must be supervised by a certified individual at all times such provisional individual is engaging in work requiring certification. The certified individual directly supervising the individual issued the provisional certificate shall only supervise one provisional certificate holder while engaging in work requiring certification. The certified individual directly supervising the provisional certificate holder shall possess a valid and current certificate for the certification category of the work being performed.
- (13) 915.13 Applications for certification and renewals shall be made on forms provided by the state fire marshal. All applications and renewals shall be accompanied by the appropriate fee, to be made payable to, "Treasurer, State

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of Ohio."

(14) 915.14 Original application for certification and renewal of an individual or provisional individual shall, at a minimum, include the following:

(a) Name of applicant;

(b) Categories for which applicant is seeking certification;

(c) If a non-resident, an irrevocable consent to legal service in Ohio (needed for original application only);

(d) If for a provisional individual, a copy of the indenture agreement;

(e) Documentation describing the applicant's recent work history relating to fire protection installer work or similar construction trade experience;  
and

(f) All information requested by the state fire marshal.

(15) 915.15 Fees for an individual or provisional certification shall be as follows:

(a) Original application for an individual or provisional individual shall be fifty dollars for each category for which certification is sought;

(b) Renewal of an individual or provisional individual shall be forty dollars;

(i) All renewal applications not submitted prior to the date of expiration shall be subject to a late fee of ten per cent of the assessed renewal fee.

(c) An application for a duplicate license shall be made in writing to the state fire marshal. The application for a duplicate license shall be accompanied by a ten dollar fee.

(16) 915.16 Applications for renewal must be received by the state fire marshal prior to the expiration date. Individual certification licenses and company certification of an individual operating alone expire in accordance with the following schedule:

(a) Last name beginning with "a-g" on January second of each year;

(b) Last name beginning with "h-m" on April first of each year;

(c) Last name beginning with "n-s" on July first of each year;

(d) Last name beginning with "t-z" on October first of each year.

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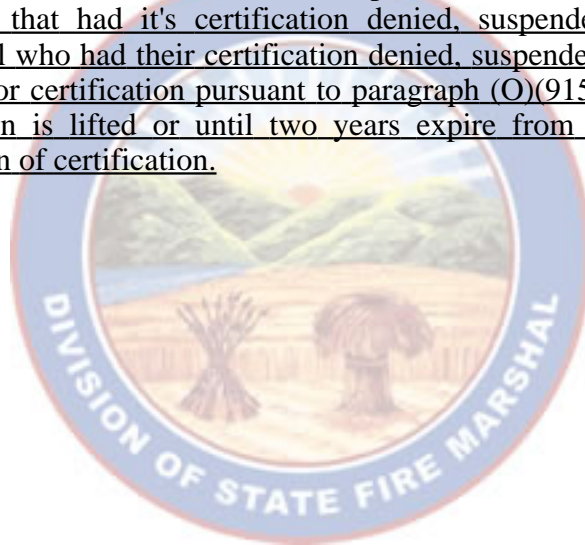
- (17) 915.17 Upon expiration of certification for a period exceeding sixty days, all applications for renewal shall be considered as a new application and the applicant shall be required to pass a fire protection installer examination administered by the state fire marshal prior to certification.
- (18) 915.18 Upon satisfactory application, the state fire marshal may certify any company to engage in the business of servicing, testing, repairing, and installing fire protection and fire fighting equipment. A company certification authorizes a company to engage in fire protection installer work requiring certification throughout its employees only for those fire protection installer categories for which its employees are certified pursuant to this rule.
- (19) 915.19 Original application for certification and renewal of a company shall, at a minimum, include the following:
- (a) Name of applicant;
  - (b) The primary business address of the company;
  - (c) Names of all persons responsible for the normal operations of the company (e.g., officers of the corporation, partners, etc.);
  - (d) Proof of liability insurance or bonding in an amount of at least fifty thousand dollars for completion and/or performance purposes;
  - (e) If a non-resident, an irrevocable consent to legal service in Ohio (needed for original application only); and
  - (f) All information required by the state fire marshal.
- (20) 915.20 Fees for a company certification shall be as follows:
- (a) Original application of a company shall be two hundred dollars, except that an individual operating as a company shall not be required to pay such fee.
  - (b) Renewal of a company shall be one hundred fifty dollars, except that an individual operating as a company shall not be required to pay such fee. All renewal applications not submitted prior to the date of expiration, shall be subject to a late fee of ten per cent of the assessed renewal fee.
  - (c) In the event that a valid license is lost or accidentally destroyed, an application for a duplicate license shall be made in writing to the state fire marshal. The application for a duplicate license shall be accompanied by a ten-dollar fee.

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- (21) 915.21 All company certification licenses expire June thirtieth of each year. Renewal shall be pursuant to standard renewal procedure.
- (22) 915.22 Any certified individual or certified company that changes the primary mailing address as previously filed with the state fire marshal or that experiences expiration of required insurance coverage, shall submit written notification of such change of address or insurance expiration to the state fire marshal within thirty days of the change of address or insurance expiration.
- (23) 915.23 An application for any certificate issued pursuant to paragraph (O)(915) of this rule may be denied, or a certificate issued pursuant to paragraph (O)(915) of this rule may be suspended or revoked, for cause by the state fire marshal. Denial, suspension or revocation for cause includes, but is not limited to, any of the following reasons:
- (a) For knowingly violating any provision of the "Ohio Building Code," the "Ohio Fire Code," or the Revised Code;
  - (b) For engaging in or permitting a person to engage in activity requiring certification, but for which activity the person is not certified;
  - (c) For gross negligence or gross incompetence;
  - (d) For knowingly making any misrepresentation or false promise, or for dishonest or illegal dealing;
  - (e) For a continued course of misrepresentation or the making of false promises individually, through employees or agents, through advertising, or otherwise;
  - (f) For failure to notify the state fire marshal of change of primary mailing address;
  - (g) In the case of a company, for failure to maintain the liability insurance or bonding in an amount of at least fifty thousand dollars for completion and/or performance purposes;
  - (h) In the case of a provisional individual, for failure to complete the apprenticeship program or failure to maintain enrollment in the apprenticeship training program; or
  - (i) In the case of a company, for failure to notify the state fire marshal upon expiration of the required insurance coverage or of any changes to the information required by paragraph (O)(22)(915.22) of this rule or for failure to provide satisfactory evidence documenting such changes to the required information.

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- (24) 915.24 The state fire marshal shall comply with the provisions of Chapter 119. of the Revised Code whenever denying, suspending or revoking a certificate pursuant to paragraph (O)(23)(915.23) of this rule.
- (25) No person who has been denied certification, or is under suspension or revocation of certificate pursuant to paragraph (O)(23)(915.23) of this rule, may be associated with any company certified pursuant to paragraph (O)(915) of this rule.
- (26) 915.26 If a certification is denied, or if a certification issued pursuant to paragraph (O)(915) of this rule is suspended or revoked, the company or individual shall immediately cease engaging in the business of servicing, testing, repairing or installing fire protection or fire fighting equipment for profit. If a certification is denied, suspended or revoked, that company or a company that had its certification denied, suspended or revoked, or an individual who had their certification denied, suspended or revoked, may not reapply for certification pursuant to paragraph (O)(915) of this rule until the suspension is lifted or until two years expire from the date of denial or revocation of certification.



Replaces: 1301:7-7-09

Effective:

R.C. 119.032 review dates:

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Certification

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Date

Promulgated Under: 119.03  
 Statutory Authority: 3737.22, 3737.82, 3737.83  
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 1/3/00, 9/1/05, 7/1/07

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